THE EFFECTS OF THE COVID-19 PANDEMIC ON CONVENTIONAL AND ISLAMIC STOCK MARKETS IN TURKEY

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Abstract

In order to reveal the macroeconomic effects of the Covid-19 pandemic, financial markets should also be handled in addition to the real sector. Investigating the changes in the stock market may give clues to analyze the effects of the pandemic on financial markets. The researches in question can be carried out for a country group or a single country. Studies that are conducted for a single country allow researchers to analyze problems more precisely and put forward more specific and convenient policy suggestions. Furthermore, while investigating the effect of the pandemic on stock markets, handling conventional and Islamic stock markets together can provide more comparative and realistic data in determining the policies regarding financial markets.

The aim of the study is to examine the reaction of conventional and Islamic stock markets to the Covid-19 outbreak in Turkey. In the study, the DCC-GARCH method was applied by using the daily data from Feb 10, 2011 to Sep 02, 2020. The empirical results indicated that Islamic stock markets are more stable to the global Covid-19 outbreak shock than the conventional stock market in Turkey. Based on these findings it can be suggested that Turkey should take steps to support the development of the Islamic financial system to have a sounder financial system.

Keywords: Islamic Economy, Covid-19, Participation index, ISE 100 index, Financial markets.

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TÜRKİYE'DE COVID-19 PANDEMİSİNİN GELENEKSEL VE İSLAMİ BORSALAR ÜZERİNDEKİ ETKİLERİ

Covid -19 pandemisinin makro ekonomik etkilerinin ortaya konması açısından reel sektörün yanısıra finansal piyasaların da takip edilmesi gerekmektedir. Pandeminin finansal piyasalar üzerindeki etkisi araştırılırken özellikle borsada meydana gelen değişikliklerin ortaya konması gerekmektedir. Söz konusu araştırmalar ülke gurubu için yapılabileceği gibi tek ülke için de gerçekleştirilebilir. Tek ülke verileri kullanılarak gerçekleştirilecek çalışmalar sorunun daha derinlemesine analiz edilmesine imkan sağlamaktadır. Pandeminin borsa üzerindeki etkisi araştırılırken geleneksel ve İslami endeksleri birlikte dikkate almak finansal piyasalara ilişkin politikaların belirlenmesinde daha gerçekçi verilerin elde edilmesini mümkün kılacaktır.

Bu çalışmanın amacı, Covid -19 pandemisine geleneksel ve İslami borsanın bulaşma ve ayrışma açısından gösterdiği tepkiyi incelemektir. Çalışmada 10 Şubat 2011 – 02 Eylül 2020 dönemine ilişkin günlük veriler kullanılmış ve DCC-GARCH yönteminden yararlanılmıştır. Elde edilen sonuçlara göre, Türkiye'de küresel Covid -19 pandemisi şoku karşısında İslami borsa, geleneksel borsadan daha istikrarlıdır. Bu sonuca göre Türkiye'de İslami finansal sistemin geliştirilmesine yönelik adımlar güçlendirilmelidir.

[Türkçe geniş öz çalışmanın sonunda yer almaktadır.]

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Introduction

The coronavirus, which was first seen in Wuhan, China in December 2019, spread all over the world in a short time and turned into a pandemic. Unfortunately, all economies have been struggling against the Covid-19 Pandemic and so far there is no specific solution to alleviate the negative effects of the pandemic. To reveal the impacts of the pandemic on economies can be possible by examining not only changes in indicators such as inflation, economic growth, foreign trade, and unemployment but also the dynamism and volatility in financial markets. Changes in financial markets, in particular, are one of the most important variables followed by economic agents. By monitoring these markets, economic agents adjust their portfolios as well as their investment decisions. Nevertheless, the guiding function of financial markets weakens when instability in these markets goes up. To reveal the magnitude of the instability in financial markets, it is a trusted way to investigate the impacts of the pandemic on stock market indices. The investigation of instability trends in stock market indices in the pandemic period can be provided for a single country or a country group.

This study goes to the heart of the matter on the impact of the Covid-19 pandemic on the financial markets of Turkey. Indeed, strong structural reforms were carried out in Turkey in the 2000s and the country showed a remarkable macroeconomic performance. However, comparing with the conventional system, Islamic financial markets has still a small part in the financial sector of Turkey.

It should be noted that analyzing the financial sector performance of a developing country with a strong economic potential during the pandemic period will guide the measures to be taken for the uninterrupted and sustainable economic growth. In our study, to evaluate the stability in the financial markets, the Islamic index was also taken into account in addition to the conventional index. Actually, the magnitude of Islamic finance in the financial system of Turkey is very limited. It should be underlined that accessing low-cost additional funding by strengthening the Islamic financial system leads a new and alternative opportunity to raise public and private sector investments. Revealing the strength of the participation index in the economic downturns such as the pandemic period can be used as a data source for policy implementations for the development of the Islamic financial system. Furthermore, the fact that Islamic finance has a stabilizing feature in economic downturns will encourage policymakers to apply Islamic financial instruments more in different investments.

