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Testing the effect of local macroeconomic indicators and global risk factors on the Turkish participation stock market: Evidence from quantile regression approach

Lokal makroekonomik göstergelerin ve küresel risk faktörlerinin Türkiye katılım endeksi üzerindeki etkisinin test edilmesi: Kantil regresyon yaklaşımı

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ABSTRACT

The purpose of this study is to investigate the effect of local macroeconomic indicators and global risk factors on the participation index in the Turkish stock market from May 2011 to April 2021. Using the quantile regression approach, we detect the impact of local macroeconomic indicators and global risk factors across different market conditions: bull, bear, and normal. The empirical results demonstrate that, among local macroeconomic indicators, monetary policy-related indicators, Consumer Price Index (CPI)(Slope of Government Bond [SGB]), merely influence participation 30 index (KAT30) return in bearish market (bullish market); however, credit default swap negatively affects KAT30 return across all quantiles. When it comes to global risk factors, results show that KAT30 return is negatively affected by the implied volatility index across all quantiles except Q0.75 and Q0.95. This means that the implied volatility index impact on KAT30 return is stronger during the bearish market. Yet, Oil Volatility Index (OVX) and Morgan Stanley Country Index (MSCI) positively impact the index return across upper quantiles.

Keywords: Global risk factors, local macroeconomic indicators, participation index, quantile regression, Turkish stock market

ÖZ

Bu çalışmanın amacı, Mayıs 2011-Nisan 2021 döneminde Türkiye hisse senedi piyasasında lokal makroekonomik göstergelerin ve küresel risk faktörlerinin katılım endeksi üzerindeki etkisini araştırmaktır. Kantil regresyon yaklaşımı kullanarak, lokal makroekonomik göstergelerin ve küresel risk faktörlerinin düşen(bear), normal, yükselen(bull) piyasa koşullarındaki etkisini tespit etmekteyiz. Ampirik sonuçlar, lokal makroekonomik göstergeler arasında para politikasıyla ilgili göstergelerden CPI(SGB)'nin sadece düşüş piyasasında (yükseliş piyasası) KAT30'u etkilediğini gösterirken, CDS tüm kantillerde KAT30'u negatif etkilemektedir. Küresel risk faktörleri söz konusu olduğunda, sonuçlar KAT30'un Q0.75 ve Q0.95 dışındaki tüm kantillerde VIX'ten negatif etkilendiğini göstermektedir. Bu durum, düşüş piyasasında VIX'in KAT30 üzerindeki etkisinin daha güçlü olduğu göstermektedir. Bununla birlikte, OVX ve MSCI'nin etkisi, üst kantillerde pozitif ve anlamlıdır.

Anahtar Kelimeler: Küresel risk faktörleri, lokal makroekonomik göstergeler, katılım endeksi, kantil regresyon, Türkiye borsası

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Introduction

For the last couple of years, the Islamic capital market has been under the spotlight. It has been gaining momentum in both academia and the financial industry. This rapid growth of the Islamic stock market

accompanied by the increasing concern of religiously conscious investors to invest according to the norms of shariah motivated investors to shift their funds to markets providing participation (Islamic) indices. Over the last decade, the Turkish stock market has been experiencing exponential growth in shariah-compliant investments and continues to grow at a steady pace (Bayram & Abdullah Othman, 2019).

For instance, in 2011, the Participation 30 Index was launched by the Turkish stock market. This index includes shares of the top 30 companies with the highest public market capitalization traded at Borsa Istanbul, which is at the same time shariah compliant. Participation indices in Turkey, like all Islamic Market indices, have been formed according to certain rules. Generally, Islamic indices construction is based on Shariah screening detailed in standard 21 published by The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI). This means that listed companies are strictly banned from investing in projects involving interest-based activities, alcohol, gambling, pork, entertainment, etc. Moreover, companies are required to respect some financial ratios to fulfill the shariah screening requirements. Both the ratio of total interest-bearing debt of companies to market capitalization and the ratio of interest-taking deposits and securities to market capitalization must be lower than 30%, while the ratio of income from illicit projects stated above to global income must be less than 5% (AAOIFI, 2015).

To this extent, we should mention that the existence of shariah-compliant stock market indices gives religiously conscious investors an alternative investment scheme in line with the Shariah principles and conventional investors a diversification investment opportunity (Arshad et al., 2013; Fatima et al., 2019; Jawadi et al., 2018; Usman et al., 2019).

According to The Capital Asset Pricing Model (CAPM), systematic risk factors have an effect on stock market returns. In fact, quantifying systemic risk in emerging stock markets is challenging since they are passing through a process of financial integration which makes them exposed to a set of local and global factors. Therefore, we need to consider these factors to correctly estimate stock market returns (Bahloul & Ben Amor, 2021). Although the Islamic stock market has been known for being decoupled from the conventional market because of the strict compliance rules, literature shows that it is integrated with the global market (Balcilar et al., 2015).

