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The Effects of Market Interest Rate on Islamic Indices: A Heterogeneous Panel Data Analysis of Participation 30 Index Companies

Salih Ulev
Mucahit Aydın

Abstract: The aim of this article is to investigate the influence of market interest rate on Participation 30 index companies. The interest rate of Turkish government bonds traded in the secondary market was used for representing market interest rate. The study uses a panel data of 41 Participation index companies from 2011 to 2017. Using LM bootstrap panel cointegration test, we obtained results showing that the market interest rate affects the stock prices of P30 index companies. This effect is negative for ALBRK, KONYA, BAGFS, KOZAL and PRKME, but positive for all other companies. The least affected company from market interest rate is TTKOM, while the most affected company is LOGO. Moreover, it is noteworthy that 5 of the 10 companies with the lowest long-run coefficient are operating in the construction-raw material industry.

Keywords: Islamic Index, Participation Index, Heterogeneity, Bootstrap, Panel Cointegration

JEL Codes: G10, G20, C21, C23

Introduction

Islamic indices, which began to be formed in the late 1990s, helped investors having Islamic sensitivity invest in stocks more easily, by determining the compatibility of stocks with the criteria set by the Shari'ah scholars. Two basic screening criteria have been set for companies to enter these indices. One of these criteria was the criterion of the activity field and the other was financial ratio criterion. In activity field criterion, the main activity of the company had to be of field that Islam accepted as legitimate. According to this criterion, if a company's main ac-

@ Research Assistant, Sakarya University. salihulev@sakarya.edu.tr
Research Assistant, Sakarya University. aydinm@sakarya.edu.tr

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tivities are conventional banking, alcohol, tobacco products or pig products, these companies are not allowed to enter Islamic index. The companies compatible with activity field criterion are subject to second screening criterion i.e. financial ratio criterion. In financial ratio criterion, the following three sub-criteria are adopted:

- The ratio of total interest-bearing loans to total market value of the firm must be less than 33 percent
- The ratio of total interest-bearing financial assets to total market value of the firm must be less than 33 percent
- In case some subsidiary activities of the firm do not comply with the Shari'ah, the revenue generated by such activities must be less than 5 percent of the total revenue (O. Al-Khazali, Lean, & Samet, 2014a)

The criteria set by the scholars for early Islamic indices such as FTSE, Dow Jones Islamic Market Index were adopted by AAOIFI and were added to their Shari'ah standards in 2004 (AAOIFI, 2015: 549). AAOIFI announced the Shari'ah basis of this criterion as application of the rule of removal of hardship, acknowledging of general need, widespread practice, the acknowledged principles of surplus, shortage, and predominance (AAOIFI, 2015: 573). It referred to some decisions of the Shari'ah Boards of Islamic Banks. These criteria adopted by AAOIFI are still being discussed and there are studies proposing a new index as criteria (Gamaleldin, 2015; Yildirim & Ilhan, 2018; Hashim et al., 2017). Intense criticism has been made on the criteria related to the interest ratio. It has always been discussed that 33 percent interest ratio cannot be legitimate for Islamic law, which has been a controversial issue in the literature.

In this study, we tried to investigate how the existing criteria related to the interest rate has an effect on the companies. It is known that companies in Islamic indices are subject to criteria related to interest based financial ratio. If so, what are the consequences of these criteria in practice? In other words, how do these criteria affect the companies in the market? To answer these questions, we treated the market interest rate as a basic variable.

The market interest rate is accepted as the basic measure of the cost of debt financing. Since almost all the debt financing of the companies consists of interest-based loans today, the alteration in interest rates has significant impact on companies, especially on ones that are highly leveraged. When the market interest rates increase, their financing cost is also expected to increase. This situation causes their profitability to fall and would ultimately be reflected in their stock retur-

ns. If the companies use equity financing rather than interest-based loans, in other words, adhere strictly to these elimination criteria related to interest ratio, the alteration in interest rates would probably not have a significant impact on these companies. So what is the situation in the companies listed in Islamic indices? (Saraç & Ülev, 2017). Does the change in market interest rates affect these companies?

