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Is the performance of the companies operating in the participation index in the Turkish economy affected by the macroeconomic perspective?

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ABSTRACT

This study aims to examine whether the participation index performance in the Turkish economy is going well in terms of macroeconomic factors over the period of January 2018March 2021. In this study, the cointegration between the variables is checked with the ARDL bound test and the Johansen cointegration method. The long-term coefficients are estimated through the ARDL model. Finally, the causal linkage among the participation index performance and traditional stock market index, short-term interest rate, money supply, and the inflation rate is tested with the Toda-Yamamoto causality method. The main empirical findings are shown as in the following: 1) there is cointegration between the Participation index performance and traditional stock market index, short-term interest rate, money supply, and inflation rate under the structural break, 2) the traditional stock market index and money supply improve the Participation index performance in Turkish economy while short-term interest rates hamper it, and 3) there is a two-way causality between the participation index performance and the traditional stock market index and inflation rate, and a one-way causality relationship running from money supply and interest rates to Participation index performance. These evidences provide important suggestions to investors in terms of portfolio diversification and to policymakers in the light of risk allocation and market policies.

I. Introduction

The Islamic financial market is expressed as a market driven by Islamic law (sharia) principles that prohibit interest (riba), extreme risk (garar), and betting (may) and promote risk sharing, support profit sharing, asset-based financial operation, and ethical capital (Shamsuddin, 2014). In addition, Sukuk (Islamic bonds) from Islamic financial services are based on financial regulations such as profit-loss sharing or leasing principles to avoid interest (Nasr et al., 2016; Akhtar et al., 2017). The DMI150 (Dar al-Mal al-Islami) index was created through two banks to observe the productivity of 150 globally publicly traded firms in the world in 1998 indicating that an Islamic index entered the financial market for the first time (Al Khamlichi et al., 2014). In Turkey, the first participation index was established with Sukuk stock in 2012 (Yılmaz & Bağış, 2020). Participation index traded in Borsa Istanbul in Turkey; There are three indices: Participation 50 Index (KAT50), Participation 30 Index (KATLM30), and Participation Model Portfolio Index (KATMP).

In recent years, the world Islamic finance market has attracted international capital flows from both Muslim and non-Muslim investors, and with the continuous growth of the trading volume of the Islamic capital market, the issue of whether the Islamic finance market is affected differently by economic variables has emerged as an ongoing debate by academics and experts (Bahloul et al., 2017). In studies in the literature, the performance of Islamic financial services (Shamsuddin, 2014), which grew by 10-15% annually, was based on the traditional stock market returns of the Islamic capital market (Majdoub et al., 2016; Bahloul et al., 2017; Sakarya et al., 2018; Star, 2020; Adekoya et al., 2021), money supply (Usa. Majid & Mohd. Yusof, 2006), inflation rate (Naifar, 2016), short term interest rate (Bahloul et al., 2017), industrial production index, an exchange rate (Prima Sakti & Harun, 2013; Aziz et al., 2020), oil prices (Abdulkarim et al., 2020) and energy prices (Zaighum et al., 2021) are affected by economic and financial variables. In addition, according to the study of Işık (2013), information technologies influence Turkish economy using the ARDL model estimator in the short and long run. On the other hand, the study conducted by Ali et al. (2018) found that Islamic markets in Brazil, the USA, Japan, China, the UK, India, Malaysia, South Africa, Russia, Turkey, and Pakistan were more effective than traditional markets throughout 2007-2010. At the same time, comparing Islamic and traditional markets, the Islamic markets are less subjected to any shocks originating from the inside while more subjected to those from outside the region (Dewandaru et al., 2014).

Therefore, focusing on the evaluations above, this study aims to examine whether the participation index performance in the Turkish economy is going well in terms of macroeconomic factors in the period January 2018 to March 2021. Macroeconomic variables such as traditional stock market yield and money supply, short-term interest rate, and inflation rate are included as independent variables in the model in the study and the data are examined by time series analysis. In addition, we have important sources of motivation to focus on the independent variables we have mentioned in this study. First, empirical studies in the literature have examined the effect of different variables such as traditional stock market indices (Jawadi et al., 2014), traditional stock market (Ajmi et al., 2014), interest rate on treasury bills, economic uncertainty, and oil prices, traditional stock market indices (Naifar, 2016), and market uncertainty index, oil prices, interest rate and inflation rate (Bahloul et al., 2017).

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Therefore, these studies are an important element in creating our model. Second, the money supply, which is treated as the macroeconomic variable in the working model, is a fundamental factor in the economic cycle phase, and the change in the money supply affects share prices (Ghazali & Yakob, 1998). Changes in the money supply cause investors to adjust the factors that determine stock prices (risk-free return, earnings expectations, and risk premium) and are expected to create an oversupply of money balances and, accordingly, excess demand for stocks (Homa & Jafee, 1971). Thus, it is seen that the money supply has a direct relationship with the stock prices in the Islamic capital market (Ajmi et al., 2014; Naifar (2016). When the relationship between the other macroeconomic variable interest rate included in the model and stock market index prices are mentioned, an increase in interest rates increases the opportunity cost of holding money and consequently increases the substitution between stocks and interest-bearing securities, that is, the decrease in stock prices. In theory, the relationship between interest rates and stock prices is negative. One of the reasons for this is that increased interest rates reduce firms' profitability, reducing their cash flows (Nishat & Sìiaheen, 2004; Panda, 2008). The last macroeconomic variable inflation rate to be included in the model is, according to Fisher (1930)'s hypothesis, "*the expected return of stocks is equal to the sum of the expected inflation and the expected real rate of return*". In other words, there is a positive relationship between the stock return index and inflation. The inflationary environment in the 1970s led researchers to examine the relationship between inflation and stock return, and empirical studies conducted in these years found that there was a negative relationship between inflation and the return of the stock market index (Fama & Schwert, 1977). In the 1980s, a negative relationship was observed between stock yield and inflation as there was a negative relationship between inflation and production and a positive relationship between production and stock yield (Fama, 1981). Studies in the literature show that there is a positive relationship between inflation and the stock return index in some and a negative relationship in others (Bahloul et al., 2017; Erdogan et al., 2019). In line with these evaluations, macroeconomic variables such as money supply, interest rate, and inflation rate in the study push the question of whether Islamic capital affects index performance. Our last source of motivation is that several countries are discussed in the first studies in the literature (Usa. Majid & Yusof, 2009; Wahyudi & Sani, 2014; Abdulkarim et al., 2020; Adekoya et al., 2021). However, studies that focus on the Turkish economy are rare. As a result, in this study, traditional stock market return index and macroeconomic factors such as money supply, interest rate, and inflation rate are analyzed by including them as independent variables in the model of determinants of Islamic capital market index performance.

