

Assessing Relationship between Type of Financial Market and Market Indices in Tehran Stock Exchange

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Abstract—The aim of this study was to examine and identify the type of Iranian financial market in terms of being symmetrical or asymmetrical and to measure relationship between type of market and the market's indices. In this study, daily information on the market's Share Price Index, Industrial Index and Top Fifty Most Active Companies during the years 1999-2010 has been used. In addition, to determine type of the financial market, rate of return on Security is taken into account. In this research, by using logistic regression analysis methods, relationship of the market type with the above mentioned indices have been examined. The results showed that the type of the financial market has a positive significant association with market share price index and Industrial Index. Index of Top Fifty Most Active Companies is significantly associated with type of financial market, however this relationship is inverse.

Keywords—All Share Price Index, Asymmetrical Market, Industrial Index, Symmetrical Market, Top Fifty Most Active Companies Index

I. INTRODUCTION

NUMEROUS researches have been carried out on impact the type of financial market (symmetric – asymmetric) may have on different variables of capital market. Estrada (2002) by inventing a model as Downside capital asset pricing model shows in asymmetric market condition, for determining the risk and expected rate of return, this method may have a more fitting estimation relative to Sharp Model. In addition, Krause and Litzenberger (1988) consider the effect of skewness in return distribution as a critical factor in investors' return [3].

In a research, Rahnamay Roodposhti and Alizadeh (2010) stated that type of financial market has effect on the capital market macro variables. Also VakiliFard and Derakhshan (2008) in a research found that type of financial market influences managers' decision in organization [10].

In the growing economy, investment managers are always looking for appropriate investment options in order to both achieve the expected return and to increase their wealth in the long run. Financial markets are one of the venues which can manifest investment motivation to investors. In financial

markets, investor through buying and selling financial assets (shares and bonds) makes investments. In this study, we examine and identify the type of Iranian financial market in terms of being symmetric and asymmetric and to measure relationship between type of market and the market's indices including share price index, industrial index and top fifty most active companies index in Tehran Stock Exchange. To find out the type of financial market and its relation with the market indices we answer this question, whether there is a significant association between type of financial market and the market's indices, through which mechanism and to what extent this relationship exist?

Early evidence in Iranian market indicates that this market is asymmetric. The factors causing the asymmetric market include changes in real risk-free interest rate of the economy, inflation rate and rewarding rate of possible risk. An asymmetric distribution is also known as a non-normal distribution or non - symmetric distribution. An asymmetrical distribution is an uneven (or imbalanced) data distribution around a central point. It is a probability distribution or frequency of data that is not symmetrical about the central value. An asymmetric distribution is one that is skewed to the right or the left. Symmetrical distributions are said to be balanced (to have symmetry). A symmetrical distribution has symmetry; it's called a "normal distribution".

Asymmetries may arise from differences in return expectations among investors about the potential international impact of changes in foreign stock markets (Erb et al., 1994; Odier and Solnik, 1993). Asymmetries may occur due to the investment strategies based on incomplete and irrelevant information. Such information set could lead to biased investments leading to irrational buying or selling. Asymmetries may also occur due to the unidentified component of risk which is priced in equity markets [2]-[8].

Fama and French (1992) suggest the existence of multidimensional risks associated with any stock. One dimension of risk is the unidentified risk which is nonetheless reflected in stock prices. However, the relationship between the unidentified components of risk with stock returns may not be linear and therefore may lead to dissimilar positive and negative returns to investors [6].

Downs and Ingram (2000) provide evidence in support of this argument and find that up market betas are not equal to down market betas in absolute terms [1]. Similarly, there is evidence in support of a positive (negative) relationship between betas and returns in an up (down) US market (Pettengill et al., 1995) and international equity market (Fletcher, 2000) [7]-[9].

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Rahnamay Roodposhti (2010), investigated condition of Iranian capital market in terms of being asymmetric or symmetric and determined its relationship with changes of price index and activity of the capital market on Tehran Stock Exchange during 1997-2009. In this research, Rahnamay Roodposhti introduced an approach to diagnose type of financial market which is determined using Estrada's (2002, 2005) theoretical concepts and based on Risk Premium Method ($R_m - R_f$) [4]-[5].

The present theory showed how financial market condition may affect changes in price index. On the other hand, it didn't specified effect of financial market on activity of capital market [10].

HYPOTHESIS

- 1) Type of financial market (symmetric – asymmetric) has significant and positive relationship with the market's share price index.
- 2) Type of financial market (symmetric –asymmetric) has significant and positive relationship with industrial index.
- 3) Type of financial market has significant and positive relationship with Top Fifty Most Active Companies Index.

II. METHODOLOGY

The used method in this research is of descriptive-survey type using historical data as the after-event-data, i.e. use of the past information. The required data has been gathered from Tehran Stock Exchange. In this research, size of statistical society is equal to size of statistical sample and the statistical society includes all the listed companies on Tehran Stock Exchange from 1998 through to 2009.

In this study, market's total index, industry index and index of the top 50 listed companies are considered as the independent variable, and type Iranian financial market as the dependent variable.