In this study, we aim to determine whether the market interest rate affects companies listed in the Islamic indices and, if it does, which companies does it affect and how. For this purpose, the companies in Participation 30 (P30) index, which were selected from the companies traded in BIST 100, were subjected to analysis. P30 index that was launched in 2011 is the first Islamic index in Turkey. This study using LM bootstrap panel cointegration test examines the relationship between daily closing stock prices of P30 index companies and the market interest rate.

One of the original contributions of this study is that each company in the P30 index is included in the analysis separately. The vast majority of the studies in the literature merely involve the own value of the P30 index in the analysis and do not analyze each company separately.

Literature Review

When we look at the studies dealing with Islamic indices, we observe that these studies can be classified into three basic categories. These categories are; studies analyzing the performance of Islamic indices, studies investigating the relationship among indices, and studies examining the relationship between indices and interest rates. This classification also gives a quantitative ranking of the studies at the same time. In other words, among studies on Islamic indices, the number of studies that deal with the topics in the first category is the highest. While the number of studies in the second category is less than the first, though not low. The studies in the third category are the ones with the lowest number.

The studies in the first category are studies evaluating the return performance of Islamic indices. When the return performance of Islamic indices is evaluated in these studies, it is generally compared with the conventional counterpart. The studies in this category and their results are summarized below.

Hassan, (2002) examined market efficiency and risk-return relationship of DJIMI between 1996 and 2000, and found that DJIMI was efficient and its revenues were normally distributed. Elfakhani, Sidani, & Fahel, (2004) assessed the

performance of 46 Islamic funds by separating them into 8 categories according to their regions and sectors. They compared these funds with both the performance of Islamic indices and conventional indices. When fund categories were compared to Islamic indices, four of the eight fund categories performed better than the Islamic indices. When they were compared with conventional indices, four categories performed better than conventional indices as well. Girard & Hassan (2005) compared the performance of Dow Jones Islamic Index with its counterpart conventional index using various measures including Sharpe, Treynor, Fama, Charhart and analyzed the cointegration relationship between these two indices. They did not find any significant difference between the performance of Islamic index and non-Islamic index. Hussein (2004) compared the performance of FTSE Global Islamic Index with FTSE All World Index between 1996 and 2002. He found that FTSE Islamic index had a significant positive return performance in bull market period, but it fell behind the performance of FTSE All World index in bear market period. Forte & Miglietta (2007) compared Islamic funds with social responsible funds and demonstrated their similarities and differences. Hussein (2007) analyzed the returns on DJIMI and FTSEGII by dividing the study period into four sub-periods: introduction period, bull period-1, bear period, and bull period-2. He found that both Islamic indices outperformed their conventional counterparts in the introduction and bull-1 period, while they showed lower performance in the other two periods. Girard & Hassan (2008) analyzed the performances of FTSEGII, FTSE Asia Pasific Index, FTSE Islamic America Index and FTSE Islamic Europe Index using various measures including Jenson, Sharpe, Treynor and Jenson & Fama, and compared the results with those of conventional counterparts. In addition, he tested the cointegration link between Islamic indices and conventional ones and found that FTSE Islamic index and its counterpart were cointegrated, contrary to the findings of Hakim & Rashidian (2004). Kok, Giorgioni, & Laws (2009) examined the relationship between Islamic indices, conventional indices and sustainability indices. They constituted four different portfolios including DJIMI, DJ conventional index, DJ sustainability index, FTSE Islamic index, FTSE conventional index and FTSE4G sustainability index and investigated the possibility of risk diversification among these indices using the Johansen cointegration test. They found that there is a possibility of risk diversification when a portfolio containing the conventional index, the sustainability index and the Islamic index is created. Al-Khazali, Lean, & Samet (2014b) compared the performance of the DJIMI with the performance of the DJ conventional index using the stochastic dominance (SD) approach. Islamic indices performed better than conventional indices only in crises times,

while conventional indices performed better than Islamic indices in all other times. Al-Khazali et al. (2015) investigated the efficiency of 9 Islamic indices in comparison with conventional indices using random walk and martingale hypothesis. The study included 1997-2012 period and examined this period by dividing it into five different sub periods. The author found that Islamic indices are more efficient than conventional ones in some periods. Yildiz (2015) and Seçme et al. (2016) compared Participation 30 index to BIST100 index. In both studies it was found that the performance of the Participation 30 Index is better than the BIST100 index. Sarılı ve Yıldırtan (2016), in their study comparing the performance of S&P, Dow Jones, Morgan Stanley and FTSE Islamic indices, found that S&P Islamic index had the highest return, while FTSE Islamic index had the lowest.