The study, first, examines whether the variables are stationary with the Augmented Dickey-Fuller (ADF), Ng-Perron & Vogelsang Perron unit root tests. Secondly, the long-term relationship between participation index performance and the traditional stock market and macroeconomic factors is analyzed by ARDL bound test and Johansen cointegration technique. Thirdly, the long-term coefficients of variables are estimated according to the ARDL model estimator. Finally, the causality relationship between variables is investigated with the Toda-Yamamoto Granger causality method.

The study makes significant contributions to the literature. First, within a coherent econometric framework, the impact of traditional stock market yield, money supply, inflation rate, and short-term interest rate on Islamic index yields is explained. Secondly, with a particular focus on the Turkish economy, the long-term determinants of Islamic capital market index performance are identified in the period from January 2018 to March 2021. Finally, with the ARDL limit test based on the fractured period, it is ensured that it is known whether there is a cointegration relationship between the traditional stock market return index and macroeconomic factors such as money supply, interest rate, and inflation rate in the sample of the Turkish economy.

The rest of the study is planned as follows: In the second section, studies conducted in the literature are mentioned. The third section mentions the data and model in this study. The fourth section explains the methodology used in the study. In the fifth section, the findings of the analysis are interpreted and discussed with the findings of the previous study. In the last section, the result of the study is summarized.

2. Literature review

There are several studies that examine the influence of traditional stock market and macroeconomic variables on Islamic stock market performance together or separately with panel or time series analysis methods, and these studies shed light on this study. First of all, the studies carried out with the time series analysis method by focusing on the Turkish economy are summarized. Sakarya et al. (2018) examine the risk and return linkage among the Corporate Governance Index and Borsa İstanbul 50 index and the Participation 30 index in the period January 10, 2011-December 22, 2016. According to the Sharpe ratio, Treynor Index, Jensen Alfa, and Beta criteria, the participation 30 index in Turkey has a lower risk than other indices and has more days of return. Erdogan et al. (2019) use the ARDL model estimator to investigate whether macroeconomic factors had an impact on the Participation 30 index from 2011-2019. According to the estimator results, the industrial production index positively affects the Participation 30 index in the long term while the inflation rate negatively affects it. Bayram and Othman (2019) investigate the performance of the Islamic Participation 50 index and the traditional BIST100 index by using the t-test. The researchers determined that there exists no difference in the performance and returns of the Participation 50 index and the traditional BIST100 index in Turkey during the period of 15 May 2015-31 December 2016. Yıldız (2020) investigates the risks and returns between participation indices and traditional stock market indices by using the TOPSİS method in 2015, 2016, and 2017. According to the findings, it is determined that there are not any differences between the returns of indices in Turkey, but in terms of risk, participation indices have a lower risk. At the same time, these findings are similar to the findings of Strong (2019), who finds that the Participation 30 index has a lower systematic risk than the traditional BIST100 index. Therefore, in the literature, the effect of macroeconomic factors on the Participation 30 index by focusing on the Turkish economy (Erdoğan et al., 2019), risks and returns between participation indices and traditional stock market indices (Sakarya et al., 2018; Yıldız, 2020) and the performance of Participation 50 index and traditional BIST100 index (Bayram & Othman, 2019) are examined. However, there is no study examining the relationship between the Participation index and the traditional stock market index and macroeconomic factors in Turkey. At the same time, other studies include the time series analysis method as in the following: Abd. Majid and Yusof (2009) examine the link between Malaysia's macroeconomic series and Islamic stock market return by using the ARDL cointegration approach for May 1999-February 2006 after the 1997 financial crisis. The findings reveal the cointegration among the Islamic stock market and macroeconomic series such as money supply, treasury bond ratio, industrial production index, real effective exchange rate, and reserve ratios. Hussin et al. (2012) reveal that the link between Islamic stock market development and macroeconomic variables through the VAR method in Malaysia for April 1999-October 2007 is analyzed. According to the findings of the VAR method, it is obtained that there is cointegration between the variables, and the industrial production index, and consumer price index have a statistically positive effect on Islamic stock market prices while the money supply and exchange rate negatively affect them. In addition, it is seen that there is an insignificant negative correlation between the interest rate & Islamic stock markets.

Similarly, Sakti and Harun (2013) examine the relationship between the Jakarta Islamic stock market index and macroeconomic variables such as exchange rate, industrial production index, inflation rate, and money supply from January 2000-December 2010. According to the Johansen-Juselius method, there is a long-term linkage among the series. Granger causality results also indicate a two-way causality relationship between the exchange rate and the Islamic stock market index and unidirectional causality running from the inflation rate and the industrial production index to the Islamic stock market index. Erdoğan et al. (2019) investigate whether macroeconomic factors have an impact on the Participation 30 index by focusing on the Turkish economy by using the ARDL model estimator. According to the long-term results, the industrial production index positively affects the Participation 30 index while the inflation rate negatively influences it.

Jawadi et al. (2014) examine the financial performance of Islamic and traditional indices in three regions such as Europe, the US, and the world between 2000 and 2011. Taking the 2008-2009 global financial crisis into account, CAPM-GARCH model results indicate that traditional funds perform better than Islamic investments before and during the recession but fail during the crisis. In Islamic markets, the impact of the global financial crisis appears to be less important than in traditional markets. These results are similar to those obtained by Ho et al. (2014), which examined the performances of Islamic and traditional indices in eight countries. It also coincides with the findings of Majdoub et al. (2016), who found that there is a strong relationship between the Islamic and traditional stock market prices in France, Indonesia, the UK, and the US from September 8, 2008, to September 6, 2013.