The aim of the study is to examine the reaction of the conventional and Islamic stock market to the Covid-19 outbreak in Turkey. The daily data over the period Feb 10, 2011 –Sep 02, 2020 were included and the DCC-GARCH method was applied in the analysis. To the best of our knowledge, this paper is the first attempt in the literature which investigates the impacts of the Covid-19 Pandemic on conventional and Islamic stock markets in Turkey. This paper also comes to the fore as one of the first studies to examine the dynamic relationship between the Islamic stock market and Volatility Implied Index in Turkey.

The rest of the paper is composed of three parts: In the first part, there is the literature review; in the second part, the econometric analysis was explained; and in the third part the data and the empirical results were discussed.

A. Literature Review

Not only macroeconomic variables[1] but also outbreaks are effective both on the Islamic stock market and the conventional stock market. Ichev and Marinč (2018) found that the Ebola epidemic caused negative returns in financial markets in the 2014-2016 period. Chen et al. (2009) investigated the negative impacts of the SARS epidemic on stock returns in Taiwan for the period of September 25, 2002 to May 21, 2003. It was concluded that while the SARS had a negative impact on the tourism, wholesale, and retail industries, it had a positive effect on the biotechnology sector. Chen et al. (2018) examined the impact of SARS on the stock market integration between China and four Asian stock markets (Hong Kong, Taiwan, Singapore, and Japan) over the period 1998-2008. The authors found that the SARS weakened the long-term relationship between China and the stock markets included in the research.

In the proceeding paragraphs, the findings of the studies investigating the effects of the Covid-19 pandemic on the stock market are summarized by considering their research subject.

Topcu and Gulal (2020) examined the impact of Covid-19 on 26 emerging stock markets for the period of March 10, 2020-April 30, 2020. The empirical findings showed that the negative effects of the pandemic are gradually alleviating. The authors also concluded that the impacts of the pandemic were not felt at the same level in every region. Asian emerging markets have been the uttermost affected region by the pandemic. Al-Awadhi et al. (2020) investigated the negative impacts of a pandemic on the Chinese stock market in the period January 10, 2020 to March 16, 2020. Empirical findings showed that the pandemic had significant adverse effects on stock market returns. Okoriea and Lin (2020) investigated the fractal contagion effect of the pandemic on the stock markets using data from 32 countries for the period of 1st October 2019 to 31st December 2019 and 1st January 2020 to 31st March 2020. Based on the test results, it was concluded that the Covid-19 pandemic had a significant short-term contagion effect on the stock markets.

Baek, Mohanty, and Mina (2020), investigated the effects of the pandemic on the U.S. stock market volatility at the industry level over the period January 2, 2020- April 30, 2020. It was determined that changes in

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[1] Bhuiyana and Chowdhury (2020); Parab and Reddy (2020); Erdoğan, Gedikli and Çevik (2019 and 2020).

volatility is more sensitive to the Covid-19 news rather than the economic variables. By using the data over the period February 27, 2020 to April 30, 2020, Jelilov et al. (2020) investigated the effect of the pandemic on the relationship between stock market returns and inflation in Nigeria. According to the findings, the pandemic not only accelerates the volatility but also distorts the positive relationship between the variables. On the same subject, Waheed et al. (2020) searched the impacts on the Pakistani stock market for the period of February 26, 2020-April 17, 2020. They determined that although the stock market made a dip at the beginning of the pandemic, it had recovery signals after the measures were initiated to decrease the negative effects of the recession. Apergis and Apergis (2020) conducted a similar study for China and searched the impacts on stock market returns and volatility for the period January 22, 2020- April 30, 2020. The authors concluded that the pandemic had a significant negative effect on stock returns. It was also found that the pandemic had a positive and statistically significant effect on stock market returns volatility.

In another study, Ashraf (2020) investigated the impacts of the pandemic in 64 countries over the period of January 22, 2020-April 17, 2020. The author concluded a reverse relationship between the number of infected people and stock market returns. In other words, as the number of cases increased, stock market returns decreased. Albulescu (2020) investigated the impact of official statements on the new cases and the mortality rate on financial markets volatility in the US in the period March 10, 2020 to May 15, 2020. In the study, the S&P 500 3-month realized volatility index was used as an indicator of the volatility of financial markets. It has been demonstrated that the presence of new cases and the increase in the mortality rate raised financial volatility both domestically and globally. Bakas and Triantafyllou (2020) investigated the effect of economic uncertainty related to pandemics on the volatility of commodity markets. The empirical results indicated that while the uncertainty had a significantly negative effect on crude oil market volatility; it had a positive but less significant effect on the gold market. Yar (2020) examined the impacts of the pandemic on the performance of the Pakistani stock market for the first half of 2020. The author pointed out that the pandemic recoveries were effective in the performance of the market. However, the relationship between Covid-19 positive cases and deaths and the performance of the index was not significant.

B. Econometric Framework

In this study, we employ bivariate multivariate GARCH models such as

the Dynamic Conditional Correlations (DCC) model suggested by Engle (2002), Asymmetric DCC (ADCC) model suggested by Cappiello, Engle, and Sheppard (2006), and the corrected DCC (cDCC) model suggested by Aielli (2013) to obtain dynamic conditional correlations between stock market (conventional and Islamic) and Volatility Implied Index (VIX). There is well-documented literature that examines the validity of the decoupling hypothesis for the Islamic stock markets by using a multivariate DCC model (Rizvi and Arshad, 2014; Kenourgios, Naifar, and Dimitriou, 2016; Rahim and Masih, 2016).

