Türkiye İletişim Araştırmaları Dergisi • Yıl/Year: 2021 • Sayı/Issue: 37 • ss/pp. 109-124 • ISSN: 2630-6220
DOI: 10.17829/turcom.859299

ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

The Impact of News about Pandemic on Borsa Istanbul during the COVID-19 Financial Turmoil

COVID-19 Finansal Çalkantısı Sırasında Pandemi ile İlgili Haberlerin Borsa İstanbul'a Etkisi

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Abstract

The COVID-19 pandemic, which emerged in December 2019 and then spread worldwide, has affected not only economic and social life but also the financial markets. It has left investors greatly panicked and affected their decisions. In this study, the effect of COVID-19 related news on Borsa Istanbul is analyzed using the panel quantile regression method. The study period is set between 10 March 2020 and 17 April 2020. The panic index, media hype index, fake news index, country sentiment index, infodemic index, and media coverage index created by the RavenPack data platform are used for the analysis. The impact of news, it was found, varies amongst the quantiles, and there exists an asymmetric dependence between the returns of Borsa Istanbul and COVID-19 related news. More efficient communication channels, the results indicate, should be used to alleviate the financial turmoil caused by COVID-19.

Keywords: COVID-19; Borsa Istanbul, Financial Markets, Fake News Index, Country Sentiment Index, Panel Quantile Regression

Öz

Aralık 2019'da ortaya çıkan ve ardından dünyaya yayılan COVID-19 salgını sadece ekonomik ve sosyal hayatı değil finansal piyasaları da etkilemiştir Yatırımcılar büyük ölçüde paniklemiş ve kararlarını etkilemiştir. Bu çalışmada, COVID-19 ile ilgili haberlerin Borsa İstanbul üzerindeki etkisi panel kantil regresyon yöntemi kullanılarak analiz edilmiştir. Çalışma dönemi olarak 10 Mart 2020 ile 17 Nisan 2020 tarihleri arası belirlenmiştir. Analiz için RavenPack veri platformu tarafından oluşturulan panik endeksi, medyatiklik endeksi, sahte haber endeksi, ülke duyarlılık endeksi, infodemi endeksi ve medya ilgi endeksi kullanılmıştır. Sonuçlara göre haberlerin etkisi kantiller arasında değişiklik göstermektedir

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Makale Geçmişi / Article History
Gönderim / Received: 12.01.2021
Düzeltme / Revised: 17.03.2021
Kabul / Accepted: 18.03.2021

ve Borsa İstanbul'un getirisi ile COVID-19 ile ilgili haberler arasında asimetrik bir bağımlılık vardır. Sonuçlar, COVID-19 ile bağlantılı finansal çalkantıyı hafifletmek için daha verimli iletişim kanallarının kullanılması gerektiğini göstermektedir.

Anahtar Kelimeler: COVID-19, Borsa İstanbul, Finansal Piyasalar, Sahte Haber Endeksi, Ülke Duyarlılık Endeksi, Panel Kantil Regresyon

Introduction

The novel coronavirus, which first appeared in December 2019 and was called "COVID-19", has affected the whole world. The first death case was reported on 11 January 2020 in China. When the first cases were confirmed, especially in the U.S. and Western Europe, at the end of January, the number of cases started to increase dramatically, especially as of March. On 11 March 2020, the World Health Organization (WHO) declared a pandemic and warned countries that they should take precautions. The spread of COVID-19 led to fluctuations and declines in stock prices, decreases in interest rates and contractions in real economic activity reflected in real Gross Domestic Products (GDPs) (Barro, Ursua, & Weng, 2020). Although past pandemic diseases such as MERS, Ebola, SARS and Avian influenza (informally known as "bird flu") led to a sharp increase in stock market volatility, COVID-19 had the most significant effect on the equity market history (Baker et al., 2020; Baker et al., 2020). Barro et al. (2020) compare COVID-19 with the Spanish flu in 1918 and find that the impact of COVID-19 on GDP, consumption and stock markets was greater.

