



The Impact of Macroeconomic Variables on Participation 30 Index in Turkey

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Abstract

Instability in the Islamic stock market is considered a negative signal for macroeconomic stability. Therefore, variables that will increase instability trends in this market should be investigated and necessary policy measures should be taken on time. The purpose of this study is to investigate the effects of industrial production index, inflation rate, real money supply and current account deficit on the Participation 30 index by using monthly data for the period 2011-2019. In this study, the research period was determined based on the publication date of the index and the ARDL Model was preferred. According to the results obtained, the impact of macroeconomic variables on Islamic stock markets in the short and long term differs. In the long run, while the Islamic stock market index was positively affected by the industrial production index and negatively by the inflation rate; no significant effect of money supply and current account deficit has been identified. According to the short-term results, the Islamic stock market is only positively affected by the money supply variable.

Keywords: Participation 30 Index, Macroeconomic variables, ARDL Model

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1. Introduction

Islamic finance is one of the basic components of the financial system along with traditional finance. The development of Islamic finance means more fund flow to the financial system. The strong Islamic financial system offers individuals an alternative investment area as well as a basic source of funding for investors.

Not only Muslim countries benefit from the Islamic financial system. Many non-Muslim countries use traditional financial instruments as well as Islamic financial instruments. Financial institutions such as Citibank, Barclays, Morgan Stanley, Merrill Lynch, and HSBC use Islamic financial instruments. Besides, Dow Jones, New York, and London Stock Exchanges have established Islamic indexes to measure the performances of the firms that operate in accordance with Shariah rules (Mongi, 2019: 524). Today, there are hundreds of Islamic indexes that measure the performances of companies operating in accordance with Islamic rules. While creating Islamic indexes, the fields of activity and financial ratios of the companies to be included in the coverage are examined carefully. Islamic rules primarily prohibit interest, alcohol, gambling and excessively risky (gharar) jobs, however, they promote profit-sharing, asset-backed financial transactions, and ethical investment. With the development of Islamic indices, it is possible to follow the performances of companies that comply with Islamic rules (Habib and Islam, 2017: 37).

In parallel to these improvements in the world, Participation 30 index was established in Turkey in 2011.⁴ Along with the traditional stock market, the stability of the Islamic stock market is one of the main determinants of economic growth performance. Instability in the Islamic stock market is considered a negative signal for macroeconomic stability. Therefore, variables that will increase instability trends in this market should be investigated and necessary policy measures should be taken in time.

The aim of this study is to investigate the effect of macroeconomic variables on the Participation 30 index. The macro-economic variables selected within the scope of the research are the industrial production index, inflation rate, money supply, and current account deficit. Data for the 2011 - 2019 periods were used and the ARDL model was employed. The research period has been determined based on the publication date of the index.

The variables selected within the scope of the research are indicators that have the feature of affecting the Participation 30 index. Changes in the industrial production index are considered as signals for economic growth performance. The decrease in the industrial production index affects expectations negatively and the increase affects positively. Changes in expectations determine investment decisions. Despite the fact that price stability is also achieved in Turkey's economy in recent years, high inflation history has increased the awareness of inflation of economic units. Even small changes in the increase in inflation rates affect investment decisions negatively. Preferences of similar studies and characteristics of Turkey's economy is taken into consideration in selection of money supply and current account deficit variables alongside of the industrial production index and inflation rate.

The contribution of this study is that, to the best of our knowledge, this paper is the first research that investigated the effects of macroeconomic variables on the Participation 30 index in Turkey.

⁴ For detailed information, see. <http://www.katilimendeksi.org/>

The study consists of three parts. In the first part, literature research, in the second part, the econometric model, and in the third part, the data and analysis results are explained.