As mentioned above, studies have been examining the connection between the Islamic stock market and its conventional counterpart. The literature conglomerates a set of researchers studying a wide range of subjects. Several studies have been focusing on the risk–return analysis and comparison to determine the existing link between diversification opportunities and performance of the Islamic financial market focusing on its performance compared to the conventional market pre-, throughout, and/or post-financial crisis or checking the decoupling hypothesis (Ahmed & Farooq, 2018; Ali et al., 2018; Al-Khazali et al., 2014; Aloui et al., 2016; Camgöz et al., 2019; Paltrinieri et al., 2019; Safiullah & Shamsuddin, 2021; Trabelsi & Naifar, 2017). A different set of studies highlight the determinants affecting the Islamic stock market (Chau et al., 2014; Dewandaru et al., 2014). The recent state of the art examines the dynamics of Islamic equity indices and provides empirical results for the dependence structure and the co-movement between global risk factors, local risk factors, and Islamic stock indices (Haddad et al., 2020; Hammoudeh et al., 2014; Naifar, 2016). Yet, these studies intend to study the global participation indices and do not provide country-specific implications.

The literature related to participation indices has two shortcomings. First, global factors have not been incorporated in studies related to the Turkish participation index. Second, previous studies only investigate average dependence without considering extreme market conditions.

To the extent of our knowledge, there is no research investigating the impact of macroeconomic indicators and global risk factors (GRF) on the participation of the stock index in Turkey. We extend two empirical works, which are related to our paper. Naifar (2016) examines the co-movement along with the impact of macroeconomic indicators, risk factors, and global financial market conditions on the global Islamic stock market indices. Bahloul and Ben Amor (2020) explore the effect of local macroeconomic indicators (LMIs) with global factors on the Middle East and North African (MENA) region stock returns (SR hereinafter). Hence, our study probes the effect of global and LMI on the Turkish participation index by employing the quantile regression approach (QR-A) for monthly data from April 2011 to April 2021.

The contribution of this study is four-fold. First, we check the effect of LMI and GRF on the participation index in the Turkish stock market. Second, using QR-A, we detect the impact of local and global factors across different market conditions: bull, bear, and normal. Third, looking for the relationship between MSCI Global and the Participation index, we check for potential diversification opportunities. Fourth, we use the lagged oil price volatility index, which has not been used in the existing state of the art on Islamic equity return dynamics.

The rest of the study is structured as follows: the second section presents the theoretical framework and the existing literature. The third section illustrates the quantile regression methodology and the fourth section illustrates data and preliminary statistics. The fifth and sixth sections provide estimation results and the discussion and the conclusion, respectively.

Literature Review

According to the CAPM, the link between stock's expected returns and systematic risk factors is predictable. The model suggests that market integration implies that the return of assets belonging to the same class is supposed to be similar, disregarding the transaction's location. Thus, it is required to identify the link between the expected returns and the affiliated risks in order to determine potential excess returns that the investor might gain.

Having said that, quantifying risk in emerging stock markets is much more complicated. Bekaert and Harvey (1995) state that the majority of emerging markets are comparatively segmented. In addition, Guesmi and Nguyen (2011) argue that despite the general increase in their integration level overtime, the emerging markets are characterized by a higher segmentation from the global market.

This means that financial markets follow a gradual integration process. Thus, investors face both GRF and local risk factors. In this regard, expected returns are captured by analyzing both global and local risk factors. Thus, the level of financial integration of an emerging stock market is explained by its related local and GRF (Bahloul & Ben Amor, 2021).

Yet, the Islamic stock markets are frequently decoupled from the conventional stock market due to the tight constraints on the former. The core of this dichotomy lies in the rules that stipulate Islamic investments code (Balcilar et al., 2015). In fact, Islamic indices are designed to meet shariah requirements, and the funds' management is heavily regulated to eliminate market manipulations and price gouging (Ho et al., 2014).

However, globalization and the recurrent re-structuring of the financial markets usher in the reshaping of the international financial market (Delle Foglie & Panetta, 2020). This might raise the question of whether the Islamic financial markets dynamic is interlinked with the conventional market conditions or independently moving. Our study aims to answer the following questions: Do global macroeconomic indicators and GRF affect the Turkish participation in SR? Does participation in stock market indices provide an alternative investment scheme, considering the particular impact of emerging market integration on portfolio diversification and hedging strategies?[1]

Stock Returns and Local Macroeconomic Indicators

The impact of macroeconomic factors on stock market dynamics is a well-documented subject in the literature. Most studies present empirical evidence for the impact of common macroeconomic indicators, especially monetary policy indicators on SR (Fama, 1981, 1990; Mun, 2012; Fama, 1990; Murthy et al., 2016).

For instance, the impact of inflation on SR has been documented by Fisher (1930) stating that there is a positive link between inflation and stock market. However, Fama (1990) states that inflation negatively impacts SR arguing that the inflation harms real economic activity. Naifar (2016) investigates the impact of local and GRF on the Global Dow Jones Islamic index by applying quantile regression model for the period between January 2003 and October 2014. Results indicate that inflation impacts Islamic stock return for the intermediate and upper quantiles; yet, it was insignificant for lower quantiles. Bahloul and Ben Amor (2020) conduct similar research for MENA countries for the period from January 2007 to January 2018 using quantile regression. Their study finds a negative relationship between inflation and stock performance for lower quantiles for most MENA countries.