The DCC-GARCH model has some advantages. First, it provides time-varying conditional correlation coefficients to test the contagion effects, if any, in both tranquil and crisis periods. Moreover, it allows dynamic correlation coefficients to be obtained through standardized residuals, taking into account heteroscedasticity.

DCC-GARCH model consists of a two-stage estimation process. In the first stage, the univariate GARCH model is estimated. In the second stage, dynamic conditional correlations are calculated. The bivariate DCC-GARCH model can be implemented as follows: let $y_t \equiv [y_{1t}\ y_{2t}]'$ be a 2×1 vector containing the past observations in a conditional mean equation. The reduced-form VAR represented in the conditional mean equation as follows:

$$A(L)y_t = \varepsilon_t, \qquad \varepsilon_t \sim Student - t(0, H_t)\ t = 1, \dots, T \qquad (1)$$

where $A(L)$ is a matrix for the autoregressive coefficients, L is the lag operator and $\varepsilon_t = [\varepsilon_{1t}, \varepsilon_{2t}]$ is a vector of standardized residuals with the following specification;

$$H_t \equiv D_t^{1/2} R_t D_t^{1/2} \qquad (2)$$

where $D_t = \text{diag}\{\sqrt{h_{it}}\}$ is a 2×2 diagonal matrix of time-varying standard deviation from the GJR-GARCH (1,1) models and $R_t \equiv \{\rho_{ij}\}_t$ for $ij = 1,2$, which symmetric dynamic conditional correlation coefficients of the standardized residuals.

The conditional standard deviations in D_t, is obtained from the univariate GJR-GARCH (1,1) model as follows:

$$h_{it} = \omega_i + \alpha_i \varepsilon_{it-1}^2 + \gamma_i \varepsilon_{it-1}^2 I_{\{\varepsilon_{t-1}<0\}} + \beta_i h_{it-1} \quad \forall i = 1, 2. \qquad (3)$$

Engle (2002) showed the structure of DCC as follows:

$$R_t = (Q_t^*)^{-1/2} Q_t (Q_t^*)^{-1/2} , \tag{4}$$

where

$$Q_t = (1 - a - b)S + a\varepsilon_{t-1}\varepsilon'_{t-1} + bQ_{t-1} \tag{5}$$

In Equation (5), *a* and *b* are nonnegative scalar (the sum of them must be less than 1 for stationarity), S indicates the time-invariant conditional covariance matrix of the standardized residuals and $S \equiv [s_{12}]$. Q_t^* is a 2×2 inverted diagonal matrix with the square root of the diagonal elements of Q_t. The time-varying conditional correlations are calculated as:

$$\rho_{12,t}$$
$$= \frac{\omega_{12,t-1} + \alpha_{t-1}\varepsilon_{1,t-1}\varepsilon_{2,t-1} + \beta\rho_{12,t-1}}{\sqrt{\{\omega_{11,t-1} + \alpha_{t-1}\varepsilon_{1,t-1}^2 + \beta\rho_{11,t-1}\}\{\omega_{22,t-1} + \alpha_{t-1}\varepsilon_{2,t-1}^2 + \beta_l}} \tag{6}$$

where $\omega_{12,t} \equiv (1 - a - b)s_{12}/\sqrt{q_{11,t}\,q_{22,t}}$ and $\alpha_t \equiv \alpha/\sqrt{q_{11,t}\,q_{22,t}}$

Cappiello et al. (2006) emphasized the leverage effect in the conditional correlations and suggested an asymmetric version of DCC (ADCC). ADCC model allows us to examine the presence of leverage effect not only in the return series but also in the conditional correlations. The econometric framework of the ADCC model as follows:

$$Q_t = (1 - a - b)S - \tau_k N + a(Q_{t-1}^*\varepsilon_{t-1}\varepsilon'_{t-1}Q_{t-1}^*) + \tau_k(n_{t-1}n'_{t-1})$$
$$+ bQ_{t-1}$$

where ε_t and S are the same in the DCC model. $n_t = I_{[\varepsilon_t<0]}$ with $I_{[\varepsilon_t<0]}$ is an indicator function that is equal to 1 when $\varepsilon_t < 0$ and 0 otherwise. $N = E[n_t n'_t]$ is the unconditional matrix of n_t.