The studies in the second category are those examining the correlation, cointegration and causality relationship between Islamic indices and its conventional counterparts. Theoretical and empirical studies based on the specific characteristics of these indices can also be added to this category. The studies in this category and their results are summarized below.

Abdul Rahim et al. (2009) investigated the correlation and the level of information transfer among the Islamic indices in Southeast Asia. They found a low correlation between Kuala Lumpur Syariah Index (KLSI) and Jakarta Islamic Index (JII). They also showed that there is a one-way information transfer that influences the return and volatility from KLSI to JII. El Khamlichi et al. (2014) examined the relationship between Dow Jones, FTSE, S&P, MSCI Islamic indices and their conventional counterparts. They found a cointegration relationship between the FTSE Islamic index and FTSE World index, MSCI Islamic index and MSCI World index, while they did not find any cointegration relationship between DJIMI and its conventional counterpart, and S&P Islamic index and its conventional counterpart. Majdoub & Mansour (2014) examined the correlation between US stock market and Islamic indices of five developing countries (Turkey, Indonesia, Pakistan, Malaysia and Qatar) and found that there is a weak correlation between these markets. Ata & Buğan (2015) examined the causal relationship between Islamic and conventional indices. They used MSCI and Dow Jones indices which are launched for Turkey. They found causality relationship between conventional indices and Islamic indices in different periods. Rizvi & Arshad (2018) examined the nature of time-varying systematic risk for both Islamic and non-Islamic sectoral indices. They show that both Islamic and conventional indices follow a similar cyclical pattern over time. Abu-Alkheil et al. (2017) analyzed 32 conventional and 32 Islamic indices from FTSE, DJ, MSCI,

S&Ps and Jakarta series. They did not find any incidence of cointegration links over the long-run between 31 pairs of Islamic and their respective conventional benchmark indices. Using various unit-root tests Savaşan et al. (2015) tested whether the effect of exogenous shocks on the participation index is permanent. Their study provides evidence that such effect is permanent. (S. Elfakhani et al. (2005) measured fund managers' timing and securities selection abilities using Treyno Mazury model. The results show that Europe, America, Emerging Markets and Technology funds have a positive security selection, but only the positive selection of emerging market funds is significant. Zandi et al. (2014) compared the criteria of the Malaysia Shariah Advisory Council with the criteria of other Islamic indices (DJIMI, FTSE, MSCI, S&P) and investigated which index is more rigid, in other words which index is more Islamic.

The studies in the third category are those that investigate the relationship between Islamic indices and market interest rates. In some of these studies, besides market interest rates, the effect of some economical indicators on Islamic indices was also measured. The studies in this category and their results are summarized below. Hakim & Rashidian (2004) investigated how Dow Jones Islamic Market Index (DJIMI) is related with Wilshire 5000 and treasury bonds with three-year maturity. Their unit-root test showed that both DJIMI and Wilshire 5000 are efficient. In addition, they found that DJIMI is not cointegrated with W-5000 and three-month T-Bills. Yusof & AbdulMajid (2007) measured the effect of macroeconomic variables on Islamic and conventional indices. They found that the reaction of Islamic index to variables except interest rate is not different from the conventional index, however, reaction of the Islamic index were not significantly responsive to changes in interest rates. Shamsuddin (2014) compared DJIMI with its conventional counterpart by examining whether DJIMI was exposed to interest rate risk. They found that DJIMI is less exposed to interest rate risk. Saraç & Ülev (2017) examined the relationship between Participation 30 index and BIST100 index using cointegration and causality test. They found that while there exists no causality between participation index and market interest rates, there is causality between BIST100 index and the market interest rates. Akhtar et al. (2017) analyzed the impact of interest rate surprises on Islamic and conventional stocks and bonds. They found that interest rate surprises affect Islamic bonds less than their conventional counterparts, and Islamic stocks more. Umar et al. (2018) analyzed the sensitivity of DJIMI and its conventional counterpart on market interest rate. They found that the sensitivity of DJIMI on market interest rate is not different from conventional index.