Another local indicator affecting the SR is the country's specific credit default swap (CDS). Coronado, Corzo, and Lazcano (2012) state that credit risk information is embedded in the asset's payoff. They explain that if countries dedicate a large sum of their income to external debt, governments will dedicate a lower sum for investment that will affect value creation in the economy and subsequently, its future growth. In this case, consumption and investment decrease, leading to lower revenue for companies, which will negatively affect their stock prices and thus the returns. Naifar (2016) finds that the US sovereign 5-year CDS index positively affects Dow Jones Islamic Market Index (DJIMI) returns among quantiles throughout and post the global financial crisis. Han et al. (2017) investigate the relationship between equity market and credit market taking into consideration the information embedded in the slope of credit spread, the latter proxied by the firm's CDS term structure using monthly data of 776 US-based firms between August 2002 and December 2012. Their results show that the slope of the CDS negatively affects cross-sectional SR.

To predict future real economic activity, the term structure is used. In fact, the term spread is considered an important predictor of future recession in the real economy (Estrella & Mishkin, 1998). This is elucidated by the expectation theory of interest rate term structure which states that a long-term rate is in fact a term premium plus the mean of future values of short-term (ST) interest rates. If investors expect a market downturn, the future values of ST rate would decrease as economic agents expect a relaxed monetary policy. This means that the expectation of lower future ST interest rates reduces longer-term rates. Hence, the term spread increases. Bhaduri and Saraogi (2010) examine the link between the yield spread and Indian SR by employing data from May 1996 to May 2008. They conclude that the yield spread can accurately identify entry and exit points for the Indian stock market. Resnick and Shoesmith (2002) also find similar results for the US stock market. Moreover, Naifar (2016) states that while ST interest rates are governed by central banks, LT interest rates depend on market forces, and the slope of the term structure can track embedded term risk premiums. Thus, this spread is considered the tracker of investors' compensation for bearing interest rate risk. Naifar (2016)'s empirical results show a positive link between the slope of the yield curve and DJIMI returns.

Stock Returns and Global Risk Factors

Since the 2008 financial crisis, the correlation between the SR around the world has increased revealing the existence of contagion effects (Haddad et al., 2020). Taking into consideration the changes in stock market linkages studies, recent studies start to rely heavily on GRF to detect dependencies and shed light on international diversification opportunities (Bahloul & Ben Amor, 2021; Balcilar et al., 2015; Haddad et al., 2020; Hammoudeh et al., 2014; Lin & Su, 2020; Naifar 2016; Yarovaya et al., 2021).

Among the commonly used global factors, the implied volatility index (VIX) is a proxy to quantify stock market uncertainty. Robert Whaley, the founder of VIX, argues that the VIX increases during market turmoil. If the expected VIX increases (decreases), investors expect higher (lower) returns (Whaley, 2009). Moreover, VIX index is computed employing the implied volatilities on S&P 500 index options (SPX). The index stands for the market's expectation of the S&P 500 index's 30-day future volatility. When it comes to its influence on SR, VIX impact can be explained as follows: when option premiums are high, the expected future volatility rises, and investor's fear increases which will cause a decrease in equity index return (Naifar, 2016). Nevertheless, empirical studies present different results regarding this matter for the Islamic Equity market. Hadad et al. (2020) investigate the time-varying impact of GRF on the return of Islamic indices and volatility spillovers for seven DJIM from April 2003 to November 2018. They found that the seven DJIM stock indices are weakly associated with the movement of global risk factors.

Paltrinieri et al. (2018) investigate the repercussions of oil prices and VIX index on 17 socially responsible investment, conventional, and Islamic stock indices using DCC (Dynamic conditional correlation)-GARCH model for the period 2005–2015. They found a negative linkage between the VIX on both conventional and Islamic index. Their findings are similar to those of Naifar (2016), who mentioned that the DJIM index returns and VIX index present an asymmetric correlated movement (trend) as the degree of dependence increases during a bullish market, yet dependence weakens during a bearish market. Furthermore, Hammoudeh et al. (2014) analyze the relationship between the DJIM and global equity indices of the United States, Asia, and Europe

[1] Please check Table 1 for Literature review summary.

by applying a copula approach to data between January 4, 1999, and July 22, 2013. Authors employ a set of risk factors such as VIX and oil. Their results reveal a negative link between the DJIM and each of the VIX. Moreover, Yarayova et al. (2021) study the effect of gold, oil, bitcoin, VIX, and economic policy uncertainty (EPU) indices on the return of Islamic and conventional stock market during the coronavirus disease-2019 pandemic outbreak using the Vector Autoregressive Moving Average-Baba Engel, Kraft & Kroner-Asymmetric Generalized Conditional Heteroscedasticity (VARMA-BEKK-AGARCH) approach on daily data from April 11, 2019, to May 4, 2020. The study shows a negative link between the returns of the Islamic stock market and the VIX. However, Hadad et al. (2020) show that Islamic equity markets are known for lower sensitivity to global risk shocks including VIX shocks. This result supports the claim stating that sharia-compliant assets have a higher resilience to prevalent risk shocks. In addition, Banerjee et al. (2007) and Giot (2005) found a positive link between stock market performance and VIX arguing that an increased VIX index reflects an oversold market.