Aielli (2013) showed that the DCC model produces inconsistent estimations when the systems are large and hence time-varying conditional correlations obtained from the DCC model lead to misleading conclusions. In this manner, Aielli (2013) suggested a more tractable DCC model that is called the corrected DCC (*c*DCC) model and it provides more consistent results for the large system estimators. The structure of *the c*DCC model as follows:

$$Q_t = (1 - a - b)S^* + a\left(Q_{t-1}^{*1/2}\varepsilon_{t-1}\varepsilon'_{t-1}Q_{t-1}^{*1/2}\right) + bQ_{t-1} \tag{8}$$

In Equation (6), S^* indicates the unconditional covariance matrix of $Q_t^*\varepsilon_t$. The adjusted time-varying conditional correlations are calculated as:

$$\rho_{12,t}^{*}$$
$$= \frac{\omega_{12,t-1} + \alpha\varepsilon_{1,t-1}\varepsilon_{2,t-1} + \beta\rho_{12,t-1}}{\sqrt{\{\omega_{11,t-1} + \alpha\varepsilon_{1,t-1}^2 + \beta\rho_{11,t-1}\}\{\omega_{22,t-1} + \alpha\varepsilon_{2,t-1}^2 + \beta\rho_{22,t-}}} \tag{9}$$

where $\omega_{12,t} \equiv (1 - a - b)s_{12}/\sqrt{q_{11,t}\,q_{22,t}}$

C. Data and Empirical Results

The aim of the study is to examine the reaction of the conventional and Islamic stock market in Turkey to the Covid-19 outbreak in terms of the contagion hypothesis. The increasing number of cases and deaths from Covid-19 has raised concerns about the global economy, health system, cost of living worldwide and the global pandemic has caused fear among the investors as well as all humanity. In this context, it can be said that one of the important reasons for the collapse of financial markets during the global pandemic period is the anxiety and fears of investors about the future. Therefore, there is a growing literature that focuses on creating a fear index for the Covid-19 outbreak. For instance, Salisu and Akanni (2020) used reported numbers of cases and deaths from Covid-19 to construct a fear index. Chen et al. (2020) considered Google search queries on coronavirus-related words to create a fear sentiment index. On the other hand, these indices may provide short-time span data. It should be noted that the investor fear index is not a new topic in the finance literature, and there are many studies in the literature on this subject before the Covid-19 outbreak. In this manner, the Volatility Implied Index (VIX) has been used as a proxy for investor sentiment or fear specifically during the global financial crisis. Therefore, a large number of studies determined that developed and emerging stock markets are significantly affected by VIX specifically during financial turmoil periods (Whaley, 2000; Korkmaz and Çevik, 2009; Sarwar, 2012; and Cheuathonghua, Padungsaksawasdi, and Boonchoo, 2019).

The VIX that is measured as the implied volatility of the S&P 500 index options represents stock market volatility and it also shows expected stock market volatility over the next month. Therefore, the increase in VIX indicates that the uncertainty in the market will increase in the next 30 days, and hence the index is also called a fear index. In this context, Chen, Liu, and Zhao (2020) found that the fear sentiment index that is calculated by using Google search queries is positively correlated with VIX. Similarly, Leduc and

Li (2020) considered the VIX as an uncertainty variable. Al-Yahyaee et al. (2019) indicated that international investors consider the VIX as an uncertainty index.

In line with this information, the volatility implied index is considered as a fear index and examines the relationship between the VIX and conventional and Islamic stock markets in Turkey specifically for the periods of the Covid-19 outbreak. Daily closing prices of the Istanbul Stock Exchange (ISE) 100 index and Participation Index (PI) are collected from the Central Bank Republic of Turkey and TR Investing web site for the 2011-2020 period. We obtained daily VIX prices from www.yahoo.finance. The total number of observations is 2340. We calculate the logarithmic return series for all the indexes using the log difference of the series: $r_t = \ln\left(P_t / P_{t-1}\right) \times 100$

We present the VIX in Figure 1. According to results in Figure 1, VIX has reached its highest value on March 16, 2020, after the declaration of the coronavirus (Covid-19) as a pandemic by the World Health Organization (WHO) on March 11, 2020. This is higher than the index level during the global financial crisis. The results clearly show that the investors' fear significantly increased during the period of the Covid-19 outbreak.

Figure 1. Daily VIX Series
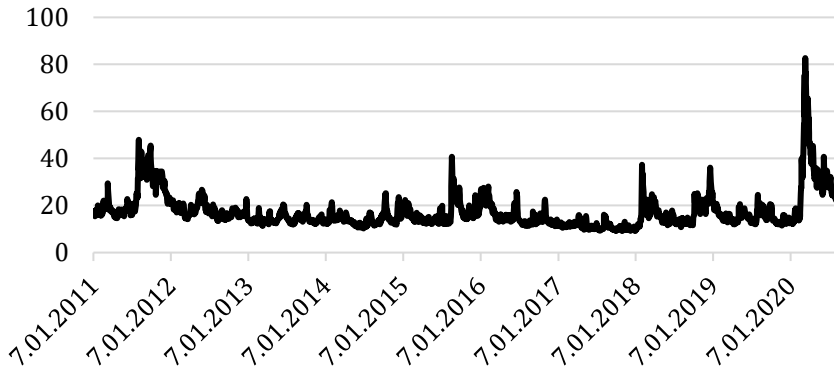
We present summary statistics for the return series in Table 1. The results in Table 1 show that daily mean return is positive for all series. On the other hand, the mean return of the Participation Index is higher than ISE. The VIX exhibits higher volatility according to standard deviations. The distributions of returns series are not normal as they exhibit excess kurtosis. The ARCH LM test results show that all returns series exhibit volatility clustering. The unit root test results suggest that all return series are stationary in levels.