Wahyudi and Sani (2014) analyze the causal linkage between the Islamic financial market and macroeconomic series by using the Toda-Yamamoto test in Indonesia from 2002-2011. The study findings show that there is an interaction among macroeconomic series, financial markets, and macroeconomic series, and between the Islamic capital and money market. In addition, Habib and Islam (2017), which tested the influence of macroeconomic series on Islamic stock market performance through regression for India between February 2007 and June 2016, found that the interest rate and exchange rate damaged Islamic stock market performance. Shahzad et al. (2017) examine returns and volatility among financial and macroeconomic series such as the global Islamic stock market, national stock markets for the US, UK, and Japan, capital market uncertainty index in the US, U.S. 10-year bond prices, and oil prices. Generalized VAR approach results obtained from July 1996-June 2016 period data show that there exists a significant and robust interaction between variables. Abdulkarim et al. (2020) study the impact of oil price changes on certain African Islamic indices (Tunisia, Morocco, Egypt, South Africa, and Nigeria) using daily data for the period May 4, 2011-January 25, 2018. MODWT, CWT, and multivariate GARCH-DCC model results also demonstrate a long-term relationship between the variables and the low volatility between the Tunisian stock market index, which is one of the Islamic stock markets, and the oil index.

At the same time, there are also some panel data studies conducted by many using panel data techniques. Bahloul et al. (2017), for example, examine the volatility impact of various macroeconomic factors and traditional stock market returns on Islamic stock market returns for 20 developed and developing countries from the period 2002-2014. According to the results of the Linear and Markov switching regression, while traditional stock market returns and money supply increase the Islamic stock market return in developing countries, short-term interest rate and inflation rate decrease it.

Akhtar et al. (2017) investigate the influence of unexpected interest on Islamic and traditional stock and bond yields in 11 countries at different periods. According to the panel regression results, the announced interest rate positively affects the returns of Islamic stocks in 2003, while it negatively affects 2011. In general, it is seen that the unexpected interest rate affects the Islamic stock yield more strongly and also has a more stable effect on the Islamic bond yield. Focusing on the US, China, Saudi Arabia, and Nigeria, Adekoya et al. (2021) analyze the relationship between traditional financial markets and Islamic financial markets by using the TVP-VAR method during the Covid-19 pandemic. According to the researchers, the findings suggest a strong relationship between traditional financial markets and Islamic financial markets between January 1 and November 30, 2020. Karyatun et al. (2021) obtain that inflation, the rupiah exchange rate, and the BI rate have not affect Indonesian Syariah Stock Index (ISSI). Ma et al. (2022) find that the economic growth, unemployment and exchange rate influence the stock market performance over the period of January 1980-December 2020 and Lopez et al. (2022) conclude that the uncertainty of oil prices and the exchange rate have an impact on the US stock returns between May 10, 2007 and December 31, 2017.

Hence, as a result of many studies carried out in the literature, especially focusing on the Turkish economy (Erdoğan et al., 2019; Sakarya et al., 2018; Yıldız, 2020; Bayram & Othman, 2019), as well as many studies in other countries, it is determined that there are not any studies that examines the combined effect of the traditional stock market index and macroeconomic factors on Islamic stock market performance in Turkey, and this is a motivating factor in determining the purpose of the study at hand. At the same time, unlike other studies (Jawadi et al., 2014; Akhtar et al., 2017; Shahzad et al., 2017; Yıldız, 2020; Adekoya et al., 2021), in this study, both the ARDL model forecaster for long-term estimation and the Toda-Yamamoto Granger causality to determine the causality relationship test were applied.

3. Model and data set

The study aims to examine whether the participation index performance in the Turkish economy from January 2018-March 2021 is going well in terms of macroeconomic factors. Money supply, interest rate, and inflation rate as macroeconomic factors and traditional market performance index are integrated into the model of participation index performance. In the models of empirical studies, the effect of different variables was examined such as traditional stock market indices (Jawadi et al., 2014), traditional stock market (Ajmi et al., 2014), interest rate on treasury bills, economic uncertainty, and oil prices, traditional stock market indices (Naifar, 2016), and market uncertainty index, oil prices, interest rate and inflation rate (Bahloul et al., 2017). In this study, a traditional capital index, traditional capital index variance, inflation rate, short-term interest rate, yield curve, and money supply variables are also included in the model. Therefore, by developing the models of these studies, the following model is obtained for the Turkish economy and tested by time series analysis.

$$lnPIP_t = \delta_0 + \delta_1 lnBIST_t + \delta_2 lnMS_t + \delta_3 lnIR_t + \delta_4 lnINF_t + \mu_t \quad (1)$$

Here, *PIP* presents the Participation 30 index as an indicator of participation index performance (Jawadi et al., 2014; Rizvi et al., 2014; Kenourgios et al., 2016), and *BIST* shows Borsa İstanbul 100 index expressed the traditional stock market performance (Nippani & Washer, 2004; Sharif et al., 2020). *MS* is a money supply consisting of cash, term deposits, checks, savings, and short-term deposits (M2) (Wahyudi & Sani, 2014; Gherbi & Alsedrah, 2021), *IR* demonstrates a quarterly short-term interest rate (Bahloul et al., 2017; Avcı, 2020) *INF* shows inflation rate as consumer price index (Wahyudi & Sani, 2014). *"t"* is January 2018- March 2021, δ_0 refers to the constant coefficient and μ presents the error term. δ_1, δ_2, δ_3, and δ_4 show the long term elasticity of the traditional stock market, money-supply, long term elasticity of the traditional stock market, money supply, interest,

and inflation rate, respectively. Logarithmic values of each variable are included in the analysis to achieve more reliable and effective empirical results (Shahbaz et al., 2013). Another reason for using the logarithmic values of the series in the study is to be able to reveal the effect of variables in the context of elasticity. In the study, a time series data set is used as monthly data covering the period January 2018-March 2021. There are many reasons why the sample in this study started in January 2018. First of all, in 2018, the trade war between the US and China and the FED's decision to raise interest rates has caused an increase in exports to Turkey, which leads to foreign exchange inflows. In this case, the uncertainty of global policy reduces the risk in Turkey and accelerates the growth of the country. In addition, macro measures taken in Turkey accelerate the development of financial markets by enabling financial assets to grow more than financial obligations. Therefore, the positive developments in the financial and real markets in Turkey in 2018 were motivating the start of the sample period of the study from January 2018 (Central Bank of Turkey Annual Report, 2018; Bloomberg, 2021). Turkey Participation index, traditional stock market, inflation, money supply, and short-term interest are collected from the Investing TR (2021) website and the Central Bank of Turkey Electronic Data Distribution System-EVDS (2021) database.

