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A Comparison between Different Factors Affecting the Stock Market Price Index Among Selected Members of the Organization of the Islamic Conference (OIC)

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ABSTRACT

Over the last few decades, the relation between macroeconomic variables and price index of the stock market has been analyzed. Using the MFM model, the present study seeks to investigate the decisive factors in the price index of the stock market in Iran and five other countries belonging to the Organization of the Islamic Conference. The time series of the suggested study is considered to be 2001-2011. Results of the panel data econometrics application are indicative of the positive and significant effects of such variables as real gross domestic product, exchange rate, interest rate and money supply on the stock market price index. On the other hand, our findings showed the negative and significant effect of the inflation rate on the stock market price index. Therefore, through the decrease in the inflation rate, increase in the economic growth, and application of efficient economic policies by the policy makers in different countries, the stock market can substantially be enhanced.

KEYWORDS: Shares, Panel data, the Organization of the Islamic Conference

1. INTRODUCTION

The performance of the stock market has a key role in the financial mediation in both advanced and advancing markets. It performs the related task through the transfer of financial resources from the entities with surplus to the entities with financial shortage. As a nation economy grows, more resources are required for financial organization of the financial clubs. The stock exchange market allows for the increase in the financial resources of the clubs through the selling of the stocks to the investors [1]. In the last few decades, many researchers have sought to solve the Stock Premium. In this context, the capital asset pricing model (CAMP) is the most common model, which has first been developed by Sharpe and Lintner, and is exclusively involved with one factor, i.e., the market premium. Due to the fact that the market premium cannot be obtained just through one stock premium, the variables related to the stock market and fundamental properties of any given asset for the formation of the asset pricing model have been agreed upon and analyzed. Were among the first to introduce some special macroeconomic variables as substitutes for undefined variables in the Arbitrage Pricing Theory (APT).The Macroeconomic Factor Model (MFM) proposed by Chen, Roll, and Ross is an expansion of APT form, which includes the macroeconomic variables. The said researchers sought to express the stock returns as a function of the macroeconomic variables. Since macroeconomic factors such as interest rates and exchequer interest rates can affect the distribution of the expected dividends, they concluded that the stock price and thus the stock returns are statistically affected by the economic variables. With regard to the failure of the APT model in pre-specification of the economic factors, Macroeconomic Factor Model (MFM) has attracted much attention among the researchers. No particular theoretic framework exists for selection of the macroeconomic variables, and thus numerous studies have obtained different results based on the considered macroeconomic variables in the model. In this context, a need for harmonizing the MFM model can strongly be felt. The aim of the present study is to identify the existing relations between the macroeconomic variables and stock market index among the members of the OIC.

Review of the Literature

Hamburger and Kochin [2], and Kraft and Kraft [3] developed a strong relation between the two variables of the stock price and monetary supply. Fama [4] found appositive relation between the stock price and stock returns in terms of such variables as gross domestic product, industry product, monetary supply, and inflation gap. Based on the studies conducted by Geske and Roll [5], Chen et al. [6], Wongbangpo and Sharma [7], there exists a positive relation between the stock price and gross domestic product. Results of Fama and Schwet [8], Chen et al. [6], Nelson [9], Jaffe and Mandelkar [10] are also indicative of a negative relation between the inflation and stock prices. Besides, as shown by the results of Maysami and Kho [11], there exists a positive relation between monetary supply and variations in the stock returns in Singapore. Mukherjee and Naka [12] demonstrated the role of the macroeconomic variables on the stock market index of Tokyo. They found a long-

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term equilibrium relation between the product stock market index and macroeconomic variables such as monetary supply, exchange rate, interest rate of the savings bond.