Data and Methodology

Research Data

In this study, daily closing stock value of the companies listed on P30 index (SP) and daily interest rates of Turkish government bonds (BND), having two year maturity and once in 3 months coupon payment, data is used for the period 2011-2017. The interest rates of these government bonds are called indicative interest rates because they have high volume and sound price mechanism.

The companies in the P30 index are subject to quarterly monitoring as other Islamic indices. Companies that do not meet the index criteria are removed from the index. Instead of those companies, other companies which meet the index criteria and have the highest market value are included in the index (Participation Index, 2011). Therefore, the companies involved in the index may change over time. For this reason, the companies which are in P30 index for a total of 27 periods between 03/2011 and 09/2017 were selected. In these 27 periods, the companies being in P30 index for at least 5 periods were included in the analysis and it was determined that the number of these companies is 48. Since the data used in this study started from January 2011 which is the launch date of the P30 index, we removed the data of 7 companies (TMSN, TATGD, NETAS, TKNSA, IZMDC, EDGE, PGSUS) from the analysis. The companies included in the analysis are shown in the table below.

Table 1.
P30 Companies and Frequency of Being in Index

Stock	Number of Periods	Stock	Number of Periods	Stock	Number of Periods
AKCNS	27	PETKM	20	BAGFS	9
ALBRK	27	MRDIN	19	TTKOM	9
BIMAS	27	CIMSA	18	ERBOS	8
FROTO	27	PETUN	17	HEKTS	8
GOODY	27	BOLUC	15	TRKCM	8
NUHCM	27	EGEEN	15	VESBE	8
PNSUT	27	KONYA	15	GOLTS	7
TTRAK	27	LOGO	15	KOZAL	7
SODA	25	ALKIM	14	CEMTS	6
AYGAZ	23	THYAO	14	EGSER	6

BUCIM	23	ADANA	13	PRKME	6
SELEC	22	ULKER	11	AKMGY	5
ENKAI	21	AFYON	10	BRISA	5
KARTN	21	AKSA	9		

Research Methodology

In this study, the relationship between variables was examined using cointegration tests. For this purpose, firstly, the possibility of cross-sectional dependency in the model using CD tests was investigated. Secondly, the stationarity of the variables was determined using CIPS panel unit root test which take cross-sectional dependency into consideration. Thirdly, using the unit rooted series, the long-run relationship between the variables was examined via LM bootstrap panel cointegration test. Finally, the long-run coefficients of the variables that were found to be cointegrated in the long run were estimated.

Cross-sectional dependency

If the relationships between the cross-sectional data are not taken into consideration, they cause misleading results. Since the study used companies with the same characteristic, we first conducted cross-sectional dependence tests. For this purpose, cross-sectional dependence of the panel was examined using Breusch and Pagan (1980) LM test and Pesaran (2004) LM tests. We used the following panel data model for testing cross-section dependence.

$$\ln SP_{it} = \alpha_i + \beta_i^{'} \ln BND_{it} + \varepsilon_{it} \quad i = 1,..,N \;\; t = 1,...,T \tag{1}$$

where i and t are the indices of the cross-section units and time dimension, respectively. α_i and β are the constant and slope coefficients that change for each cross-section unit, respectively. Breusch and Pagan (1980) developed the following test statistic from the equation 1.

$$CD_{BP} = T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}^{2}$$

Breusch and Pagan (1980) test has a disadvantage. As per literature it is inapplicable in situations where N is large i.e. $N \to \infty$. Pesaran (2004) developed the following LM statistic in order to overcome this problem.

$$CD_{LM} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T\hat{\rho}_{ij}^2 - 1)$$

Pesaran (2004) suggests the use of the following test statistic in case the cross-sectional size is larger than the time dimension ($N > T$).

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \right)$$

The $\hat{\rho}_{ij}$ in all the test statistics indicates the correlation between the errors which is estimated from equation 1. The null and alternative hypotheses used in all models for the cross-sectional dependence test are as follows.