Table 1 summarizes the correlation matrix and descriptive statistics of each variable. According to Table 1, the average value of the Participation 30 index in Turkey is 7.123 and the standard deviation is 0.303. This indicates that the Participation 30 index in Turkey does not have a high disparity from the period of January 2018-March 2021. The minimum and maximum values of the Participation 30 indexes are 6.772 and 7.774. The average value of the BIST100 index in Turkey is 6.978. There is no high discrepancy between the standard deviation value of 0.136 and the BIST100 index in Turkey. The minimum and maximum values of this index are 6.798 and 7.297, respectively. The average values of Turkey's money supply, interest rate, and inflation rate for the period of January 2018-March 2021 are 21.581, 2.968, and 2.651, respectively, and their standard deviations are 0.240, 0.349, and 0.276. At the same time, when looking at Table 1, it can be said that there is a positive correlation between Participation index performance and traditional stock market index and money supply, and a negative correlation between Participation index performance and interest rate and inflation rate. In addition, the trend of each series in the January 2018-March 2021 period is shown in Graph 1.

4. Methodology

The methodology section of the study consists of four stages. In the first stage, the variables are stationary with the Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1981), Ng-Perron (Ng & Perron, 2001), and Vogelsang Perron (Vogelsang & Perron, 1998) unit root tests. In the second stage, the long-term relationship between Participation index performance and traditional stock market index and macroeconomic factors is analyzed through the ARDL bound test (Pesaran et al., 2001) and the Johansen cointegration technique (Johansen, 1988). In the third stage, long-term coefficients of variables are estimated by the ARDL model (Pesaran et al., 2001). In the final stage, the Toda-Yamamoto causality (Toda & Yamamoto, 1995) analysis is applied to check the causality relationship between variables.

In the first part of the methodology, ADF and Ng-Perron tests as classical unit root tests and Vogelsang Perron unit root tests under one structural break are used to test whether the variables contain unit roots. The ADF and Ng-Perron tests do not provide reliable results because they are not based on structural breaks. In addition, in the existence of structural breaks, it is seen that these unit root tests are not suitable (Shahbaz et al., 2013).

Therefore, the stationary features of the series are also investigated with the Vogelsang Perron unit root test, which considers structural breakage. The Vogelsang-Perron unit root test offers two different models. These are the Additive Outlier Value-AO model in which break is abrupt and the Innovation Outlier Value-IO model, where the breakage occurs slowly, and unit root tests are made with these two models (Vogelsang & Perron, 1998). In this study, the stationary variables are analyzed with the AO model of the Vogelsang-Perron unit root test.

In the second part of the methodology, the long-term link between the Participation index performance and the traditional stock market and macroeconomic series like money supply, interest, and the inflation rate is determined by the ARDL bound test approach and the Johansen cointegration test. ARDL bound test developed by Pesaran et al. (2001) is also applied when variables are a mixture of I(0) or I(1) or both, and this test is more suitable for small samples. Short and long-term analysis can be performed by a dynamic unrestricted error correction model (UECM) derived from the ARDL bound test (Pesaran et al., 2001). The equation of the ARDL bound test is formulated as follows:

$$InPIP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i}\, \Delta InPIP_{t-i} + \sum_{i=0}^{q} \alpha_{2i}\, \Delta lnBIST_{t-i} + \sum_{i=0}^{q} \alpha_{3i}\, \Delta lnMS_{t-i} + \sum_{i=0}^{q} \alpha_{4i}\, \Delta lnIR_{t-i} + \sum_{i=0}^{q} \alpha_{5i}\, \Delta lnINF_{t-i} + \beta_1 InPIP_{t-1} + \beta_2 lnBIST_{t-1} + \beta_3 lnMS_{t-1} + \beta_4 lnIR_{t-1} + \beta_5 lnINF_{t-1} + \beta_6 D_{2019M10} + u_t \quad (2)$$

Where α_0 refers to the constant term, Δ is the first difference operator of variables, $_{it}$ is the error term, and D presents the structural break as a dummy variable. The Schwarz Information Criteria (SIC) is used to determine the optimal lag length for the model. Null hypothesis of cointegration is $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$ and alternative hypothesis is $H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$'. *F*-test is proposed by Pesaran et al. (2001) and the calculated *F*-statistics value is compared with the upper and lower limit critical values to decide the cointegration between the variables. If the *F*-statistics value exceeds the upper limit value, it indicates that there is cointegration between the variables. If the *F*-statistics value is below the lower limit value, it is stated that there is not a long-term relationship between the series by rejecting the null hypothesis of cointegration. Furthermore, if the *F*-statistics value is between the lower and upper limit values, there is no interpretation of the existence of cointegration (Pesaran et al., 2001). In addition, an alternative way for the existence of cointegration between variables in the model is the error correction term $ECT_{(t-1)}$ and the coefficient of this term is significant. If ECT_{-1} is negative at a significance level of 5%, this points out that there is cointegration among the series by rejecting the null hypothesis (Saboori & Sulaiman, 2013). In addition, the existence of the long-term linkage among dependent and independent variables is checked by the Johansen cointegration procedure proposed by Johansen (1988).

After examining the presence of cointegration between variables, long-term coefficients are estimated with the ARDL model estimator in the third part of the methodology. At the same time, diagnostic and stability tests are applied to ensure the suitability of the ARDL model. Diagnostic tests include normality, autocorrelation, heteroskedasticity, and suitability for modeling. In addition, the CUSUM and $CUSUM^2$ tests detect the stability of the long and short-term elasticity estimates (Sebri & Ben-Salha, 2014).