Maysami et al. [13] investigated the relation between the selected macroeconomic variables and stock market indexes in Singapore. They concluded that financial asset index has an aggregate relation with the changes in the short term and long term interest rates, industrial products index, price level, exchange rate, and monetary supply. They calculated the relation between the exchange rate and the stock price to be positive, while the relation between the interest rates and stock price was obtained to be negative. Abraham [14] investigated the relation between the stock market indexes of different selected macroeconomic variables in Nigeria and found that there exists a short term, negative, and significant relation between the stock market index and interest rate. Furthermore, he found that exchange rate stability may contribute to the better performance of the stock market in the long term. Hsing [15] studied the effects of the selected macroeconomic variables on the stock market index in South Africa. According to his results, the stock market index in South Africa is positively affected by the GDP growth rate and the stock market index of the United States of America, while it is negatively affected by the ratio of the governmental budget deficit to the GDP, internal real interest rate, nominal effective exchange rate, and inflation rate. Ozcan [16] considered the relation between the macroeconomic variables and industry index of Istanbul Stock Exchange (ISE). The selected macroeconomic variables involve the interest rates, consumer price index, monetary supply, exchange rate, gold prices, oil prices, current budget deficit, and export value. As shown by the result of the co-integration test, these macroeconomic variables have a long term, equilibrium relation with the industrial index of the ISE. Hsing [17] showed the effects of selected macroeconomic variables on the stock exchange market of Slovakia. As indicated by his results, the stock exchange market of Slovakia is positively affected by the real GDP and stock market index of Germany or the United States of America, while it is negatively affected by the ratio of the bonds to the GDP, internal real interest rate, expected inflation, the governmental bonds of America, and the Euro.

2. MATERIALS AND METHODS

Theoretical Basis of the Research and the Considered Data

Theoretical Basis of the Research: In the present study, for the investigation of the effective factors in the stock price, the Microeconomic Factor Model (MFM) has been taken into account. In this model, parameters related to the financial and economic time series can be observed. MFM models are highly useful in terms of the stock returns. Such models can be used for measuring many risk resources such as inflation risk, commercial cycle risk, interest rate risk, oil price risk, and so on. These models are very different. In the preliminary kinds of MFM models, Chen et al. [6] first introduced and considered the use of change percentage in the industrial product, change percentage in the unexpected inflation, change percentage in the expected inflation, long-term company bonds efficiency-long-term governmental bonds efficiency, and long-term governmental bonds efficiency-exchequer bonds efficiency. In multifactor models including the MFM model, the asset efficiency is usually as follows.

$$\begin{aligned} \mathrm{R}_{it} &= \alpha_i + b_{1i}\mathrm{F}_{1t} + b_{2t}\mathrm{F}_{2t} + \cdots + b_{ki}\mathrm{F}_{kt} + e_{it} \\ &= \alpha_i + \boldsymbol{b}_i'\mathbf{F}_t + e_{it} \end{aligned} \qquad (1)$$

Here, R_{it} is simple efficiency (besides the ratio without risk) on the asset i,(i = 1,…,N) in t period, (t = 1,…,T); F_{kt} is the k^{th} common factor, (k = 1,…,K); b_{ki} shows the factor loader beta for the asset i in the k^{th} part; and e_{it} is the special factor of the asset. The MFM model must be harmonized based on the type of the stock markets under study. The experimental studies also indicate the existence of the relations between the financial markets and real economic activity. The results obtained from each case study are shown to be sensitive to the selected country (where the study was conducted), selected variable, and the used time series. Therefore, generalization of the results is difficult since each market is unique in terms of its principles and kinds of investors. As a result, further studies are required to be carried out with different statistical societies and various time series.

Data: This study has shown the relationship between macroeconomic variables and stock market index among selected countries within the OIC within the framework of the panel data approach. The present study has been conducted based on the annual data. The time series of the study sample covers the years from 2001to 2011. For determination of the influential factors in the stock market index for a group of six selected countries within the OIC, the required data for independent research variables have been gathered from the GFS, IFS, WDI CDs issued by the year 2012, the websites of the central banks of the considered countries, as well as the UNDATA. Furthermore, the data related to the stock price index have been collected from the WFE.

Sample: The research sample has considered six countries within the OIC as section. These countries involve Iran, Malaysia, Indonesia, Turkey, Saudi Arabia, and Egypt. The criterion for consideration of the said countries as section is, in addition to the membership in the OIC and WFE, the inclusion of the corresponding economic time series during the considered time period (2001-2011).