$H_0 : Cov(u_{it}, u_{ij}) = 0$ *no cross-section dependence*

$H_1 : Cov(u_{it}, u_{ij}) \neq 0$ *cross-section dependence*

CIPS Panel Unit Root Test

The panel unit root test can be evaluated in two groups according to whether it considers cross-section dependency or not. Since cross-section dependency was determined in this study, we used the panel unit root test which takes it into consideration. Peseran (2007) developed a cross-sectional augmented ADF (CADF) panel unit root test, which takes into account the cross-section dependency. The model developed for the CADF test is as follows;

$$\Delta y_{it} = a_i + b_i y_{i,t-1} + c_i \overline{y}_{t-1} + d_i \Delta \overline{y}_t + e_{it}$$

It is defined here $\overline{y}_t = N^{-1} \sum_{i=1}^{N} y_{it}$ and $\Delta \overline{y}_t = N^{-1} \sum_{i=1}^{N} \Delta y_{it}$. Using the CADF statistics obtained for each cross-section unit, cross-sectional augmented IPS (CIPS) panel unit root test statistic is calculated as follows:

$$CIPS(N,T) = N^{-1} \sum_{i=1}^{N} t_i(N,T)$$

Pesaran (2007) obtained the critical values of the CIPS statistic. The null hypothesis is based on the assumption that no series in the panel is stationary.

LM Bootstrap Panel Cointegration Test

In this study, panel cointegration test developed by Westerlund and Edgerton (2007) was used, which can be used in heterogeneous and cross-sectional dependency situations.

$$LM_N^+ = \frac{1}{NT^2}\sum_{i=1}^{N}\sum_{t=1}^{T}\hat{w}_i^{-2}s_{it}^2$$

where s_{it}^2 shows the partial sums of error terms, $\hat{w}_i^2$ shows long-run variances of error terms. The null hypothesis that cointegration exists is tested by the calculated test statistic. In case of cross-section dependency, critical values calculated by bootstrap are used in the test. Monte Carlo simulations demonstrate that the test can also be used in small sample situations.

Research results and discussion

In the study, it was first investigated whether the model used has cross-sectional dependency. Table 2 shows the results of cross-section dependency tests. Th e results demonstrate the presence of cross-sectional dependency in the model according to three different test statistics. In this case, the companies in the panel are likely to influence each other.

Table 2.
Results of Cross-Sectional Dependence and Slope Homogeneity Tests

Tests	Statistics	P-value
CD_{BP}	6628.924*	0.000
CD_{LM}	1495.891*	0.000
CD	697.409*	0.000

*indicates the rejection of null hypothesis at 1% significance levels.

Table 3 shows the CIPS panel unit root test results considering cross-section dependency. According to the obtained results, all variables have a unit root at the level, while they are stationary in first differences.

Table 3.
Results of CIPS Panel Unit Root Test

	Level		First difference	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
lnBND	-2.39	-2.46	-13.354*	-13.145*
lnSP	-2.50	-2.59	-31.551*	-31.566*

* indicates the rejection of null hypothesis at the 1% significance level.

The results of the panel cointegration test, which is applied by using variables having unit root at the level and taking into account the cross-section dependency, are shown in Table 4. According to the panel cointegration test, a long-run relationship was found between variables in the model where lnSP is dependent variable and lnBND is the independent variable. The coefficients of this long-run relationship were calculated using MG estimator which takes cross-section dependency into consideration.

Table 4.
Results of LM bootstrap panel cointegration test

Dependent variable	LM statistics	Bootstrap p-value
lnSP	150.724	0.820

Note: The bootstrap is based on 1000 replications. The null hypothesis of this test is cointegration between variables.

Table 5 indicates the results of MG Long run estimations. According to the results, interest rates of bonds have a significant effect on stock closing prices for all companies. This effect is negative for ALBRK, KONYA, BAGFS, KOZAL and PRKME, but positive for all other companies.

Table 5.
Results of MG Long-run Estimations

Company	Industry	Coefficient	Z-stat	P-value
TTKOM	Communications Services	0.005*	0.44	0.000
KONYA	Construction - Raw Materials	-0.0468*	-3.3	0.001
KARTN	Containers & Packaging	0.0764*	4.54	0.000
MRDIN	Construction - Raw Materials	0.1086*	7.72	0.000
BUCIM	Construction - Raw Materials	0.1368*	7.22	0.000
BAGFS	Chemical Manufacturing	-0.1381*	-6.91	0.000
NUHCM	Construction - Raw Materials	0.1915*	15.76	0.000
PNSUT	Food Processing	0.2829*	11.42	0.000
GOLTS	Construction - Raw Materials	0.3377*	13.5	0.000
ALBRK	Finance	-0.3468*	-17.34	0.000
AKMGY	Real Estate Operations	0.3986*	17.17	0.000
PRKME	Metal Mining	-0.4124*	-14.05	0.000
KOZAL	Gold & Silver	-0.4656*	-12.88	0.000