Table 1: Descriptive Statistics

	ISE	PI	VIX
Mean	0.019	0.047	0.019
Median	0.082	0.105	-0.586
Maximum	6.238	6.600	76.825
Minimum	-11.064	-11.049	-31.414
Std. Dev.	1.449	1.275	8.009
Skewness	-0.678	-0.988	1.176
Kurtosis	7.134	10.172	9.786
Jarque-Bera	1845.806 [0.000]	5396.447 [0.000]	5028.985 [0.000]
Q (50)	50.784 [0.442]	49.006 [0.513]	66.722 [0.056]
Q_s (50)	290.146 [0.000]	452.771 [0.000]	186.818 [0.000]
ARCH (5)	24.180 [0.000]	39.824 [0.000]	21.626 [0.000]
ADF	-23.380***	-18.957***	-21.197***
PP	-48.860***	-46.393***	-56.734***
KPSS	0.026***	0.035***	0.033***

Note: *** indicates stationary at the %1 significance level. The values in square brackets are p-value.

Table 2 shows the Pearson correlations for the return series. According to the results in Table 2, there is a positive and significant correlation between Participation Index and ISE. On the other hand, stock markets are negatively correlated with VIX and it is consistent with theoretical expectations. It can be seen from Table 2, the absolute value of the correlation between ISE and VIX is found to be higher than the absolute value of the correlation between PI and VIX and it indicates that VIX is more correlated with the conventional stock market than Islamic stock market. This finding is expected because the Shariah screening is prone to making Islamic stock markets more stable and predictable specifically to the global shocks.

Table 2. Pearson Correlations

	ISE	PI	VIX
ISE	1.000		
PI	0.873***	1.000	
VIX	-0.265***	-0.238***	1.000

Note: *** indicates significant correlations at the %1 significance level.

Even if the results in Table 2 show the presence of a negative correlation between VIX and Turkish stock markets, the relationship between the markets can vary over time. Specifically, the relationship between financial markets may change during financial turmoil periods when it is compared to tranquil periods. In this context, we employ the bivariate DCC model to ascertain time-varying conditional correlations.

Since our empirical strategy is based on estimations of three different DCC models, we first examine the optimal ARMA structure in the then mean model, and Schwarz Bayesian information criterion (BIC) suggests the ARMA(1,1) model. We employ the GJR-GARCH model for each return series to account for the leverage effects in estimation in the first step and GJR-GARCH (1,1) specification is found to be adequate in modeling the volatility of the return series. Then, we employ three different DCC models with the multivariate t distribution, and we present model selection criteria for each model in Table 3. All information criteria in Table 3 strongly suggest the *c*DCC model to estimate time-varying correlations between VIX and stock market index.

Table 3. Model Selection Criteria

	ISE & VIX			PI & VIX		
	DCC	*c*DCC	ADCC	DCC	*c*DCC	ADCC
AIC	10.062	<u>10.061</u>	10.063	9.724	<u>9.723</u>	9.724
BIC	10.072	<u>10.071</u>	10.075	9.734	<u>9.733</u>	9.736
HQ	10.066	<u>10.065</u>	10.067	9.726	<u>9.727</u>	9.729
Log-lik	-11768.469	-11768.344	-11.768.461	-11372.980	-11372.908	-11372.692

Note: AIC, BIC and HQ indicate Akaike, Schwarz and Hannan-Quinn model information criteria respectively. Log-lik is the log-likelihood value of model.

After confirming the best model for the dynamic conditional correlations, we employ the *c*DCC model, and model results in both the first and second steps are presented in Table 4. According to the GJR-GARCH model results, the ARCH parameter is found to be statistically significant only in the VIX model. These results show that persistence in the shocks is significant only in the VIX model. The estimates of *the β* parameter are significant at 1% level in all models. Note that the β parameter shows persistence in the volatility clustering and the results in Table 4 indicate that

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volatility clustering is the stock market is more persistent than VIX. The leverage parameter is found to be positive and statistically significant for ISE and PI and this finding implies the presence of leverage. On the other hand, the γ parameter is negative and statistically significant for VIX and this result suggests that negative news increases the investors' fear more than positive news.

In the second step, cDCC model parameters are estimated by using standardized residuals that are obtained from the GJR-GARCH model in the first step and we present the results in Table 4. Note that a shows the effect of shocks on conditional correlations and b indicates the persistence in the conditional correlations. Although both parameters are positive, only the b parameters are found to be statistically significant. These findings indicate that persistence in the correlations is very high and past shocks in the markets do not affect conditional correlations. The dynamic conditional correlations are negative and statistically significant and these results indicate the contagion effect between VIX and stock markets. In other words, an increase in VIX is accompanied by a decrease in stock returns. However, the effect of VIX on ISE is found to be higher than the Islamic stock market.