In the last part of the methodology, the causality relationship between Participation index performance and traditional stock market index and macroeconomic variables is analyzed by the Toda-Yamamoto Granger causality test. This test was recommended by Toda and Yamamoto (1995) who examined the causality relationship between variables based on their level values, regardless of which variables were cointegrated in $I(0)$, $I(1)$, or $I(2)$.

Table 1: Descriptive statistic and correlation matrix

Statistics/Variables	$lnPIP_t$	$lnBIST_t$	$lnMS_t$	$lnIR_t$	$lnINF_t$
Average	7.123	6.978	21.581	2.968	2.651
Median	7.013	6.952	21.536	2.983	2.641
Standard deviation	0.303	0.136	0.240	0.349	0.276
Min.	6.772	6.798	21.204	2.302	2.145
Mak.	7.774	7.297	21.981	3.481	3.228
Skew	0.966	0.931	0.233	-0.244	0.315
Pressure	2.695	3.213	1.769	1.935	2.159
Observation Number	39	39	39	39	39
$lnPIP_t$	1.000				
$lnBIST_t$	0.883	1.000			
$lnMS_t$	0.849	0.556	1.000		
$lnIR_t$	-0.506	-0.362	-0.469	1.000	
$lnINF_t$	-0.264	-0.288	-0.185	0.746	1.000

Graph 1: Trend of variables (January 2018 - March 2021)

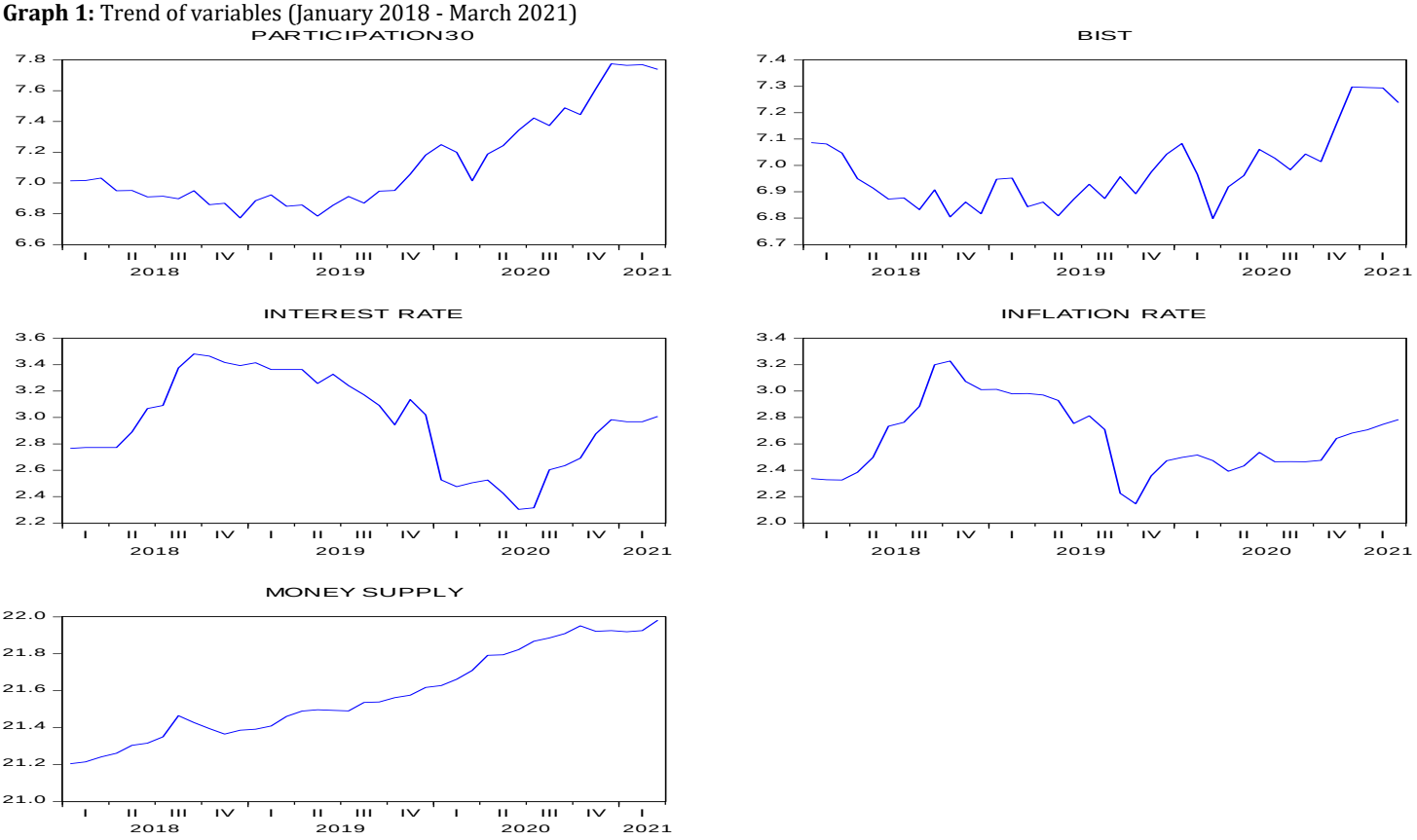


Table 2: ADF and Ng-Perron unit root tests

	Ng-Perron				ADF	
Regressor	MZ_a	MZ_t	MSB	MPT	Test statistics	Result
Panel A: Level						
$lnPIP_t$	-2.940	-1.085	0.369	27.635	-1.729	-
$lnBIST_t$	-6.301	-1.647	0.265	14.424	-2.596	-
$lnMS_t$	-6.778	-1.838	0.271	13.445	-1.977	-
$lnIR_t$	-2.797	-1.153	0.412	31.680	-1.549	-
$lnINF_t$	-3.547	-1.313	0.370	25.371	-1.756	-
Panel B: First difference						
$\Delta lnPIP_t$	-17.959**	-2.961**	0.164**	5.287**	-6.582***	I(1)
$\Delta lnBIST_t$	-18.209**	-2.979**	0.163**	5.229**	-5.880***	I(1)
$\Delta lnMS_t$	-18.413**	-3.000**	0.162**	5.149**	-5.476***	I(1)
$\Delta lnIR_t$	-17.511**	-2.955**	0.168*	5.224**	-4.607***	I(1)
$\Delta lnINF_t$	-32.190***	-4.010***	0.124***	2.838***	-4.583***	I(1)

Note: ***and ** indicate 1% and 5% significant, respectively.