The rapid spread of this pandemic worldwide and its risk of death prompted countries to take drastic measures. To prevent the spread of the COVID-19, many countries have taken unprecedented radical steps, such as social distance, wearing masks, banning travel, vacationing schools and closing restaurants (Chen et al., 2020; Nicola et al., 2020; Zaremba et al., 2021). By the end of March, more than 100 countries had entered into restrictions against the pandemic, so people's lives were affected socially and economically (Nicola et al., 2020). This pandemic has also affected financial markets and created panic among investors. Stock markets, especially in the U.S, Japan, Germany and the U.K, experienced a decline of around 10-20 percent (Akhtaruzzaman, Boubaker, & Sensoy, 2020; Ali, Alam, & Rizvi, 2020; Ashraf, 2020b; Zhang, Hu, & Ji, 2020). On March 16, the Chicago Board Options Exchange's Volatility Index, known as the VIX, reached the highest level in its history (Wagner, 2020).

The frequent media coverage of COVID-19 could cause panic in investors and influence their investment decisions. The disease-related news could trigger fear and influence investors' sentiment (Tetlock, 2007). According to literature, political and economic news influences the movements of share prices (Broadstock & Zhang, 2019; Shi & Ho, 2020). Especially in situations of political and economic uncertainty, news on social media significantly impacts share prices (Cepoi, 2020). In such a context of unprecedented access to news and information, investors find it difficult to accurately determine the economic importance and effect of the information they receive (Haroon & Rizvi, 2020). According to Groß-Klußmann & Hautsch (2011) and Smales (2014b), high relevance news increase market activity, and negative news has a higher effect than

positive news on financial markets. Moreover, according to Dzielinski (2011), negative (positive) news causes below (above) average returns.

This paper aims to contribute to the literature by investigating the impact of the COVID-19-related news on Borsa Istanbul. By applying the panel quantile regression method, this study finds an asymmetric dependence between news and returns of Borsa Istanbul. Such studies in the literature are rare and examine the U.S. and European stock markets. In contrast, this study considers Borsa Istanbul, one of the emerging financial markets. Hence, first, this research aims to fill gap in the literature on the effect of COVID-19-related news on returns. Second, it specifically focuses on the impact of COVID-19-related news on Borsa Istanbul, which has not yet been addressed in the literature. So far, studies investigating the impact of COVID-19 on Borsa Istanbul have generally used event study method. They reveal that the number of cases and the announcement of social measures have negatively affected the returns (Keles 2020), and the returns of sectors such as tourism, transportation, textile are more affected (Keles, 2020; Kilic, 2020, Kandil-Göker, Eren & Karaca, 2020). To the best of our knowledge, this study is the first to analyze the impact of COVID-19-related news on Borsa Istanbul using quantile regression analysis.

Literature Review

Many studies are deal with the impact of COVID-19 on the financial markets, such as the impact on stock market returns and volatility (Al-Awadhi et al., Alhammadi, 2020; Albulescu, 2020; Ali et al., 2020; Ashraf, 2020b, 2020c; Bahrini & Filfilan, 2020; Contessi & Pierangelo, 2020; Harjoto et al., 2020; Kartal, Kılıç-Depren, & Depren, 2020; Mazur, Dang, & Vega, 2020; Rababah et al., 2020; Thorbecke, 2020; Topcu & Gulal, 2020), market illiquidity (Baig et al., 2020), contagion effect (Okorie & Lin, 2020), government interventions or responses against COVID-19 (Ashraf, 2020a; Zaremba et al., 2021; Zaremba et al., 2020), cryptocurrencies (Conlon & McGee, 2020; Corbet, Larkin, & Lucey, 2020; Demir et al., 2020; Goodell & Goutte, 2020), tourism and leisure sectors (Chen et al., 2020; Demir et al., 2020; Ghosh, 2020), uncertainty (Jeris & Nath, 2020), social trust (Mazumder, 2020), dividends (Krieger & Mauck, 2020), and commodity prices (Corbet, Goodell, & Günay, 2020; Devpura & Narayan, 2020; Huang & Zheng, 2020; Salisu, Ebuh, & Usman, 2020).