**Table 4.** Multivariate GARCH model results

				GJR-GARCH Model		
	ω	A	β	γ	Q(50)	Q$_s$ (50)
ISE	0.125***	-0.001	0.870***	0.130***	44.102 [0.707]	33.422 [0.965]
PI	0.126***	0.014	0.813***	0.174***	41.020 [0.813]	26.740 [0.997]
VIX	10.460***	0.270***	0.694***	-0.317***	54.825 [0.296]	42.178 [0.776]
			cDCC Model			
	ρ	A	b	v	L-M (50)	L-M$_s$ (50)
ISE & VIX	-0.225***	0.014	0.921***	6.056***	176.273 [0.864]	192.060 [0.605]
PI & VIX	-0.211***	0.010	0.956***	5.625***	176.145 [0.865]	207.885 [0.300]

Note: The figures in square brackets show the p-values. v is the multivariate student t

distribution parameter. $Q(50)$ and $Q_s(50)$ indicate Box-Pierce serial correlation test values for the residuals and the squared residuals respectively. M-L and M-L$_s$ indicate Li and McLeod's multivariate Portmanteau statistics for the residuals and the squared residuals respectively.

We present the time-varying conditional correlations in Figure 2. The shaded areas indicate the periods of December 1, 2019 (the first Covid-19 case appeared), and September 2, 2020. The results in Figure 2 show that the absolute values of time-varying correlations between the conventional stock market and VIX started to increase at the beginning of 2020 and reached the highest level when the disease was declared a pandemic. The time-varying correlations between ISE and VIX exceed -0.45 as of March 2020 and it is recorded as its highest value during the sample period. On the other hand, the absolute value of time-varying correlations between PI and VIX is generally lower than the time-varying correlations between ISE and VIX. In this context, the time-varying correlations between PI and VIX exceed -0.30 as of March 2020 and it is not higher than the conditional correlations that are calculated in 2011 and 2016. These findings indicate that uncertainty in financial markets increased significantly due to Covid-19 and developed and emerging markets were affected by this disaster. The financial markets in Turkey were also affected by the global pandemic but it seems that the impact of this disaster on the Participation index is more limited than the conventional index in Turkey. It can be expected and also consistent with empirical studies in the literature because two-stage Shariah screening makes Islamic stock markets more stable and predictable to the global shocks.
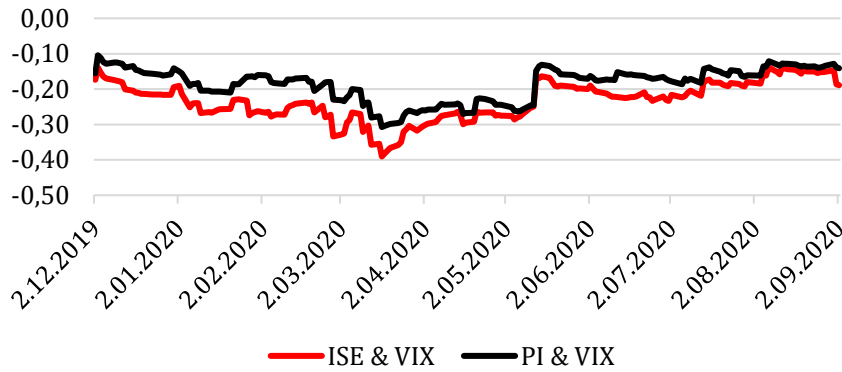
Figure 2. Time-varying correlations for the full sample
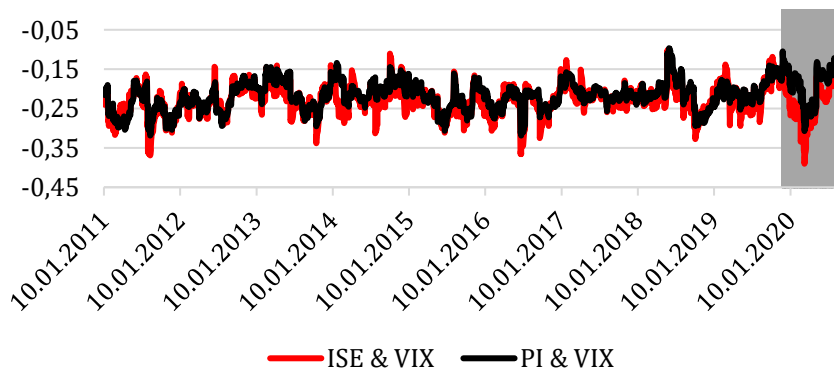
To understand the dynamic relationship between the fear index and stock markets in the Covid-19 outbreak period in detail, we also show the

time-varying correlations in Figure 3 for the periods of December 2019 and September 2020.

Figure 3. Time-varying correlations for global pandemic periods

The results in Figure 3 more clearly show that the absolute value of time-varying correlations for PI & VIX is significantly lower than the absolute value of time-varying correlations for ISE & VIX.

Finally, the descriptive statistics of the time-varying correlations for full sample periods and the Covid-19 periods (December 1, 2019-September 2, 2020) and *t*-test results are presented in Table 5. The results in Table 5 indicate that the mean of the absolute value of time-varying correlations between ISE and VIX after the Covid-19 outbreak is statistically higher than the mean of the absolute value of time-varying correlations for full sample periods. The contagion analysis reinforces the hypothesis that the correlations between the stock markets and VIX have significantly increased during the global Covid-19 pandemic. On the other hand, the absolute value of time-varying correlations between ISE and VIX decreased after the Covid-19 outbreak and this finding suggests that Islamic stock markets are less sensitive to global shocks than conventional markets. We also employ a *t*-test to compare the mean of conditional correlations between ISE & VIX and PI & VIX and the test results in Table 5 show that the conditional correlations for ISE & VIX and PI & VIX are statistically different from each other at 1% level. Hence, it can be said that Islamic stock markets are more stable to the global Covid-19 outbreak shock than the conventional stock market. These results are consistent with the empirical findings of Yarovaya, Elsayed, and Hammoudeh (2020) and Ashraf, Rizwan, and Ahmad (2020). They empirically show that Islamic financial markets exhibit safe haven properties during the Covid-19 outbreak.