III. HYPOTHESIS TESTING

A. Specifying type of Financial Market

To determine and identify type of Iranian financial market in terms of being symmetric or asymmetric, risk-free rate of return is used. Risk-free rate of return is a rate received by investor in absence of risk. Risk-free rate of return in each period will be equal to the expected value, because variance is zero. Payment of this rate of return is guaranteed by government or other institutions. This rate varies depending on financial markets of different countries and according to the used financial tools. For this purpose, in this research, the interest rate on Iran Central Bank's short-term deposits is used. The reason for this is that the interest rate of short-term deposits does not comprise risk of time and on the other side they are guaranteed by bank and more importantly they are short-term and with macro-economic changes investors can receive the real interest rate. As was mentioned, the market's asymmetric condition is a result of the factors which while

influencing risk premium, affect the expected rate of return as well and hence eliminates the tradeoff between risk and return. Early evidence of Iranian capital market suggests asymmetry of this market. Factors causing asymmetric market condition include changes in real risk-free interest rate of economy, expected inflation rate and reward rate of the likely risk. In asymmetric market condition which is formed based on risk premium it is only enough to prove $R_f > R_m$. Thus, since risk premium is negative, Iranian market condition is asymmetric and if premium risk is positive, i.e. $R_m > R_f$, it can be concluded that Iranian market condition is symmetric.

Calculation of market return is done using the below relation:

$$R_m = \frac{P_2 - P_1}{P_1} \times 100$$

Where:

R_m = market return, P_2 = share price index in time t

P_1 = share price index in time t-1.

B. First Hypothesis

Type of financial market (symmetric – asymmetric) has significant and positive relationship with the market's share price index.

To investigate this hypothesis, logistic regression analysis has been used.

H_0 : Market's share price index has no positive effect on type of financial market.

H_1 : Market's share price index has positive effect on type of financial market.

$$\begin{cases} H_0 : \beta_x \leq 0 \\ H_1 : \beta_x > 0 \end{cases}$$

Based on the performed analysis, the index and the test statistic "Omnibus Tests of Model Coefficients" which measures about the whole model have an error probability less than 0.05. Hence, assessment of the overall model is acceptable and significant and its indices are shown in table I. Pseudo R^2 coefficient comprised of Cox and Snell R^2 and Nagelkerke R^2 is a value within 0.216 and 0.288 which indicate explanation power of financial market symmetry and asymmetry by the market's share price index is a value between 0.216 and 0.288 percent. Its indices are presented in table II. Wald Test index has shown that the independent variable has significant effect on the dependent variable. These results based on the calculated α (error possibility) have been found to be smaller than 0.05 for Wald Test. In two-sided logistic regression analysis, the criterion for rejecting or accepting significance of the independent variables' effect is the error level smaller than 0.05. In this model, the independent variable, market's share price index, which has an $\alpha < 0.05$ has significant effect on the dependent variable. Also considering that sign of β is positive, effect of the independent

variable on dependent variable is positive. In other words, since Sig. of the independent variable has been found to be equal to 0.000 which is smaller than the error possibility 0.05, the null hypothesis is rejected and the alternative hypothesis is confirmed. It is shown in table III. Therefore, type of financial market (symmetric – asymmetric) has significant and positive relationship with the market's share price index.

TABLE I

RESULT OF OMNIBUS TEST FOR TESTING THE WHOLE MODEL EVALUATION

	Chi-square	df	Sig.
Step	35.106	1	0
Block	35.106	1	0
Model	35.106	1	0

TABLE II

RESULT OF THE MODEL'S R² EXAMINATION

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
164.52	0.216	0.288

TABLE III

RESULT OF TESTING EFFECT OF INDEPENDENT VARIABLE ON DEPENDENT VARIABLE

Exp(B)	Sig.	df	Wald	S.E.	B	Variable
1	0	1	28.871	0	0	X1(Share Price Index)
7.19	0	1	22.145	0.419	1.973	Constant

C. Second Hypothesis

Type of financial market (symmetric –asymmetric) has significant and positive relationship with industrial index. To investigate this hypothesis, logistic regression analysis has been used.

H_0 : Industrial index has no positive effect on type of financial market.

H_1 : Industrial index has positive effect on type of financial market.

$$\begin{cases} H0 : \beta_x \leq 0 \\ H1 : \beta_x > 0 \end{cases}$$

Based on the performed analysis, the index and the test statistic "Omnibus Tests of Model Coefficients" which measures about the whole model have an error probability less than 0.05. Hence, assessment of the overall model is acceptable and significant and its indices are shown in table IV. Pseudo R² coefficient comprised of Cox and Snell R² and Nagelkerke R² is a value within 0.184 and 0.246 which indicate explanation power of financial market symmetry and asymmetry by the industrial index is a value between 0.184 and 0.246 percent. Its indices are presented in table V. Wald Test index has shown that the independent variable has significant effect on the dependent variable. These results

based on the calculated α have been found to be smaller than 0.05 for Wald Test. In two-sided logistic regression analysis, the criterion for rejecting or accepting significance of the independent variables' effect is the error level smaller than 0.05. In this model, the independent variable, industrial index, which has $\alpha < 0.05$, has significant effect on the dependent variable. Also considering that sign of β is positive, effect of the independent variable on dependent variable is positive. In other words, since Sig. of the independent variable has been found to be equal to 0.000 which is smaller than the error possibility 0.05, the null hypothesis is rejected and the alternative hypothesis is confirmed. It is shown in table VI. Therefore, type of financial market (symmetric – asymmetric) has significant and positive relationship with the industrial index.