Literature Survey

Marjan and Mansur (2013) investigated the causality between money supply, consumer price index and exchange rate and the Islamic stock market, using Malaysia's data for the period 2006 - 2013. According to the findings obtained, the selected macroeconomic variables are effective in the Islamic stock market. Using data from 1999 to 2013, Hammoudeh, Kim, and Sarafrazi (2016) analyzed the sources of fluctuations between US federal funds rates and US economic policy uncertainty and the US, European Union, Asia, and Islamic Stock markets. The US economic policy uncertainty shock is the main cause of fluctuations in the US, European Union, Asia, and Islamic stock markets. Akhtar et al. (2017) studied the effects of interest rate surprises on income and volatility of Islamic and traditional stock and bond variables using the data of Australia, Canada, France, Germany, Indonesia, Italy, Japan, Malaysia, Turkey, UK, and USA. The period of the study was determined according to the data constraint. The results are as follows: First, interest surprises have a smaller impact on the yield and volatility of Islamic bonds. Second, interest surprises have an equal or higher effect on the income and volatility of Islamic stocks.

Habib and Islam (2017), using India's data for the period 2007-2016, investigated the effects of inflation, industrial production index, exchange rate, interest rates, and money supply on Islamic Stock returns. According to the findings, exchange rates and interest rates have a significant impact on the Islamic Stock market. Umar et al. (2018) investigated the interest rate sensitivity of the Dow Jones Islamic market index using the data for the period 1996 - 2015. According to the findings, there is no difference between traditional and Islamic equity market in terms of sensitivity to the interest rate. Haider (2018) investigated the effects of macroeconomic and financial variables (interest rate, exchange rate, and inflation rate and gold price) on Karachi Meezan Index 30 of the Pakistan Stock Exchange in the 2011-2016 periods. Karachi Meezan Index 30's is negatively related to interest rate and gold prices; on the other hand, it has been found to be positively related to the exchange rate. On the other hand, it is concluded that there is no significant relationship between the inflation rate and Karachi Meezan Index 30.

Mohammed and Rumman (2018) investigated the effect of oil price, gas price, money supply, interest rate, and producer price index on the performance of Qatar Exchange index and Al Rayyan Islamic Index in the period of 2014-2018. It was determined that the interest rate had a significant negative relationship with both indices. It is concluded that indices are affected differently from other variables. Masitah, Rosli and Mohammad (2018) investigated the relationship between inflation and interest rate and the Islamic stock market in Malaysia from 2008 to 2015. According to the results obtained, there is an inverse relationship between the selected macroeconomic indicators and the Islamic stock market. Ziaei (2018) investigated the effects of US unconventional monetary policy innovation on Islamic equity prices using data from 2007 to 2015. It has been determined that monetary policy shocks have significant effects on Islamic equities.

Mongi (2019) investigated the impact of oil future prices on Dow Jones Islamic equity indices during the Global Financial Crisis. In the study, data for the period 2007 - 2015 were used. According to the results obtained, there is no long-term causality towards refined oil futures prices and Islamic equities. Mawardi, Widiastuti, and Sukmaningrum (2019) analyzed the effects of the inflation rate, industrial production index and interest rate on the Indonesia Islamic Stock

Index using the data for the 2011-2017 periods. The results obtained are as follows: There is a positive relationship between inflation rate and Islamic stock prices. There is a positive relationship between the industrial production index and Islamic stock prices. The relationship between the interest rate and Islamic stock prices is negative.

Kantakji (2019) investigated the effects of industrial production, inflation, money supply and the short-term interest rate on Islamic and conventional equity indices using data from 1996 to 2013 for the US economy. Compared with the traditional index, the effect of industrial production on the Islamic index is higher; the effect of changes in interest rate was found to be lower. Tuna (2019) researched the relationship between gold, silver, platinum and palladium and Islamic stock markets using data from 32 countries for the period 2002 - 2015. According to the results obtained, all of the precious metals within the scope of research in developed countries, whereas in developing countries, only gold and palladium are effective portfolio diversification tools.