Table 5. Descriptive statistics for the time-varying conditional correlations

	Full Periods				% difference	t-test
	Mean	**Min.**	**Max.**	**Std. Dev.**		
ISE & VIX	-0.229	-0.391	-0.101	0.040	-0.013	-11.307***
PI & VIX	-0.216	-0.319	-0.096	0.038		
	COVID-19				% difference	t-test
	Mean	**Min.**	**Max.**	**Std. Dev.**		
ISE & VIX	-0.233	-0.390	-0.135	0.056	-0.048	-8.817***
PI & VIX	-0.185	-0.307	-0.104	0.047		

Note: *** indicates statistically significant test statistic at the 1% level.

Conclusions

The aim of the study is that examine the reaction of conventional and Islamic stock market in Turkey to the Covid-19 outbreak in terms of contagion hypothesis. The studies in the literature show that one of the important reasons for the simultaneous collapse of financial markets during the Covid-19 outbreak is the anxiety and fears of investors about the future. Hence, we consider the volatility implied index as a fear index and examine the relationship between the VIX and conventional and Islamic stock markets in Turkey specifically for the periods of the Covid-19 outbreak by using dynamic conditional correlations. The empirical result shows that both conventional and Islamic stock markets are negatively correlated with the fear index. On the other hand, the absolute value of time-varying correlations between PI & VIX is generally lower than the time-varying correlations between ISE & VIX. When we compare the conditional correlations between VIX and stock markets in terms of the full sample period and after the Covid-19 outbreak period, we determine that the conditional correlations between ISE & VIX increased and the conditional correlations between PI & VIX decreased after the Covid-19 outbreak. Therefore, it is concluded that Islamic stock markets are more stable to the global Covid-19 outbreak shock than the conventional stock market in Turkey. These results are consistent with the empirical findings of Yarovaya et al. (2020) and Ashraf et al. (2020). In both studies, the empirical results showed that Islamic financial markets had safe haven characteristics during the Covid-19 outbreak.

One may think that the reason for less affection of the Islamic financial system from the pandemic and its more stable appearance can be attributed to its small weight compared to the conventional financial system in the financial industry in Turkey. Notwithstanding this fact, the findings of this

study should be used as supportive data for the attempts to strengthen the Islamic financial system in Turkey. Turkey should take the advantage of its strong and remarkable healthcare management performance both within the pandemic period and in the post-pandemic period. Accordingly, Turkey should apply to the Islamic financial instruments more especially for financing of public investments such as hospital and infrastructure constructions. Financing of various infrastructure investments by cost-effective and interest-free Islamic financial instruments will be the important steps to be taken to strengthen the Islamic financial system in Turkey.

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TÜRKİYE'DE COVID-19 PANDEMİSİNİN GELENEKSEL VE İSLAMİ BORSALAR ÜZERİNDEKİ ETKİLERİ

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Geniş Öz

Aralık 2019'da Çin'in Wuhan şehrinde ortaya çıkan koronavirüs, kısa sürede bütün dünyaya yayılmış ve pandemiye dönüşmüştür. Covid 19 pandemisi gelişmişlik düzeyi ne olursa olsun bütün ekonomileri derinden sarsmaya devam etmektedir. Bütün ülkelerde iktisadi büyüme performansı sürekli zayıflamakta ve durgunluk eğilimleri iyice gün yüzüne çıkmaktadır. Pandemi ile mücadelede etkin bir tıbbi tedavi yöntemi geliştirilmediği sürece küresel depresyona gidişi durdurmak mümkün olmayacaktır. Pandeminin ekonomi üzerindeki etkilerinin ortaya konması, bu dönemdeki temel makro ekonomik göstergelerdeki değişikliğin yanısıra finansal piyasalardaki hareketliliğin incelenmesi ile mümkündür. Finansal piyasalardaki değişiklikler iktisadi birimlerin takip ettiği en önemli değişkenlerden birisidir. İktisadi birimler bu piyasaları takip ederek portföylerini ayarladıkları gibi yatırım kararlarını da belirlerler. Ancak finansal piyasaların yol göstericilik işlevi, bu piyasalardaki belirsizliğin ve istikrarsızlığın arttığı durumlarda zayıflamaktadır. Finansal piyasalardaki istikrarsızlığın boyutlarının ortaya konması açısından, pandeminin borsa endeksleri üzerindeki etkisinin araştırılması başvurulacak yollardan birisidir. Söz konusu araştırmalar ülke gurubu için yapılabileceği gibi tek ülke için de gerçekleştirilebilir. Tek ülke verilerini kullanarak gerçekleştirilecek çalışmalar, sorunun daha derinlemesine ortaya konmasına imkan sağlamaktadır. Pandeminin borsa üzerindeki etkisi araştırılırken, geleneksel ve İslami endeksleri birlikte dikkate almak finansal piyasalara ilişkin politikaların belirlenmesinde daha gerçekçi verilerin elde edilmesi açısından önemlidir. Pandeminin etkilerini net olarak görmek için