Considering the studies related to Turkish financial markets, the impact of COVID-19 have been analyzed on financial reporting (Cavlak, 2020), stock market returns (Coban, Coşkun, & Coban, 2020; Kandil et al., 2020; Kartal, Depren, & Kılıç Depren, 2020; Kayral & Tandogan, 2020; Keleş, 2020; Kılıc, 2020; Özkan, 2020), CDS spreads (Kartal, 2020), food and beverage sectors (Levent, 2020), and tourism sector (Korkut et al.,2020; Kandil-Göker, Eren & Karkaca, 2020) have been analyzed so far.

Analyzing the papers related to COVID-19 news, Cepoi (2020) explores the financial markets' reactions to COVID-19-related news in the six most-affected developed countries: the U.S., Italy, Spain, the U.K, Germany and France. Using a panel quantile regression analysis, the

study finds that stock markets present asymmetric dependencies of COVID-19-related news. For the news-based proxy, this study uses panic index, media hype index, fake news index, sentiment index, contagion index and media coverage index. The fake news index is found to negatively affect lower and the middle quantiles throughout the distribution of returns. The media coverage index negatively and significantly affects returns across middle and upper quantiles and does not influence the lower ones. Also, the contagion index has a negative effect on stocks from 0.50 to 0.75 quantiles. Haroon & Rizvi (2020) evaluate the impact of the COVID-19 related news on the volatility of equity markets for the world, the U.S and sub-sectors indices from 1 January 2020 to 30 April 2020. Global sentiment index, panic index and media coverage index are used for the proxy for COVID-19 related news. The increasing panic index generates volatility for the world, the U.S. and some sectors and proliferation uncertainty in the market. A negative sentiment index causes volatility in returns in the U.S. market, and, interestingly, higher media coverage is associated with lower volatility in world markets. In addition, the effects on the panic index and media coverage index of the number of cases are greater than the number of deaths. Corbet et al. (2020) analyze the stock performances of firms with the word 'corona' in their brands or products. They explore firms on an hourly and daily basis from March 2019 to March 2020. According to the findings of the study, these firms' stock prices are negatively affected more, and the volatility is higher. Salisu & Vo (2020) test the impact of the COVID-19 related health news on the stock markets. Financial markets of 20 countries are analyzed using the panel method between 01 January 2020 – 30 March 2020. They reveal that health news has a negative impact on stock returns, implying that returns decline as more information is searched for health news, including macroeconomic variables. Furthermore, combined health news and VIX predictability results have a negative and significant effect on returns. Narayan (2020) investigates the relative importance of COVID-19 and oil price news in influencing oil prices. When oil price volatility is used as a threshold, both COVID-19 and negative oil price news impact oil prices at higher volatility levels.

Data and Methodology

Data

The impact of COVID-19 related news on Borsa Istanbul (in Table 1) is analyzed from 10 March 2020 to 17 April 2020. Daily index returns are calculated [$R_{i,t} = (P_{i,t} - P_{i,t-1})/P_{i,t-1}$] in where *i* is the return of the index at day *t*. After deducting holidays, the balanced panel data is used, covering 29 working days. The data of sectoral indices are obtained from the Thomson Reuters DataStream. March 10 is selected as the starting day since it is when the first COVID-19 case is announced in Turkey; April 17 is selected as the last day because, while the uncertainty continued through mid-April, the stock markets begin to recover to a certain extent (Cepoi, 2020); other studies in the literature also considered April 17 as the last day (Ashraf, 2020a, 2020b, 2020c; Baig et al., 2020; Cepoi, 2020). The timeline of COVID-19 in Turkey is shown in Table 2.