The Toda-Yamamoto causality test is based on the VAR model and firstly the appropriate lag length is detected through the VAR model for the implementation of this test. In the following process, the degree of cointegration of the variables in the model is determined. In the last period, the optimal lag length and the degree of cointegration are collected and estimated by Wald statistics by utilizing the VAR model.

5. Findings and discussion

First of all, the results of unit root tests utilized to analyze the stationarity features of series are evaluated in the study. Table 2 shows the results of the ADF and Ng-Perron tests. The findings demonstrate that the series is not stationary at this level. Then, unit root tests are applied again by taking the first differences of the series, and by rejecting the null hypothesis, it is detected that the variables are stationary at the first difference level.

In addition, the stationary characteristics of the variables are checked by the Vogelsang-Perron AO model unit root method under a single structural break and the findings are summarized in Table 3. These findings coincide with the results of ADF and Ng-Perron unit root tests and indicate that the series are integrated at the level *I*(1). Furthermore, the findings in Table 3 show the structural break dates of the Participation index performance, traditional stock market index, money supply, interest rate, and inflation rate variables as 2019M10, 2019M07, 2020M03, 2019M08, and 2019M02, respectively. The reason why the Participation index performance is broken in 2019M10 is that portfolio outflows due to the stock market in Turkey occur at that time and an interest rate cut of 250 basis points is made by the Monetary Policy Board, predicting that inflation would improve in October. As a result, the tight stance policy on monetary policy has also affected Islamic markets (Enflasyon Raporu 2019-IV, 31 October 2019, p. 1).

The optimal lag length for the model is determined through the VAR model before the ARDL bound test is applied. It is used the Schwarz information criterion (SIC), which provides reliable results to select the appropriate lag length. The findings obtained from the VAR model are summarized in Table 4. According to the findings, the optimal lag length is determined as one (1). After the optimal lag length is determined, the second part of the empirical findings of the study is based on ARDL bound test findings and these findings are shown in Table 5. According to the findings, the *F*-statistics value calculated for the model is 3.638, which is statistically higher than the upper critical value at 10% significance. This means that there is cointegration between the Participation index performance and the traditional stock market, money supply, interest, and inflation under the structural break. Coefficient $ECT_{(t-1)}$ in Table 5 is negative at the level of 5% significance, which points out a long-term linkage between dependent series and independent variables.

At the same time, Table 6 shows the findings of the Johansen procedure. According to the findings, it is seen that there are statistically least two vectors at the level of 1% significance and these findings coincide with the results of the ARDL bound approach. Thus, it is identified that there exists a long-term linkage between Participation performance and the traditional stock market and macroeconomic series like money supply, interest, and inflation. This finding is similar to the findings revealed by Sakti and Harun (2013) for Jakarta and by Erdogan et al. (2019) for Turkey, who show that there is a cointegration link between Islamic Participation and macroeconomic series. After the cointegration methods are performed, in the third part of the empirical findings, the long-term coefficients of the series are estimated with the ARDL model and these results are reported in Table 7. According to the results, the coefficient of the traditional stock market index is 1.454% and statistically at a level of 1% significance. This indicates a positive correlation between Participation index performance and the traditional stock market index, and a 1% increase in the traditional stock market index increases Participation index performance by 1,454%. In other words, the traditional stock market index improves the performance of the Participation index. This finding coincides with the finding of Sakarya et al. (2018), who found a positive correlation between the Participation index and the Borsa Istanbul50 index in Turkey between January 10, 2011, and December 22, 2016. It also coincides with the findings of Hammoudeh et al. (2014), who found that there is a positive relationship between the global Islamic index and the

Table 3: Vogelsang-Perron test

Model	Additive outlier		
Variables	*t-statistics*	Break Time	Result
Panel A: Level			
$\ln PIP_t$	-4.638(8)	2019M10	-
$\ln BIST_t$	-4.907(8)	2019M07	-
$\ln MS_t$	-3.506(0)	2020M03	-
$\ln IR_t$	-3.717(5)	2019M08	-
$\ln INF_t$	-2.872(1)	2019M02	-
Panel B: First difference			
$\Delta \ln PIP_t$	-8.977(0)***	2020M03	*I*(1)
$\Delta \ln BIST_t$	-8.167(0)***	2020M03	*I*(1)
$\Delta \ln MS_t$	-6.025(0)***	2020M04	*I*(1)
$\Delta \ln IR_t$	-6.642(0)***	2020M01	*I*(1)
$\Delta \ln INF_t$	-6.979(1)***	2019M08	*I*(1)

Note: *** shows the level of 1% significance.

Table 4: Appropriate lag length selection

Latency length	*LR*	*FPE*	*AIC*	*SIC*	*HQ*
1	272.463*	9.20e-13*	-13.542	-12.208*	-13.081*
2	25.431	1.46e-12	-13.173	-10.729	-12.329
3	35,105	1,24e-12	-13.592	-10.037	-12.365
4	22.785	1.79e-12	-13.791*	-9.125	-12.180

Note: * indicates optimal lag.

US, European, and Asian traditional stock market indices by utilizing the kopula model approach from January 4, 1999 to July 22, 2013. Our finding is similar to the finding of Bahloul et al. (2017) for 20 developing and developed countries and of Rahman et al. (2021) for the world, developing world, developed world, Asia Pacific, the UK, and the US.