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henüz yeterli bir zaman diliminin geçmediği düşünülebilir. Ancak görece kısa dönemli verileri kullanarak ya da pandemi öncesi dönemi de dikkate alarak daha uzun dönemli bir perspektifle analizler yapmak ve makro ekonomik göstergelerin yanısıra finansal piyasalardaki eğilimler hakkında somut sinyaller yakalamak mümkündür. Makro ekonomik sorunlar ile mücadelede hem kısa dönemli hem de uzun dönemli stratejilerin uygulanması ile başarıya ulaşılabilir. Pandeminin süresine ilişkin belirsizlik nedeniyle finansal piyasalardaki değişimin sürekli takip edilmesi, tutarlı politikaların geliştirilmesi açısından elzemdir.

Bu çalışmanın amacı, Covid -19 pandemisine geleneksel ve İslami borsanın bulaşma ve ayrışma açısından gösterdiği tepkiyi incelemektir. Çalışmada 10 Şubat 2011 – 02 Eylül 2020 dönemine ilişkin günlük veriler kullanılmış ve DCC-GARCH yönteminden yararlanılmıştır. Pandemi döneminde küresel ölçekteki vaka ve hayatını kaybedenlerin sayısının sürekli artması, makro ekonomik göstergeleri negatif yönde etkilediğinden, finansal piyasalardaki yatırımcılarda korku ve tedirginlik eğilimlerini arttırmaktadır. Bu dönemde finansal piyasalardaki istikrarsızlığın en önemli nedenleri arasında yatırımcıların gelecek korkusu ön sıralarda yer almaktadır. Dolayısıyla, ilgili literatüre katkı yapmayı hedefleyen bilim insanları Covid -19 pandemisi için bir korku endeksi geliştirme çabası içerisine girmişlerdir. Ancak finans literatüründe yatırımcı korku endeksi geliştirme çabası Covid -19 pandemisi ile birlikte gündeme gelmiş yeni bir konu değildir. Covid -19 pandemisi öncesi dönemde de birçok çalışmada bu konunun ele alındığını görmek mümkündür. Zımni Volatilite Endeksi (Volatility Implied Index: VIX), özellikle küresel finans krizi döneminde yatırımcı duyarlılığını ya da korkusunu temsil etmek üzere kullanılmıştır.

Bu çalışmanın literatüre katkısı iki noktada öne çıkmaktadır. Birincisi, bildiğimiz kadarıyla, Covid -19 pandemisinin geleneksel ve İslami endeksler üzerindeki etkisini Türkiye'de inceleyen başka bir araştırma henüz bulunmamaktadır. İkincisi, bu çalışma İslami borsa ile Volatility Implied Index arasındaki dinamik ilişkiyi Türkiye özelinde inceleyen ilk araştırmalardan birisidir. Elde edilen sonuçlara göre, Türkiye'de küresel Covid -19 pandemisi şoku karşısında İslami borsa, geleneksel borsadan daha istikrarlıdır. Bu sonuca göre Türkiye'de İslami finansal sistemin geliştirilmesine yönelik adımlar güçlendirilmelidir. İslami finansal sistemin pandemiden görece daha az etkilenmesi, diğer bir ifade ile daha istikrarlı olması geleneksel finansal sistem ile karşılaştırıldığında ağırlığının küçük olmasına bağlanabilir. Ancak bu sonucun İslami finansal sistemin güçlendirilmesine yönelik girişimler için destekleyici bir veri olarak kullanılması gerekmektedir. Pandemi dönemi ve sonrasında, Türkiye, sağlık

yönetimi konusunda gösterdiği güçlü ve saygın performansı çok iyi değerlendirip özellikle kamu yatırımlarının finansmanında İslami finansal enstrümanlardan yararlanmalıdır. Düşük maliyetli ve faizsiz olma özelliğine sahip İslami finansal enstrümanların kullanılması İslami finansal sistemin güçlendirilmesi açısından atılacak en önemli adımların başında gelmektedir.

Çalışma üç bölümden meydana gelmektedir. Birinci bölümde, literatür araştırması yer almaktadır. Literatür araştırması başlığı altında makro ekonomik değişkenlerin yanısıra Ebole ve SARS gibi salgınların etkilerini araştıran çalışmalardan kısaca bahsedilmiş, akabinde Covid -19 pandemisi-borsa ilişkilerini ele alan çalışmaların bulguları özetlenmiştir. İkinci bölümde, ekonometrik çerçeve üzerinde durulmuştur. Üçüncü bölümde ise veri ve ampirik sonuçlar ele alınmıştır.

Anahtar Kelimeler: İslami Ekonomi, Covid-19, Katılım Endeksi, BİST 100 Endeksi, Finansal Piyasalar.

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