Another common global risk factor is the EPU. Economic policy uncertainty is a US news-based uncertainty index that has become a trending factor used in recent studies. Economic policy uncertainty is perceived as a proxy for the expectations of investors with regard to U.S. government's future response to economic problems (Liang et al., 2020). The empirical literature shows that EPU has a considerable impact on stock return. From the theoretical perspective, it has been stated that EPU has a negative impact on the SR (Liang et al., 2020). However, empirical results have been divergent, while Christou et al. (2017), Donadelli (2015), and Lean and Nguyen (2014) indicate a positive linkage between EPU and SR. Brogaard and Detzel (2015), Kang et al. (2016), and Bahloul and Ben Amor (2020) found a negative linkage. When it comes to Islamic stock indices, Hammoudeh et al. (2016) analyzed the impact of US federal funds rates and EPU on the indices of the Islamic, US, European, and Asian stock markets using the Structural Vector Error Correction Model (SVEC) and the Structural Vector Autoregressive Model (SVAR) models on daily data from 1999 to 2013. They found a negative impact of EPU on all indices. Their result is in line with Yarovaya et al. (2021). However, Hammoudeh et al. (2014), Nazlioglu et al. (2015), and Ftiti and Hadhri (2018) found that Islamic SR are unaffected by EPU shocks.

One of the prominent GRF in the literature is oil price. The growing financialization of oil price has made it a key factor in portfolio strategies (Lin & Su, 2020). Henriques and Sadorsky (2011) state that financial characteristics of oil price cause extreme fluctuations. Thus, oil price volatility is one of the important variables when constructing a portfolio strategy. According to the theory of equity valuation, the stock price is considered as an aggregate of the discounted values of expected future cash flows regarding distinct investment perspectives. This means that the stock price incorporates a set of macroeconomic events and indicators, such as inflation, market participants' trust, and oil shock (Hedi Arouri & Khuong Nguyen, 2010; Jouini, 2013). Furthermore, volatile oil prices may cause a low-risk premium, which might negatively affect cash flows and thus SR (Chang et al., 2020). To put it in a nutshell, the fluctuations in the oil market may pass to the stock market by affecting investors' expectations as the oil market can mirror the situation of the global economy (Liu & Chen, 2017; Zhu et al., 2016). Under the conventional stock market, mixed results have been found. While previous papers found a negative relationship between oil prices and SR (Driesprong et al., 2008; Filis, 2010; Kling, 1985; Sadorsky, 1999), recent papers found a positive relationship (Narayan & Narayan, 2010; Zhu et al., 2016). A different strand of the literature analyzes the linkage between crude oil and Islamic indices (Chang et al., 2020; Ftiti & Hadhri, 2018; Ghorbel et al., 2014; Mezghani & Boujelbène, 2018). Chang et al. (2020) studied the asymmetric effects of oil price on the DJIM and 10 sectorial stock indices by applying quantile-on-quantile approach using daily data over the period January 1996 to April 2019. They found that lower/upper quantiles of oil prices negatively impact the upper/lower quantiles of the DJIM. A similar study by Lin and Su (2020) found a negative link between oil market uncertainty and Islamic SR, especially when the Islamic stock market is bearish (low quantiles), using a quantile-on-quantile approach. Their results are in line with the findings of Yarovaya et al. (2021). However, Jawad et al. (2018) analyzed the link between Islamic stock markets and oil prices. They used a copula approach and three derivations of the value at risk measure: Conditional Value at Risk (CoVaR), Delta CoVaR, and VaR. Their results show a positive dependence between oil prices and Islamic SR. This is in line with the study by Naifar (2016) and Hammoudeh et al. (2014).

The MSCI world index is employed as an estimator to check for the integration of the local stock market with the global stock market. Jouini (2013) investigates the effect of MSCI on SR of Gulf Cooperation Council (GCC) countries. He used the VAR and the VEC models using weekly data from 2005 to 2008 and found a positive link between MSCI and Bahrain, Kuwait, and Oman markets. Yet, he found that MSCI negatively affects Saudi Arabia, Qatar, and UAE markets. Bahloul and Ben Amor (2020) found a positive link between SR and MSCI for MENA countries decreasing from lower to upper quantiles.