2. Econometric Model

The study aims to examine the macroeconomic factors that affect the Participation 30 Index in Turkey. In this context, we consider industrial production index, inflation rates, real money supply, and current account deficits as macroeconomic variables and the relation between the Participation 30 Index and macroeconomic variables are analyzed by using the following model:

$$PI_t = \alpha_0 + \alpha_1 IP_t + \alpha_2 INF_t + \alpha_3 MS_t + \alpha_4 CAD_t + \varepsilon_t \quad (1)$$

where PI_t represents the participation stock index, IP_t , INF_t , MS_t , and CAD_t are industrial production index, inflation rates, real M2 and current account deficits respectively.

Note that Equation (1) suggests that the relation between participation stock index and macroeconomic variables is linear and static. On the other hand, the effect of macroeconomic variables on the stock market can happen with time delay and hence the relation between the variables may be dynamic rather than static. Secondly, the Equation (1) assumes that the participation index is endogenous and the macroeconomic variables are purely exogenous. However, when the relation between the stock market and macroeconomic variables is analyzed, it is not easy to discriminate the variables as endogenous and exogenous since there may be a feedback relationship between the variables. Therefore, as in Yusof and Majid (2007), and Shabri and Yusof. (2009), we employ the Autoregressive Distributed Lagged (ARDL) model to estimate Equation (1).

The ARDL model first suggested by Pesaran and Shin (1999) and Pesaran, Shin and Smith (2001) proposed a cointegration testing procedure based on the estimation of the ARDL model. The cointegration test that is called a bonds test allows us to examine the presence of long-run relationship among the variables even if they have different integration orders.

When determining the presence of long-run relationships between variables, using a bonds cointegration test has several advantages compared to traditional cointegration tests. Different from other cointegration tests, there is no requirement that all variables have the same degree of integration in the bonds cointegration test. In other words, the integration orders of right side variables can be I(1) or I(0). Secondly, although conventional cointegration tests are very sensitive to the sample size, the bonds cointegration test provides efficient results even if the sample size is small. Finally, the ARDL model allows us to determine unbiased estimates for the

long-run relation and it provides robust standard errors even if some of the right-side variables are endogenous. Ozturk and Acaravci (2011) pointed out that the ARDL model allows us to use different lags for each variable in the system differently from conventional cointegration tests.

The relation between the Participation Index and macroeconomic variables is examined by the following model in terms of ARDL model:

$$\Delta PI_t = \beta_0 + \beta_1 PI_{t-1} + \beta_2 IP_{t-1} + \beta_3 INF_{t-1} + \beta_4 MS_{t-1} + \beta_5 CAD_{t-1} + \sum_{i=1}^{p1} \gamma_{1i} \Delta PI_{t-i} + \sum_{j=1}^{p2} \gamma_{2j} \Delta IP_{t-j} + \sum_{l=1}^{p3} \gamma_{3l} \Delta INF_{t-l} + \sum_{m=1}^{p4} \gamma_{4m} \Delta MS_{t-m} + \sum_{n=1}^{p5} \gamma_{5n} \Delta CAD_{t-n} + \varepsilon_{1t} \quad (2)$$

The presence of long-run (or cointegration) relation between the participation index and macroeconomic variables can be examined by using *the F* test by imposing zero constraints on the estimates of β parameters. The null hypothesis suggests that there is no cointegration between the variables ($H_0: \beta_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$) and the null hypothesis can be rejected by using lower and upper bonds critical values proposed by Pesaran, Shin, and Smith (2001). If the test statistic is found to be higher than upper bonds critical values, the null hypothesis can be rejected and it is concluded the presence of cointegration relation among the variables. On the other hand, it can be said that there is no cointegration relation if the test statistic is lower than the lower bonds critical values.