Variables: The starting point for investors when purchasing the shares is to investigate the trend of variations in the stock price. Stock price index, both from the perspective of the investors for investment in the private equity and as an economic index from the macroeconomic perspective of the society, has been widely applied. The dependent variable in the present study is the stock price index. The stock exchange indexes used

here are the Tehran Stock Exchange Price Index (TEPIX), Istanbul Stock Exchange (ISE), Jakarta Stock Exchange (JSE), KL, TASI, and EGX. Based on the research objectives, the present study has investigated the effect of the gross domestic product (GDP), interest rate, inflation rate, exchange rate, and monetary supply on the stock price index in selected countries within the OIC.

3. RESULTS

Results Analysis and Estimation

Introduction of Model: In the light of the above statements in the sections related to the theoretical basis of the study and previous experimental studies on the influential factors in the stock market price, the proposed MFM model can be expressed as follows.

$$LPS_{it} = \beta_0 + \beta_1 LGDP_{it} + \beta_2 LINF_{it} + \beta_3 LINT_{it} + \beta_4 LM_{it} + \beta_5 LEXC_{it} + U_{it} \quad (10)$$

In the above equation, index i shows different countries (i = 1,…,6) and index t signifies the time for each variable of (t = 2001,…, 2011). Therefore, the total number of observations for each variable is 60 samples, (N × T = 10 × 6).For estimation of the model, logarithmic form has been used. The variables LSP, LGDP, LINF, LINT, LM, and LEXC show the logarithm of stock price, logarithm of real gross domestic product, inflation rate logarithm, real interest rate logarithm, monetary supply rate logarithm, and exchange rate logarithm, respectively. Due to the presence of the time series data as a part of the panel data in this study, first the existence or nonexistence of the long term relation between the existing variables in the sample has been examined. To this end, static tests and co-integration tests have been taken into account. The stationary state of the model's variables has been investigated using Im, Pesaran and Shin (IPS) test. Optimal intervals in these tests have been determined using Schwarts test. This test has been considered fewer than two cases (i.e., sectional data with a constant value and sectional data with a constant value and trend variable). Then, for selection of the proper estimation method, the F-Leamer test, the Hausman test, and the Breuch and Pagan test have been used.

IPS Test Results

Based on the static test and in accordance with Table 1, none of the existing variables in the model is in the static level. However, based on the results of the first order difference of the variables, the null hypothesis is rejected and the variables are significant at 1% level. Thus, all the variables considered in this study are stationary of the first order, $I(1)$.

Table 1. ISP test results with constant value and trend

Variable	level		First difference	
Item	Statistic	Probability value	Statistic	Probability value
Logarithm of stock price	-1.1876	0.1175	-3.5438	0.000
Logarithm of real gross domestic product	3.633	0.9999	-4.515	0.000
Exchange rate logarithm	-0.517	0.3024	-3.938	0.000
Inflation rate logarithm	0.7177	0.7636	-3.969	0.000
Monetary supply rate logarithm	-1.5621	0.0691	-7.2303	0.000
Real interest rate logarithm	2.6029	0.9954	-3.6851	0.000

Co-integration Test Results

In the present study, Pedoroni co-integration test has been used for the investigation of the existence or nonexistence of the co-integration relation among the variables (Table 2). Based on the results of the co-integration test, at the 5% level, the null hypothesis of the nonexistence of the co-integration relation is accepted and the variables are co-integrated in the long term. In this context, using the related methods, the long term relations can be estimated.