Turkish Stock Returns and Local Macroeconomic Indicators–Global Risk Factors

Regarding the Turkish context, few studies have analyzed the effect of local and global factors on the Turkish stock market. Çonkir et al. (2021) analyzed the effect of the VIX index on The Borsa Istanbul Index (BIST) 30 by applying the Granger causality test and VAR model using monthly data from 2015 to 2019. They found one-way causality between VIX and BIST 30. A similar result has been found by Kaya and Coşkun (2015) who applied Granger causality and regression analysis on daily data from 1995 to 2014. They conclude that VIX negatively affects BIST 100. In addition, Kaya (2015) checks for the cointegration between BIST 100 and VIX using daily data for the period from 2009 to 2013. He concludes that a long-term relationship exists between the BIST 100 and VIX. This is in line with the results of Öner, İçellioğlu, and Öner (2018) finding a one-way relationship of the long and short horizons between VIX and BIST 100. Furthermore, Tursoy and Faisal (2018) investigate the long- and short-term dynamics between Turkish stock prices, gold prices, and crude oil prices by applying Autoregressive Distributed Lag Model (ARDL) model to monthly data from January 1986 to November 2016. Their results show that a positive link exists between crude oil and stock prices. In addition, Erdoğan et al. (2021) use the Nonlinear Autoregressive Distributed Lag Model (NARDL) framework to look at the short-run and long-run asymmetric effects of risk factors on SR in Turkey using data from 1997 to 2020. Their results show that the Turkish stock market is more reactive to bad news transmitted/channeled through global factors than those transmitted by local macroeconomic variables. They claim that an increase in EPU

depresses real SR and an increase in oil price leads to a decrease in the SR. Lin and Su (2020) analyzed the relationship between the Islamic stock market and oil market uncertainty (OVX) by applying quantile-on-quantile approach to four countries including Turkey using daily data from 2013 to 2019. They conclude that OVX variations impact asymmetrically the Turkish participation index. They found that the estimated coefficients are negative.

As shown above, none of the previous studies has analyzed the impact of local and GRF on the Turkish participation SR across the changing market conditions.

Methodology

Following Bahloul and Ben Amor (2021) and Naifar (2016), we analyzed the relative effect of LMI and GRF on the participation index return. For this purpose, we used the following model.

$$PIR_t = \alpha_0 + \sum_{i=1}^{N} \beta_i LMI_{it} + \sum_{j=1}^{M} \delta_j GRF_{jt} + \varepsilon_t \quad (1)$$

In this model, *i* and *j* denote the LMI and global risk factors. α_0 and ε_t indicate intercept and disturbance. β_i represents the sensitivity of the participation index return in the Turkish stock market to the *i*th LMI and δ_j shows the sensitivity of the participation index return in the Turkish stock market to the *j*th global risk factors.

We provided the description of the variables as follows:

PIR_t: Participation index return in the Turkish stock market at time *t*;

LMI_t: The realization of the *i*th LMI in Turkey at time *t*;

GRF_t: The realization of the jth GRF in Turkey at time *t*.

To estimate this model, we used the quantile regression model developed by Koenker and Bassett (1978). The QR-A differs from OLS since it considers not only the mean value but also extreme values in a data set. Therefore, QR-A presents a broad relationship between regressed and regressors in a regression model (Koenker, 2005).

The quantile regression by Koenker and Bassett (1978) is shown as:

$$Q_y(\frac{\tau}{x}) = x'\beta(\tau) \quad (2)$$

In this model, it is assumed that the dependent variable *y* is linearly dependent on *x*. $Q_y(\frac{\tau}{x})$ indicates the conditional quantile of *y*.

$$Q_y(\frac{\tau}{x}) = \inf\left\{\frac{a}{F_y(a/x)} \geq \tau\right\} = \sum_k \beta_k(\tau) x_k \quad (3)$$

The dependent variable *y* has a conditional probability distribution function on *x* denoted by $F_y(a/x)$. In our study, we use LMI (CPI, SGB, CDS) and GRF (EPU, VIX, MSCI, OVX) to identify the determinants of participation index return (KAT30) in the Turkish stock market. We investigated KAT30 among the seven quantiles (0.05, 0.1, 0.25., 0.5, 0.75, 0.90, 0.95). For the quantile regression model, $\beta(\tau)$ quantifies the degree of dependence between *x* and τth conditional quantile of the dependent variable *y*. Therefore, if the values of $\beta(\tau)$ remain the same among the quantiles, the structure of dependence is named to be constant. If these values increase/decrease among the quantiles, the structure of dependence is named to be increasing/decreasing. If these values become similar/dissimilar for high and low quantiles, the structure of dependence is named to be symmetric/asymmetric (Koenker, 2005; Naifar, 2016). It is also noted that there is conditional/unconditional dependency if there is an exogenous/no exogenous variable in *x*.

For a given τ, the coefficients of independent variable *x* can be obtained by minimizing the weighted absolute difference between dependent variable *y* and independent variable *x* as:

$$\hat{\beta}(\tau) = \arg\min \sum_{n=1} (\tau - 1_{\{y_n < x_n\beta(\tau)\}}) \left| Y_n - x_n'\beta(\tau) \right|$$

Data Description and Preliminary Statistics

The data set employed in this study consists of the monthly data for the Turkish participation stock index returns represented by (KAT30) for the period from April 2011 to April 2021. Prior to 2011, some of the data were missing; furthermore, the period is a decade characterized by the European debt crisis (the crisis peaked between 2010 and 2012) and drastic political changes and volatility in the region—for instance the Arab Spring—that caused the decline of the stock markets. This period reflects the impact of these crises on the dynamics of the Turkish stock market return over time.