The long and short-run relation among the variables can be estimated by using the following models respectively:

$$PI_t = \delta_0 + \sum_{i=1}^{p1} \beta_{1i} PI_{t-i} + \sum_{j=1}^{p2} \beta_{2j} IP_{t-j} + \sum_{l=1}^{p3} \beta_{3l} INF_{t-l} + \sum_{m=1}^{p4} \beta_{4m} MS_{t-m} + \sum_{n=1}^{p5} \beta_{5n} CAD_{t-n} + \varepsilon_{2t} \quad (3)$$

$$\Delta PI_t = \omega_0 + \sum_{i=1}^{p1} \gamma_{1i} \Delta PI_{t-i} + \sum_{j=1}^{p2} \gamma_{2j} \Delta IP_{t-j} + \sum_{l=1}^{p3} \gamma_{3l} \Delta INF_{t-l} + \sum_{m=1}^{p4} \gamma_{4m} \Delta MS_{t-m} + \sum_{n=1}^{p5} \gamma_{5n} \Delta CAD_{t-n} + \lambda ECT_{t-1} + \varepsilon_{1t} \quad (4)$$

Equation (3) shows the model for long-run relation and Equation (4) indicates the model for short-run relation. The ECT_t in Equation (4) is the error correction term and it represents how much of the deviations in the short run have adjusted in the long run. Therefore, it is expected that the coefficient of ECT_t is negative and statistically significant.

3 Data and Empirical Results

We use monthly data for the periods between 2011 and 2019. The Participation 30 stock index is collected from www.investing.com and the macroeconomic variables are obtained from Turkey Republic Central Bank and World Bank Global Economic Monitor. We consider the real industrial production index and consumer price index is used to calculate the real M2. The

inflation rates are calculated by using the monthly change in the consumer price index. The Tramo-Seats method is employed to remove the seasonal effects in the data. We calculate the natural logarithm of the Participation Index; industrial production index and real money supply variables and we use the logarithm of the variables in the empirical part of the study.

We start our analysis by first employing unit root tests to determine the integration orders of the variables. Hence, we employ ADF and PP unit root tests and the results of the tests are presented in Table 1. The results in Table 1 indicate that the null hypothesis of unit root can not be rejected for all variables except for inflation rates. On the other hand, the null hypothesis can be rejected at a 1% significance level for inflation rates according to ADF and PP unit root test results and this finding indicates that the integration order of inflation rates is I(0). Moreover, when we consider the first differences of the variables, the null hypothesis of unit root can be rejected at 1% significance level for all variables and these results suggest that the integration order of the participation index, industrial production, money supply, and current account deficits is I(1).

Table 1: Unit root test results

Level	ADF		PP	
	Constant	Constant and Trend	Constant	Constant and Trend
PI_t	-0.989 [0.754]	-3.027 [0.130]	-1.006 [0.749]	-3.432 [0.0052]
IP_t	-1.568 [0.494]	-1.848 [0.673]	-1.457 [0.551]	-3.578 [0.036]
INF_t	-4.777 [0.000]	-5.410 [0.000]	-7.733 [0.000]	-7.795 [0.000]
MS_t	-0.482 [0.889]	-3.084 [0.115]	-2.574 [0.101]	-4.633 [0.001]
CAD_t	-1.538 [0.487]	-2.801 [0.200]	-2.547 [0.101]	-4.633 [0.001]
First Differences	ADF		PP	
	Constant	Constant and Trend	Constant	Constant and Trend
ΔPI_t	-4.801 [0.000]	-4.781 [0.000]	-14.335 [0.000]	-15.023 [0.000]
ΔIP_t	-10.495 [0.001]	-10.580 [0.000]	-14.931 [0.000]	-15.213 [0.000]
ΔINF_t	-7.645 [0.000]	-7.602 [0.000]	-36.304 [0.000]	-35.713 [0.000]
ΔMS_t	-8.934 [0.000]	-8.886 [0.000]	-11.697 [0.000]	-11.642 [0.000]
ΔCAD_t	-16.462 [0.000]	-16.396 [0.000]	-17.309 [0.000]	-17.293 [0.000]

Note: [...] indicates the p-value.