The COVID-19 related news variables are obtained from RavenPack. This data analytics platform provides the latest info about COVID-19 and measures panic, sentiment and misinformation. The platform has a country-specific panic index, media hype index, fake news index, country sentiment index, infodemic index and media coverage index. The panic index measures the level of news chatter that makes reference to panic or hysteria and coronavirus. The media hype index measures the percentage of news talking about the coronavirus. The fake news index measures the level of media chatter about the novel virus that makes reference to misinformation or fake news alongside COVID-19. The country sentiment index measures the level of sentiment across all entities mentioned in the news alongside the coronavirus. The infodemic index computes the percentage of all entities that are somehow linked to COVID-19. The media coverage index calculates the percentage of all news sources covering the topic of the novel coronavirus. Blitz et al., (2020), Cepoi (2020), Shi & Ho (2020), Smales (2014a) use the data in their studies to examine the link between news and implied volatility or stock market returns. These indices are used as a proxy and the detailed description of each variable is given in the Appendix. In addition, a 5-year Credit Default Swap (CDS) for Turkey (https://tr.investing.com) is used as a dependent variable recommended by (Grammatikos & Vermeulen, 2012) to control default risk.

Table 1. Sample Information about Borsa Istanbul Sectoral Indices

Index	Code	Obs.	Start Date	End Date
BANK	XBANK	29	10.03.2020	17.04.2020
BASIC METAL	XMANA	29	10.03.2020	17.04.2020
CHEMICALS, PETROL, PLASTIC	XKMYA	29	10.03.2020	17.04.2020
CORPORATE GOVERNANCE	XKURY	29	10.03.2020	17.04.2020
ELECTRICITY	XELKT	29	10.03.2020	17.04.2020
FOOD & BEVERAGE	XGIDA	29	10.03.2020	17.04.2020
HOLDING & INV	XHOLD	29	10.03.2020	17.04.2020
INFORMATION TECHNOLOGY	XBLSM	29	10.03.2020	17.04.2020
INSURANCE	XSGRT	29	10.03.2020	17.04.2020
INV. TRUSTS	XYORT	29	10.03.2020	17.04.2020
LEASING & FACTORING	XFINK	29	10.03.2020	17.04.2020
METAL PRODUCTS	XMESY	29	10.03.2020	17.04.2020
FINANCIALS	XUMAL	29	10.03.2020	17.04.2020
INDUSTRIAL	XUSIN	29	10.03.2020	17.04.2020
SERVICES	XUHIZ	29	10.03.2020	17.04.2020
TECHNOLOGY	XUTEK	29	10.03.2020	17.04.2020
NON-METAL MRL PRODS.	XTAST	29	10.03.2020	17.04.2020
REAL ESTATE INV. TRUST	XGMYO	29	10.03.2020	17.04.2020
SPORTS	XSPOR	29	10.03.2020	17.04.2020
TEXTILE & LEATHER	XTEKS	29	10.03.2020	17.04.2020
TOURISM	XTRZM	29	10.03.2020	17.04.2020
TRANSPORTATION	XULAS	29	10.03.2020	17.04.2020
WHOLESALE & RETAIL	XTCRT	29	10.03.2020	17.04.2020
WOOD, PAPER & PRINT	XKAGT	29	10.03.2020	17.04.2020

Table 2. The timeline of COVID-19 in Turkey

10.03.2020: First COVID-19 case in Turkey
10.03.2020: WSO declared COVID-19 to be a pandemic
12.03.2020: Schools were closed. Football matches were canceled
17.03.2020: First death
18.03.2020: Number of cases passed 100
18.03.2020: First economic support package was declared
21.03.2020: Flights were stopped mutually with 46 countries
21.03.2020: Number of cases passed 1000
28.03.2020: Number of deaths passed 100
10.04.2020: Number of deaths passed 1000
15.04.2020: Second economic support package was declared

Source: Keleş (2020)

Methodology

The ordinary least square (OLS) methods are mostly preferred in the regression analysis because of the more straightforward calculation than other regression methods. The purpose of the OLS methods is to minimize the sum of squares of errors. The OLS estimators lose their effectiveness when the errors are not suitable for normal distribution and contain outliers. This disadvantage of the OLS methods causes the estimated coefficients not to reflect reality. In these cases, an alternative regression method should be used (Altın-Yavuz & Gündoğan-Işık, 2017). In some cases, the quantile varying estimates reveal that OLS methods cannot provide a solution for extreme events. In this study, considering the excess volatility during COVID-19 turbulence, we employ a panel quantile regression model. The difference from the other econometric approaches that mainly focus on the mean effects, panel quantile regression is the more powerful tool for handling the fat tails or extreme values throughout the asset return distributions (du Plooy, 2019; Cepoi, 2020). The quantile regression model is firstly suggested by Koenker & Basset (1978).