For local factors, we employed three macroeconomic indicators which are inflation rate (CPI), sovereign credit risk (CDS), and the term structure slope (SGB). SGB shows the difference between Turkey's 10-year Treasury bond rates and 3-year Treasury bond rates.

For global factors, we utilized the US VIX, EPU, MSCI world index, and the CBOE oil volatility index OVX.[2]

In Table 2, we provide the preliminary statistics of the variables.

Table 2 shows that KAT30 presents a mean of 2192,23 points and a standard deviation of 410,25 points. The world index (MSCI) records the highest average compared to the rest of the variables (43864,73), with the highest standard deviation (8515,01). A positive skewness characterizes our data set. The kurtosis statistic exceeds 3 (except for MSCI), with SGB and OVX scoring the highest kurtosis levels. The Jarque–Bera test shows that the null hypothesis is rejected for most series (except for KAT30), which means that the distribution is not normal.

Results

We applied QR-A to capture the dynamics of KAT30 among all the quantiles. For this purpose, we first controlled the stationarity of the variables using unit root tests: Augmented Dickey–Fuller (ADF) test by Dickey and Fuller (1979) and Philips–Perron (PP) test by Phillips and Perron (1988). Table 3 and Table 4 show the unit root test results. Augmented Dickey–Fuller and PP indicate the rejection of the null hypothesis of the unit root for all variables at level except for KAT 30, CPI, EPU, and CDS which are stationary at the first difference. These results present that all variables are stationary (at different levels). We estimated our model by applying a quantile regression model.

[2] MSCI, VIX, and EPU data are collected from DataStream, yahoo finance, and economicuncertainty.com, respectively. The rest of the data is available on Investing.com.

Table 1.
Literature Review Matrix

Reference	Market	Methodology	Result
Naifar (2016)	Global	Quantile regression	Inflation impacts Islamic stock return of the intermediate and upper quantiles
Bahloul and Ben Amor (2020)	MENA countries	Quantile regression	Negative relationship between inflation and stock performance for lower quantiles
Naifar (2016)	Global	Quantile regression	The U.S. sovereign 5-year CDS index positively affects Dow Jones Islamic Market Index (DJIMI)
Han et al. (2017)	United States	A combination of empirical methods	The slope of the CDS negatively affects cross-sectional SR
Naifar (2016)	Global	Quantile regression	Positive link between the slope of the yield spread and DJIMI returns
Paltrinieri et al. (2018)	Asia-Pacific, Europe, the United States, UAE	DCC-GGARCH model	Negative linkage between the implied volatility index (VIX) on both conventional and Islamic index
Naifar (2016)	Global	Quantile regression	Negative link between the VIX and DJIMI returns
Hammoudeh et al. (2014)	United States, Asia, and Europe	Copula approach	Negative link between the DJIM and each of the VIX
Yarovaya et al. (2021)	Global	VARMA-BEKK-AGARCH approach	Negative link between the returns of Islamic stock market and the VIX
Hammoudeh, et al. (2016)	United States, Europe, and Asia	SVEC and SVAR models	Negative impact of EPU on all indices
Reference	**Market**	**Methodology**	**Result**
Chang et al. (2020)	Global	Quantile-on-quantile approach	Lower/upper quantiles of oil prices negatively impact the upper/lower quantiles of the DJIM
Lin and Su (2020)	Canada, Japan, Turkey, and Kuwait	Quantile-on-quantile approach	Negative link between oil market uncertainty and Islamic SR
Yarovaya et al. (2021)	Global	VARMA-BEKK-AGARCH approach	Negative link between oil market uncertainty and Islamic SR
Jouini (2013)	GCC countries	VAR and the VEC models	*Positive link between MSCI and Bahrain, Kuwait, and Oman markets *MSCI negatively affects Saudi Arabia, Qatar, and UAE markets
Bahloul and Ben Amor (2020)	MENA	Quantile regression	Positive link between SR and MSCI for MENA countries decreasing from lower to upper quantiles
Tursoy and Faisal (2018)	Turkey	ARDL framework	Positive link exists between crude oil and stock prices
Erdoğan et al. (2021)	Turkey	NARDL framework	Increasing EPU depresses real SR and an increase in oil price leads to a decrease in the SR
Lin and Su (2020)	Canada, Japan, Turkey, and Kuwait	Quantile-on-quantile approach	OVX negatively impacts the Turkish participation index

Note: MENA = Middle East and North African; CDS = credit default swap; VIX = implied volatility index; EPU = economic policy uncertainity.

Table 5 presents the quantile regression results and illustrates the effect of local and global factors on the bearish market (Q0.05, Q0.1, Q0.25), normal (Q0.5), and the Bullish market (Q0.75, Q 0.9, Q0.95) (see Kangalli Uyar et al., 2021; Naifar, 2016; Zhu et al., 2016).