As shown in Table 7, the coefficient of the money supply is 0.549% and statistically, at a level of 1% significance The results indicate that a 1% increase in money supply increases Participation index performance by 0.549%, and expresses a positive relationship between money supply and Participation index performance. This finding is similar to the outcomes of Erdogan et al. (2019), who found that the money supply of Turkey in the short term positively affects the Islamic stock market index, and Majid and Yusof (2009), who conclude that the money supply of Malaysia after the 1997 financial crisis improved the return of the Islamic Stock Exchange. However, it is not similar to the result obtained by Wongbangpo and Sharma (2002) for Indonesia and the Philippines.

According to the ARDL model long-term estimate, the elasticity of the interest rate is -0.172% and statistically significant at 1%. A 1% increase in the interest rate reduces Participation index performance by 0.172%. In other words, there is a negative relationship between the interest rate and Participation performance. This finding from the study is in line with the result obtained by Hammoudeh et al. (2014), who found a negative correlation between global Islam and interest by using the kopula model approach based on daily data between January 4, 1999, and July 22, 2013. This finding also supports the conclusions revealed by Wongbangpo and Sharma (2002) for the Philippines, Singapore, and Thailand, by Albaity (2011) for Malaysia, by Habib, Moya-Martínez, et al. (2015) for Spain, and by Islam (2017) for Malaysia. However, the findings obtained by Rana and Akhter (2015) for Pakistan, Akhtar et al. (2017) for 11 countries, and Sakti and Harun (2013) for the Jakarta Islamic stock market index do not match this finding of the study.

At the same time, according to the long-term results, there is a statistically insignificant relationship between Participation index performance and inflation rate in a positive way. This study finding is similar to Naifar's (2016) study, in which the dynamics of the global Dow Jones Islamic stock market return are examined by utilizing the Quantile regression analysis with data between January 2003 and October 2014. However, Erdogan et al. (2019) do not argue that the Turkish inflation rate negatively affects the Islamic stock market index from 2011-2019.

Finally, Table 7 reports the results of diagnostic tests which are used to determine whether the model is appropriate and whether it presents strong and reliable findings. According to these results, it is stated that there are not any heteroscedasticity and autocorrelation problems in the model and the model shows the normal distribution and there are not any modelling errors.

Graph 2 illustrates the results of the CUSUM and CUSUM2 tests, and according to the results, the model is among the critical limit values at the level of 5% significance. This expresses that the long-term coefficient estimate for the model is stable.

In the last part of the empirical findings, the analysis results of the Toda-Yamamoto Granger causality test are evaluated and these results are summarized in Table 8. First, the optimal lag length is determined as one (1) by the SIC criteria through the VAR model, and the cointegration level of the variables is an $I(1)$. Then, optimal length and cointegration values are collected and then number two (2) is obtained, and accordingly, Wald statistics and Toda-Yamamoto Granger causality results are obtained. The results show a two-way causality linkage between the traditional stock market and Participation performance at the level of significance of 1%. This finding is similar to the finding of the Ajmi et al.'s (2014) study, in which a two-way causality link between the Down Jones Islamic stock market, the global Islamic stock exchange, and the traditional stock market indices of the US, Europe, and Asia are found by conducting a linear Granger causality test with the daily data of the period January 4, 1999-October 8, 2010.

According to causality results, a one-way causality is determined, running from money supply to Participation performance at the level of 5% significance. This result does not coincide with the conclusion of Wahyudi and Sani (2014), who examined the causal linkage between the Islamic financial market and macroeconomic series in Indonesia by using the Toda-Yamamoto method for the period of 2002-2011 to find that the money supply is not the cause of Islamic stock market return. In addition, the results in Table 8 point out a one-way linkage from the interest rate to Participation index performance at the level of 10% significance. This finding of the study does not coincide with the findings of Sakti and Harun (2013), who found that there is no causality link between the Jakarta Islamic stock market and the money supply during January 2000-December 2010.

Finally, it is determined in Table 8 that there is a two-way causality between the inflation rate and Participation index performance at the level of a significant 1%. This finding is not similar to the finding revealed by Wahyudi and Sani (2014) for Indonesia.

6. Conclusion and policy recommendations

In recent years, the world Islamic finance market has attracted international capital flows from both Muslims and non-Muslims, causing the Islamic market index to grow rapidly in national and international markets, and the performance determinants of the Islamic finance market are examined by several researchers. Thus, this study investigates the traditional stock market index and macroeconomic factors as determinants of Islamic stock market index performance in the Turkish economy from January 2018 to March 2021.

Empirical results show that under the breakdown using the ARDL boundary test and the Johansen cointegration technique, there is cointegration between the performance of the Participation index and independent variables. In addition, by applying the ARDL model forecaster, it is obtained that the traditional stock market index and the money supply positively affect the Participation index performance, while the interest rate has a negative effect. Finally, using the Toda-Yamamoto method during the January 2018-March 2021 period, it is concluded that there is a two-way causality between the participation performance and traditional stock market and inflation, and a one-way causality relationship running from money supply and interest rates to Participation index performance. Thus, it can be said that the traditional stock market index and macroeconomic variables affect the Participation index in the Turkish economy from January 2018 to March 2021. These study findings are supported by the results of Bahloul et al. (2017) for 20 developing countries who used the Markov transition regression and MS-VAR model and contributed to the literature.

The findings of our study provide valuable and important recommendations regarding Islamic market index performance for both investors and financial market regulators, portfolio managers, and policymakers. First, these study findings and other study findings (Jawadi et al., 2014; Majdoub et al., 2016; Bahloul et al., 2017; Hassan et al., 2021) show that the interoperability relationship between the Islamic finance market and the traditional market provides important information to investors and market regulators in both portfolio diversification and risk management, and these findings suggest that investors and market regulators control risk in the portfolio and strike a balance between earnings and risk by investing in Islamic funds. Second, the study findings could help portfolio managers combine assets with a strong immune structure, such as Islamic securities, and traditional securities to determine optimal portfolio weights and hedging ratios in different market segments. Therefore, for investors and market regulators in Turkey, the Islamic finance market is a haven

Table 5: ARDL Bound test

Panel A: *F*- Bound test		
Equation	*F(PIP/BIST,MS,IR,INF)*	
Optimal lag structure	[1,1,0,1,0]	
F-statistic	3.638*	
Time to break	2019M10	
$ECT_{(t-1)}$	-0.338***	
Pesaran et al. (2001) critical values		
Level of Significant	The lower limit, *I*(0)	The upper limit, *I*(1)
1%	3.74	5.06
5%	2.86	4.01
10%	2.45	3.52

Note: Optimal lag length is selected by SIC. *** and * indicates 1% and 10% significance.