The unit root test results indicate that the variables are not stationary at the level and also the integration order of the right-side variables is different from each other. The evidence in favor of non-stationarity and mixed integration order of right-side variables requires to examine the presence of cointegration relation among the variables to avoid spurious regression results. Therefore, we employ the bonds cointegration test suggested by Pesaran, Shin and Smith (2001) whether there is a long-run relationship among the variables.

To employ the bonds cointegration test, we first estimate the ARDL model and we select the best model according to Akaike information criteria. The Akaike information criteria suggest the ARDL (1, 2, 0, 0) model which indicates a lag of the Participation index and two lags of industrial production and money supply are taken place into the best ADRL model. Then, we employ diagnostic tests for residuals such as normality, serial autocorrelation, and heteroscedasticity tests and the results of the tests that are given in Table 2 indicate the null

hypothesis cannot be rejected at 1% significance level and these results suggest lack of diagnostic problems. Moreover, we employ the Ramsey Reset test and find that the functional form of the model is not incorrect. Also, we employ the CUSUM and CUSUM square test to examine whether the estimated model is stable and the test results are presented in Figure 1. The results in Figure 1 indicate the presence of stability of the equation during the sample.

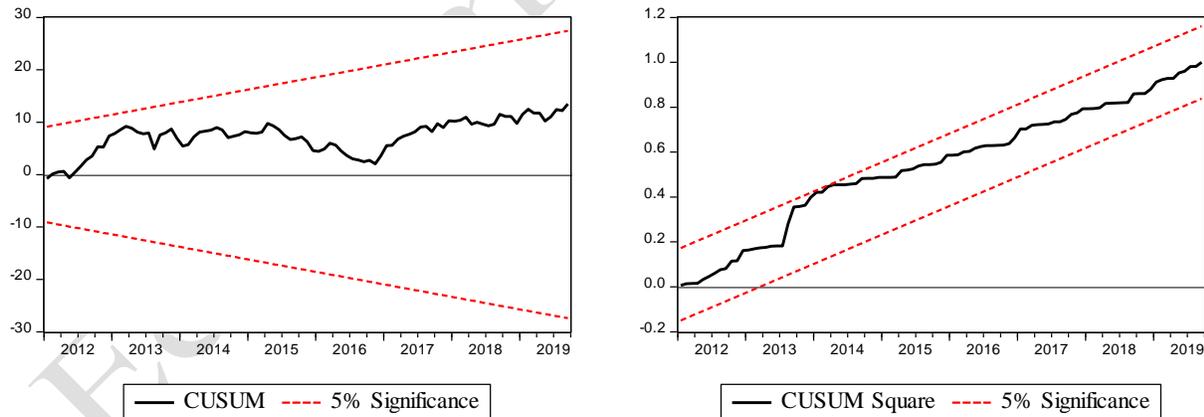
After confirming the validity of the model in terms of diagnostic tests, we employ the cointegration test and the results are present in Table 2. The test statistic for the cointegration relation is found to be 4.089 and it is higher than at 5% significance level upper bonds critical value. This finding indicates evidence in favor of cointegration relation among the variables and hence the long-run and short-run relation among the variables can be examined separately.

Table 2: ARDL Model and Bounds Test Results

Model	(1, 2, 0, 2, 0)	
F^b-st	4.089	
JB χ^2-st	2.361 [0.307]	
BG-F st	0.307 [0.736]	
W-Fist	0.596 [0.797]	
RR-F st	0.020 [0.885]	
Critical Values	I (0)	I (1)
1%	3.602	4.787
5%	2.688	3.698
10%	2.303	3.220

Note: F^b-st is the bonds cointegration test statistic. JB is the Jarque-Bera normality test, W is White heteroscedasticity test, BG is Breusch-Godfrey serial correlation test and RR is Ramsey Reset test.