For the local factors, we noticed that CPI does not affect KAT30 except for the last quantile of the bearish market (Q 0.25). Credit default swap negatively affects KAT30 across all quantiles as expected except for Q0.75. This result indicates that CDS negatively affects KAT30 across bearish market's quantiles. When it

Table 2.
Preliminary Statistics

	KAT30	CPI	EPU	MSCI	CDS	SGB	VIX	OVX
Mean	929.49	10.63	2.02	43864.73	–10.82	236.61	17.96	36.41
Median	798.91	9	1.60	42327.50	–12.09	–0.29	16.01	32.44
Maximum	2379.9	25	9.90	67329.00	3.08	9468.26	53.54	170.55
Minimum	490.05	6	1.70	28064.00	–18.96	–5.01	9.51	15.61
Standard deviation	410.25	4.08	1.87	8515.01	5.27	1484.38	7.17	18.08
Skewness	2.01	1.50	2.98	0.42	1.02	6.08	2.10	3.98
Kurtosis	7.13	4.97	12.40	2.79	3.42	38.02	8.65	27.90
Jarque-Bera	166.98	64.74***	620.35***	3.85***	21.75***	6874.42**	248.35***	3418.04***

*** indicate 1% level of significance.

Table 3.
Unit Root Tests Results at level

	ADF	PP
KAT30	0.85	0.24
CPI	−2.97	−2.64
EPU	−9.29***	−9.36***
MSCI	−7.61***	−8.46***
CDS	−2.42	−2.30
SGB	−4.43***	−8.13***
VIX	−4.48***	−4.48***
OVX	−4.87***	−4.81***

** and *** indicate 5% and 1% level of significance, respectively.
Note: ADF = Augmented Dickey–Fuller; PP = Philips–Perron; EPU = economic policy uncertainity; CDS = credit default swap; VIX = implied volatility index; KAT30 = participation index 30; CPI = consumer price index; MSCI = world index, Morgan Stanley country index; SGB = Term structure slope; OVX = Oil volatility index.

Table 4.
Unit Root Tests Results at First Difference

	ADF	PP
ΔKAT30	−3.04**	−10.60***
ΔCPI	−8.09***	−8.78***
ΔEPU	−8.79***	−62.37***
ΔMSCI	−1.59***	−4.65***
ΔCDS	−11.42***	−13.12***
ΔSGB	−13.02***	−33.33***
ΔVIX	−9.82***	−18.94***
ΔOVX	−12.24***	−34.67***

** and *** indicate 5% and 1% level of significance, respectively.
Note: ADF = Augmented Dickey–Fuller; PP = Philips–Perron; EPU = economic policy uncertainity; CDS = credit default swap; VIX = implied volatility index.

comes to the bullish market state, at its start (Q 0.75), investors react positively to the good news in the economy. However, this effect does not hold long and the trend reverses (CDS negatively affecting KAT30). The impact of SGB on KAT30 is insignificant across all quantiles except for the last one (Q 0.95) that shows a positive impact of SGB on KAT30. The latter is in line with Naifar's (2016) results. That is, even if the SGB increases during a bullish market state, corporate profits increase and so do KAT30 returns.

When it comes to global factors, results show that for most quantiles, VIX has a negative impact on KAT30 as expected except for Q 0.75 and Q 0.95. Economic policy uncertainty (has a positive impact on KAT30 (Q0.1 and Q0.9), while it has a negative significant impact on KAT30 (Q0.95). These results are almost close to the results of Hammoudeh et al. (2014), Nazlioglu et al. (2015), and Ftiti and Hadhri (2018) stating that Islamic SR is unresponsive to shocks of EPU. The world index (MSCI) impact on KAT30 is insignificant except for the last upper quantiles (Q0.9 andQ0.95). In addition, OVX positively impacts the upper quantiles (Q0.9 and Q0.95) and positively affects KAT30 during a bullish market.

Discussion and Conclusion

This study analyzes the effect of LMI and GRF on the participation stock index in Turkey, using monthly data from May 2011 to April 2021. There is a wide set of research that analyzes the effect of LMI and GRF on the Turkish stock market. Yet, there are no studies investigating the effect of LMI and GRF on Turkish participation indices. The motivation of this study arises from this gap in the literature. This study bridges the gap in the empirical literature by analyzing the effect of local macroeconomic and GRF on the Turkish participation index KAT30 returns using a quantile regression method to study, first, dependencies between KAT30 and risk factors, second, to examine the integration of the Turkish stock market, and third, to check for potential diversification opportunities.

Our results show that, among local factors, monetary policy-related indicators (CPI and SGB) merely influence KAT30; however, CDS affects the index across all quantiles. This means that KAT30 is comparatively insensitive to interest rate channels represented by inflation and the spread of the term structure. This result is as expected considering that KAT30 firms' indebtedness ratios and their dependency on interest income are low as mentioned in the introduction section. Yet, the participation index is affected by the country's global risk reflected by the CDS; this is expected as the country's credit risk information is embedded in stock prices, which will in turn affect their returns. In fact, CDS reflects the country's ability to pay its external debts which means that an increase in CDS causes an increase in external debt risk premium. Therefore, while the cost of external debts increases, the ability of external indebtedness decreases. In this case, lower consumption and investment levels will decrease the revenues of companies, which will negatively affect their stock prices and thus their returns.