Table 6: Johansen cointegration test

Hypothesis	Trace statistic	Max-Eigenvalue Statistic
R=0	112.5932***	56.69856***
R≤1	55.89462***	31.10682***
R≤2	24.78781	13.99402
R≤3	10.79378	10.46558
R≤4	0.328202	0.328202

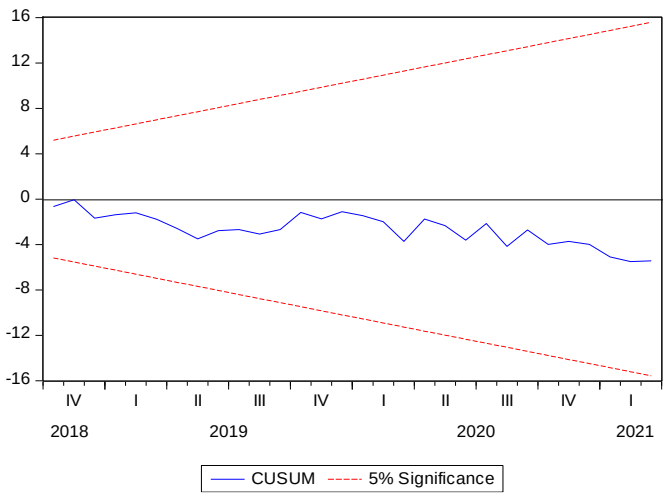
Note: *** indicates a 1% level of significance.

Table 7: ARDL long-term results

Variables	Coefficient	*t-statistics*
Constant	-14.491	-10.310***
$lnBIST_t$	1.454	12.864***
$lnMS_t$	0.549	7.609***
$lnIR_t$	-0.172	- 2.843***
$lnINF_t$	0.053	0.739
Diagnostic Tests		
R^2	0.994	
Adj. R^2	0.992	
F-statistics	734.721***	
Breusch-Godfrey LM test[a]	2.012 (0.152)	
ARCH LM test[b]	0.857 (0.360)	
J-B normality test[c]	1.122 (0.570)	
Ramsey RESET[d]	0.364 (0.550)	

Note: an Autocorrelation, b heteroscedasticity, c the Jarque –Bera for normality test and d model specification. *** and ** show the significance at 1% and 5% level of significance, respectively.

Graph 2: CUSUM and $CUSUM^2$ Tests



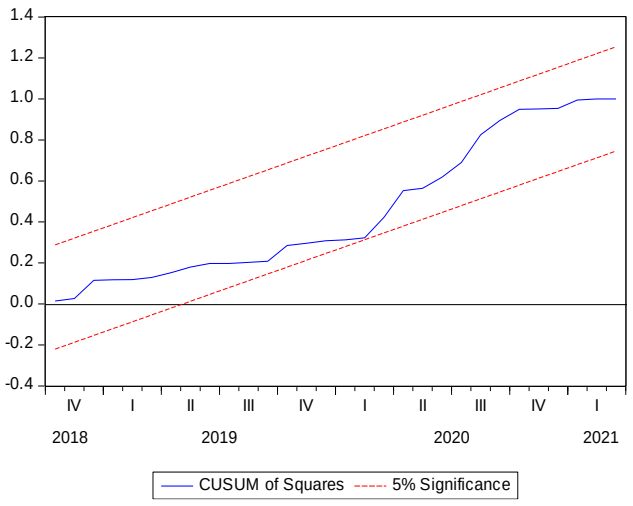


Table 8: Toda and Yamamoto causality test

Hypotheses	Test Statistics	p-value
BIST is not the Granger cause of PIP.	10.403	0.005***
PIP is not the Granger cause of BIST.	6.374	0.041***
MS is not the Granger cause of PIP.	8.355	0.015**
PIP is not the Granger cause of MS.	0.656	0.720
IR is not the Granger cause of PIP.	5.593	0.061*
PIP is not the Granger cause of IR.	3.126	0.209
INF is not the Granger cause of PIP.	13.987	0.000***
PIP is not the Granger cause of INF.	11.104	0.003***

Note: ***, ** and * show the level of significant of %1, 5% and 10%, respectively.

from many crises. Third, the study findings suggest that policymakers should support the Islamic finance market, especially in times of financial turbulence, and provide information on market policies and risk-distress and how important macroeconomic variables are in stabilizing Islamic financial markets. Fourth, since adverse shocks in interest rates negatively affect participation index performance in the long run, the findings suggest that a stable interest rate policy through intervention in interest rates will promote the trade balance and eventually the improvement of stock market index performance. On the other hand, this study and other studies can help policymakers publish a "safe havens guide for investors" that lists possible combinations of assets that can minimize the positive and negative impact of traditional stock market yield, money supply, interest rate, and inflation rate on portfolio returns. Finally, market regulators should revise the laws and regulations related to Islamic market instruments so that the Islamic market in Turkey can develop and become an international target.

Finally, there are some limitations to this study. First of all, the effect of other macroeconomic factors such as economic growth, VIX-index, treasury bond ratio, industrial production index, and exchange rate on Participation index performance is not mentioned in the study. In future studies, these macroeconomic variables may also be taken into account. Secondly, this study focuses on Turkey as a developing country, but in future studies, the determinants of Islamic capital market performance can be examined based on various developing or developed countries.

This study is applied the ARDL model estimators, but for the future studies, new ARDL methods such as bootstrap ARDL, dynamic ARDL should be used. On the other hand, as stated in Işık et al. (2020)'s study, in the future studies should be taken account the economic politic uncertainty index, as an additional independent variable besides the traditional variables related to the economic factors in the performance model. Finally, this study examines the determinants of Participation index performance based on a narrow period sample, but in future studies, the study can be improved by expanding the sample period.

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