TABLE IV

RESULT OF OMNIBUS TEST FOR TESTING THE WHOLE MODEL EVALUATION

	Chi-square	df	Sig.
Step	29.317	1	0
Block	29.317	1	0
Model	29.317	1	0

TABLE V

RESULT OF THE MODEL'S R² EXAMINATION

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
170.309	0.184	0.246

TABLE VI

RESULT OF TESTING EFFECT OF INDEPENDENT VARIABLE ON DEPENDENT VARIABLE

Exp(B)	Sig.	df	Wald	S.E.	B	Variable
1	0	1	24.873	0	0	X2(Industrial Index)
6.445	0	1	19.415	0.423	1.863	Constant

D. Third Hypothesis

Type of financial market has significant and positive relationship with Top Fifty Most Active Companies Index. To investigate this hypothesis, logistic regression analysis has been used.

H_0 : Top Fifty Most Active Companies Index has no positive effect on type of financial market.

H_1 : Top Fifty Most Active Companies Index has positive effect on type of financial market.

$$\begin{cases} H0 : \beta_x \leq 0 \\ H1 : \beta_x > 0 \end{cases}$$

Based on the performed analysis, the index and the test statistic "Omnibus Tests of Model Coefficients" which measures about the whole model have an error probability less than 0.05. Hence, assessment of the overall model is acceptable and significant and its indices are shown in table

VII. Pseudo R^2 coefficient comprised of Cox and Snell R^2 and Nagelkerke R^2 is a value within 0.315 and 0.420 which indicate explanation power of financial market symmetry and asymmetry by the Top fifty most active companies index is a value between 0.315 and 0.420 percent. Its indices are presented in table VIII. Wald Test index has shown that the independent variable has significant effect on the dependent variable. These results based on the calculated α have been found to be smaller than 0.05 for Wald Test. In two-sided logistic regression analysis, the criterion for rejecting or accepting significance of the independent variables' effect is the error level smaller than 0.05. In this model, the independent variable, Top fifty most active companies' index with α smaller than 0.05, has significant effect on the dependent variable. Also considering that sign of β is negative; the independent variable has inverse effect on the dependent variable. Results of statistical test of this model are presented in table IX. Given negative coefficient of the statistic, the null hypothesis is rejected the opposite hypothesis is confirmed. In other words, since Sig. of the independent variable is equal to 0.000 which is smaller than $\alpha = 0.05$, the null hypothesis is rejected and the alternative hypothesis is confirmed. However, on the other hand, since β has negative sign, the research hypothesis is confirmed in inverse form. As a result, it can be concluded that type of financial market (symmetric – asymmetric) has significant and inverse relationship with Top fifty most active companies' index.

TABLE VII
RESULT OF OMNIBUS TEST FOR TESTING THE WHOLE MODEL EVALUATION

	Chi-square	Df	Sig.
Step	52.997	1	0
Block	52.997	1	0
Model	52.997	1	0

TABLE VIII
RESULT OF THE MODEL'S R2 EXAMINATION

-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
140.97	0.315	0.42

TABLE IX
RESULT OF TESTING EFFECT OF INDEPENDENT VARIABLE ON DEPENDENT VARIABLE

Exp(B)	Sig.	Df	Wald	S.E.	B	Variable
0.995	0	1	36.13	0	-0.005	X3 (Top fifty most active companies index)
13.081	0	1	31.253	0.46	2.571	Constant

IV. CONCLUSION AND DISCUSSION

Given that in symmetric market, $R_m - R_f$ is greater than zero and investment risk and return are higher, therefore, in symmetric market, investment is more risky. In other words, when risk-free return is less than risky investment return, Iranian market condition is identified as symmetric. Given

Estrada's formula and considering the downside β , relationship between investment risk and return is unclear and this relationship is not linear and consequently the market is asymmetric. In this condition, due to extreme economic fluctuation and existence of risk in economy and finance it is possible that risk of risk-free investment to be greater than that of risky investment. In other words, when risk-free rate of return is greater than risky investment's rate of return, condition of the Iranian financial market is considered to be asymmetric.

In the meantime, in comparison of the independent variables, given type of market, it was found that mean of the under study independent variables, i.e. share price index, industrial index and Top fifty most active companies index, in symmetric markets is greater, and this result indicates that investment in asymmetric market is more suitable. Since effect of the government's policy on investment has been manifested in thrive of the capital market only during the last few years, mean of the independent variables given type of the market, in asymmetric market is greater than that of symmetric market and if this trend goes on, in the coming years, this mean will change and asymmetric market will be replaced by symmetric market.

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