Table 5.
Quantile Regression Results

	Q0.05	Q0.1	Q0.25	Q0.5	Q0.75	Q0.9	Q0.95
Δlog CPI	−0.061	−0.030	−0.075*	−0.019	0.017	0.013	−0.07
ΔCDS	−0.015***	−0.011***	−0.014***	−0.012***	0.012***	−0.008***	−0.01***
SGB	−2.07E-06	9.50E-07	5.16E-07	3.48E-06	5.23E-06	6.34E-06	−1.11E-05***
Δlog VIX	−0.075*	−0.073**	−0.090***	−0.050**	−0.042	−0.084*	−0.05
EPU	4.6E-17	4.6E-17*	6.6E-18	2.1E-17	1.2E-16	2.1E-16**	−1.1E-05*
Δlog MSCI	−0.292	0.342	0.275	0.163	−0.079	0.359*	0.48**
Δlog OVXlag	−0.047	−0.020	−0.029	0.049	0.022	0.065**	0.08**
α	−.069***	−.051***	−.026***	.009	.024	.014	.04*
Adj R^2	.27	.23	.18	.14	.15	.22	.3

***, **, and * indicate 1%, 5%,and 10% level of significance, respectively.

When it comes to GRF, results show that KAT30 is generally affected by VIX across the low quantiles. This means that the VIX impact on KAT30 is stronger during market downturn. This relative asymmetric co-movement is in line with Whaley's (2009) result, who argues that VIX is more of an indicator that reflects the fear of investors from a recession than it is an indicator of investors' excitement. This shows that religiously conscious investors behave the same way as conventional investors during bearish markets. Yet, OVX and MSCI are mostly significant across upper quantiles. MSCI positively affects KAT30 index across upper quantiles. This means that the decoupling hypothesis is affirmed for Turkish participation indices during the normal and bearish phase. The Turkish participation stock market is integrated with the global stock market only during the bullish market. Also, this result implies that during market decline or recession (bearish market), KAT30 might be a safe haven for investors. Thus, Turkish participation indices might be a diversification tool for stock market investors. Lastly, OVX positively affects KAT30 across upper quantiles. The bullish market reflects a good economic condition and thus demand for crude oil increases followed by an increase in its price. This means increasing oil price volatility during the bullish market increases the KAT30 index. Furthermore, this result indicates that oil shocks affect the Turkish participation indices with lags; hence, the gradual information diffusion hypothesis is affirmed. This means that some investors in the Turkish stock market do not incorporate new information directly into their strategy, and investors underreact to new information by responding to them at belated points in time.

These findings are relevant and valuable as they provide a new perspective on the dynamics of KAT30 returns. Thus, this study provides a tool for fundamental investors targeting a sound long-term investment by identifying entry and exit strategy points considering bullish and bearish market conditions.

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Genişletilmiş Özet

Amaç

Bu çalışma, farklı piyasa durumlarında lokal makroekonomik göstergelerin ve küresel risk faktörlerinin Türk hisse senedi piyasasında katılım endeksi üzerindeki etkisini araştırmaktadır.

Araştırmanın Metodu

Lokal ve küresel faktörlerin farklı piyasa koşulları üzerindeki etkisini tespit etmek için Mayıs 2011'den Nisan 2021'e kadar olan aylık veriler kullanılarak kantil regresyon yaklaşımı ile analiz edilmektedir**.**

Bulgular ve Tartışma

Sonuçlar, lokal makroekonomik göstergeler arasında para politikasıyla ilgili göstergelerden CPI(SGB)'nin sadece düşüş piyasasında (yükseliş piyasası) KAT30'u etkilediğini gösterirken, CDS tüm kantillerde KAT30'u negatif etkilemektedir.Bu, KAT30'un enflasyon ve vade yapısının yayılması ile temsil edilen faiz oranına nispeten duyarsız olduğunu göstermektedir. Küresel risk faktörleri söz konusu olduğunda, sonuçlar KAT30'un Q0.75 ve Q0.95 dışındaki tüm kantillerde VIX'ten negatif etkilendiğini göstermektedir. Bu durum, düşüş piyasasında VIX'in KAT30 üzerindeki etkisinin daha güçlü olduğu göstermektedir. Bununla birlikte, OVX ve MSCI'nin etkisi, üst kantillerde pozitif ve anlamlıdır. Bu, KAT30 üzerindeki VIX etkisinin pazarın gerilemesi sırasında daha güçlü olduğu anlamına gelmektedir. Bu göreli asimetrik ortak hareket, VIX'in yatırımcıların heyecanının bir göstergesi olmaktan çok, yatırımcıların resesyon korkusunu yansıtan bir gösterge olduğunu savunan Whaley (2009)'un sonucu ile uyumludur. Bu, dini hassasiyeti olan ve olmayan yatırımcıların düşüş piyasalarında aynı şekilde davrandığını göstermektedir. Ancak, OVX ve MSCI'nin etkisi çoğunlukla üst kantillerde anlamlılık göstermektedir. MSCI, üst kantillerde KAT30 endeksini olumlu yönde etkilemektedir. Bu, normal ve düşüş döneminde Türkiye katılım endeksleri için ayrışma hipotezini desteklemektedir.