Figure 1: CUSUM and CUSUM Square Test Results



The long-run estimates are presented in Table 3. The results in Table 3 show that the coefficient of industrial production is positive and statistically significant at 1% level. This result indicates that a one percent increase in industrial production causes to 2.06 percent increase in the participation stock index. This finding is consistent with theoretical expectations because an increase in the industrial production index represents economic growth and there is a positive relationship between the stock market and economic growth. On the other hand, we find a negative and statistically significant relation between stock index and inflation rates and this

result shows that an increase in the inflation rates causes to decrease in the participation stock index. The reverse relation between the stock market and inflation rates is consistent with a priori expectations because interest rates rise at high inflation periods due to the relation between interest rates and inflation rates and rising interest rates lead to the withdrawal of liquidity from the market. In this context, it can be said that the liquidity in the market is directed towards the banks from the capital markets in the high inflation periods and it leads to depreciation in the capital markets. On the other hand, even if the coefficients for money supply and current account deficits are estimated as negatively, they cannot find to be statically significant and these results show that the participation stock index in Turkey is not affected by money supply and current account deficits.

Table 3: Long-run model results

<i>Dependent Variable = PI_t</i>			
Variables	Coefficients	Std. Error	Prob.
Constant	5.139	0.619	0.323
IP_t	2.069	0.619	0.001
INF_t	-4.341	2.566	0.094
MS_t	-0.219	0.516	0.671
CAD_t	-0.005	0.009	0.542

The short-run model results are given in Table 4. The results in Table 4 indicate that only lags of industrial production index and money supply take place in the short-run model. Hence, it can be said that the participation index is not affected by inflation rates and current account deficits in the short-run. The estimates of coefficients for the industrial production index are not statistically significant and this result indicates that there is no significant relationship between participation index and industrial production in the short-run. On the other hand, we determine a statistically significant relationship between participation index and money supply in the short-run. The sum of estimated coefficients for money supply is found to be positive and it indicates the presence of positive relationships between them. In other words, an increase in the money supply leads to an increase in the participation index in the short-run.

Table 4: Short-run model results

<i>Dependent Variable = ΔPI_t</i>			
Variables	Coefficients	Std. Error	Prob.
ECT	-0.312	0.061	0.000
ΔIP_t	0.101	0.200	0.613
ΔIP_{t-1}	-0.304	0.213	0.157
ΔMS_t	-0.412	0.228	0.074
ΔMS_{t-1}	0.580	0.225	0.011

Conclusion

The study aims to examine the macroeconomic factors that affect the Participation 30 stock index in Turkey. The industrial production index, inflation rates, money supply, and current account deficits are considered as macroeconomic variables and the relationships among the variables are examined by using the ARDL model. Empirical results indicate that the

macroeconomic variables have different effects on the Islamic stock index in terms of the short and long-run. The Islamic stock market index is positively affected by the industrial production index in the long-run. On the other hand, there is a negative relation between the Islamic stock market index and inflation rates in Turkey. However, we cannot find a statistically significant relation between Islamic stock market index and money supply and current account deficits. Short-run model results suggest that the Islamic stock market index is significantly only affected by money supply and there is a positive relationship between them.

The positive impact of the Islamic stock market index in the long run on the industrial production index shows the importance of stable economic growth performance. The stable trend of the industrial production index positively affects the Islamic stock market.

The negative impact of the Islamic stock market on the inflation rate indicates the need to avoid policies that will distort price stability. Although a remarkable success has been achieved in the establishment of price stability in recent years, experiencing high and unstable inflation for many years has led to an increased sensitivity of inflation in Turkey. The anxiety that it will return to high inflation years when a small deviation trend occurs in price stability increases the negative effect of inflation on the stock market and macroeconomic variables.

The fact that economic growth and other macroeconomic variables, as well as the Islamic stock market, have been negatively affected by the increase in the inflation rate, requires that the stance set for the first goal of economic policy to be price stability. Price stability is a prerequisite for macroeconomic stability.

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