Table 2. Co-integration test results

statistic	Co-integration test	Prob.
Panel adf-stat	-1.0759	0.009
Group adf-stat	-1.7717	0.0389

Pattern Estimation Results

In order to decide on the use of the pooled data or panel data method, F-Leamer test has been used. The obtained results from the test $F(5,55) = 54.47$ showed that the hypothesis H_0, which represents the equality of the intercepts for different countries (pooled data method) versus the hypothesis H_1,which shows the inequality of the intercepts (panel data method), is rejected at 1% level. Subsequently, for determination of the type of the applied panel data model, Hausman test has been employed. The value of the statistic of this test is $\chi^2 = 246.87$ with the degree of freedom of 5 and the probability value of 0.0001. Therefore, for the estimation of the research model, application of the fixed effect method is appropriate. Calculation results of the test based on the Pagan method also show that, due to the fact that the value of the calculative statistic χ^2 is smaller than its value in the

table, fixed effect approach is proved to be appropriate for the research data. Due to the results of the performed tests, estimation of the model has been done based on the fixed effect approach. For estimation and consideration of the sectional heterogeneity, different weights have been used for each section of (GLS). Results of estimation of the research model are listed in Table 3.

Table 3. estimation of the model of effective factors in the stock price index

Independent variables	Estimation of the coefficients	Standard deviation	t-statistic	Value-probability
Real GDP logarithm	1.0496	0.1945	5.3952	0.000
Inflation rate logarithm	-0.1831	0.0937	-1.9533	0.0559
Interest rate logarithm	0.4865	0.1948	2.4974	0.0155
Monetary supply logarithm	0.3522	0.0787	4.4736	0.0000
Exchange rate logarithm	0.2727	0.098	2.7082	0.007
	$R^2 = 0.94$	F = 85.34	P = 0.0001	

The results of the fixed effect method are indicative of the fact that the coefficient of the real GDP variable is statistically significant and also involves the expected theoretical sign. This variable has had a positive effect on the stock market price index during the time period from 2001 to 2011, to the effect that by 1% increase in the real GDP, then an increase as large as 1.05% occurs in the stock market index. Besides, the inflation rate has had a negative effect on the stock market price index so that with 1% increase in the inflation rate results, the stock market index decreases as large as 0.18%. As indicated by our obtained results, with 1% increase in the interest rate, an increase in the stock market price index (as large as 0.49%) occurs. The coefficient of the monetary supply variable is statistically highly significant, and the corresponding sign has a proper theoretical ground. Therefore, during the considered time period, monetary supply has positively affected the stock market price index so that by 1% increase in the monetary supply an increase (as great as 0.35%) occurs in the stock market price index. The variable of the exchange rate has an estimated coefficient of 0.27. Thus, by 1% increase in the exchange rate, an increase as great as 0.27% happens in the stock market price index. Estimated effects for our considered countries using the fixed effect method are provided in Table 4.

The obtained results are indicative of the heterogeneity of the calculated values for different countries. Such differences can be due to the varied economic and structural conditions and opportunities in the said countries.

Table 4. The estimated effects related to the considered countries using the fixed effect method

Row	Country	Fixed effects
1	Iran	11.3913
2	Malaysia	-8.3978
3	Indonesia	-11.8854
4	Turkey	-8.5863
5	Saudi Arabia	10.623
6	Egypt	6.855

4. CONCLUSION

As recorded in the literature, different theories and approaches have already sought to express the relation between the macroeconomic and stock market variables. However, both CAMP and APT models have failed to clearly state the type and the number of the macroeconomic variables involved. Therefore, through the investigation of the previous experimental studies on the issue, it can be concluded that a large number of macroeconomic variables have already been considered and examined in terms of their effect on the stock market prices (stock returns). Based on the macroeconomic factor model (MFM), the present study has shown the effects of such macroeconomic factors as GDP, interest rate, exchange rate, inflation rate, and monetary supply on the stock price index of the selected members of OIC in a time period from the year 2001 to 2011 using the panel data technique. The results show that the stock price index is negatively affected by the inflation rate variable, while it is positively affected by the GDP, interest rate, exchange rate, and monetary supply. In general, the results are indicative of the significant effect of research variables on the stock market price index, and MFM is justified due to the considered variables. Therefore, it can be concluded that the stock price index is influence by the variables related to the general conditions of economy, monetary policy, price level, and international economic activities.

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