THYAO	Airway	0.4814*	8.25	0.000
BRISA	Tires	0.62561*	14.35	0.000
BIMAS	Retail (Grocery)	0.6379*	17.72	0.000
SELEC	Biotechnology & Drugs	0.6382*	20.32	0.000
GOODY	Tires	0.6563*	16.07	0.000
TRKCM	Constr. - Supplies & Fixtures	0.6746*	18.57	0.000
ENKAI	Construction Services	0.7658*	25.06	0.000
AKCNS	Construction - Raw Materials	0.8349*	26.04	0.000
AYGAZ	Oil & Gas Operations	0.8360*	26.06	0.000
ULKER	Food Processing	0.8733*	13.07	0.000
TTRAK	Constr. & Agric. Machinery	0.9540*	16.56	0.000
ALKIM	Paper & Paper Products	0.9794*	19.35	0.000
CIMSA	Construction - Raw Materials	0.9829*	21.37	0.000
EGSER	Constr. - Supplies & Fixtures	1.0088*	21.39	0.000
ADANA	Construction - Raw Materials	1.0453*	25.05	0.000
PETUN	Food Processing	1.0507*	26.04	0.000
FROTO	Auto & Truck Manufacturers	1.0679*	20.4	0.000
ERBOS	Constr. - Supplies & Fixtures	1.2976*	26.97	0.000
CEMTS	Iron & Steel	1.3118*	30.99	0.000
AFYON	Construction - Raw Materials	1.3445*	22.31	0.000
PETKM	Chemical Manufacturing	1.4201*	25.82	0.000
HEKTS	Chemical Manufacturing	1.5648*	25.42	0.000
AKSA	Chemicals - Plastics & Rubber	1.586*	30.2	0.000
BOLUC	Construction - Raw Materials	1.8679*	25.68	0.000
VESBE	Appliance & Tool	1.9742*	23.64	0.000
SODA	Chemical Manufacturing	2.081*	35.56	0.000
EGEEN	Auto & Truck Parts	2.3505*	26.5	0.000
LOGO	Software & Programming	3.256*	22.95	0.000

* indicates the rejection of null hypothesis at the 1% significance level.

Conclusion

In this study, the effect of the market interest rates on the companies in the P30 index has been investigated. For this purpose, the long-run relationship between stock prices of companies listed in the P30 index over 2011-2017 and interest rates of Turkish goverment bonds, having two year maturity, has been analyzed using LM bootstrap panel cointegration test. According to the results of the cointegration test, it is found that there is a long-run and significant relationship between the market interest rate and all of the examined 41 companies. The coefficients of the long-run relationship are calculated using the MG estimator taking into account cross-section dependency.

The least affected company from market interest rate is TTKOM, while the most affected company is LOGO. The long-run coefficient of TTKOM is 0.005 while of LOGO is 3,256. This means that an increase of 1 percent in market interest rates affects TTKOM by 0.005 percent while affects LOGO by 3.256 percentage points. Moreover, it is noteworthy that 5 of the 10 companies with the lowest long-run coefficient are operating in the construction-raw material industry. According to this result, it can be said that the companies operating in the construction-raw material industry are less affected by the market interest rates. Another result of the model is about the stock prices of the first Islamic bank in Turkey, namely ALBRK that indicates a negative correlation with interest rates. This result is in line with the expectation towards stock prices of conventional banks for which profit declines in the increasing interest rate environment because of the narrowing net interest margin. Although ALBRK is not using interest in their operations, they are affected by the market rates because of the small size of the Islamic banks (around 5%) in the Turkish banking sector.

As a result, the companies in the P30 index are subject to two different elimination criteria, the latter requiring interest-related rates to be below a certain level. It can be considered that the companies which qualify the second elimination criteria will not be affected by the market interest rates. But the results of this study demonstrate that P30 companies are affected by market interest rates. In this context, it is important to consider the criticism of those who believe the upper limit on interest rate ratio in the second elimination criterion to be too high.

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