Quantile regression is applied as it can cover a set of regression curves that differ across different quantiles (i.e., median) of the conditional distribution of the dependent variable. The advantages of quantile regressions:

This method is more flexible for modeling data with heterogeneous conditional distributions.

Median regression is more robust to outliers than the mean regression.

This method can capture the potential nonlinear relationship between independent variables and covariates, which cannot be solved by the other linear approaches.

We can write the basic quantile model in equation (1):

$$Y_i = x_i'\beta_\theta + \mu\theta_i \text{ with } Q_\theta(y_t|x_t) = x_t'\beta_\theta$$

in where, x_t' shows a vector of regressors, b_θ displays the vector of parameters to be estimated and $\mu_{\theta i}$ represents a vector of residuals. $Q_\theta(y_r|x)$ demonstrates θ^{th} conditional quantile of y_i granted x_i'

The approximation of b_θ is supported on the undermentioned optimization problems:

$b_\theta = \text{argmin} b$

$0 < \theta < 1$

$$\left\{\sum_{t:yt>x_t'\beta} \theta|yi - x_i'\beta| + \sum_{t:yt>x_t'\beta}(1-\theta)|y_i - x_i'\beta|\right\} \quad (2)$$

The median regression is received by θ = 0.5. Different quantiles of conditional distribution can be found through variations of θ. This can be interpreted as the conditional distribution of the dependent variable reacting differently to changes in independent variables at different points. In general, 0.25, 0.50. 075 are used as quantile variables (Chellaswamy, Natchimuthu, & Faniband, 2020).

Empirical Findings and Discussions

Table 3 indicates the descriptive statistics of variables used in the study. Except for the country sentiment index, other indices take values between 0 and 100. An increase in value means that news about COVID is getting more coverage in the media. The sentiment index takes a value between – 100 and 100, and on the contrary, as it approaches 100, the sentiment positively affects returns. The country's CDS premium fluctuates high during this period, and its average value is 522.

Table 3. Descriptive Statistics

Variables	N	Mean	Std. Dev	Min	Max
Panic Index	30	7.540	2.805	3.930	18.39
Media Hype Index	30	52.38	13.51	21.81	75.62
Fake News Index	30	2.530	2.297	0.620	11.74
Country Sentiment Index	30	-18.53	11.51	-43.24	-2.200
Infodemic Index	30	56.92	16.10	20.69	80.42
Media Coverage Index	30	73.94	11.18	43.46	88.43
5-year CDS	30	522.0	79.62	407.7	651.9

Table 4 shows the correlation matrix table. As the news about COVID-19 increases in the media, the CDS premium increases. The country sentiment index is the only variable that has a negative correlation with 5-year CDS. Variance inflation factor (VIF) displays the multicollinearity problem among independent variables. If the VIF is larger than 5 or 10, multicollinearity is accepted high in the regression model (Guizani, 2017). The mean VIF is 2.09, so there is no multicollinearity problem among variables.

Table 4. Pairwise Correlation Matrix

Variables	1	2	3	4	5	6	7	VIF
Panic Index (1)	1							1.61
Media Hype Index (2)	0.5507*	1						3.92
Fake News Index (3)	0.0291	0.292	1					2.35
Country Sentiment Index (4)	0.0034	-0.3071	-0.2125	1				1.22
Infodemic Index (5)	0.2569	0.6387*	0.2832	-0.3201	1			1.14
Media Coverage Index (6)	0.4093*	0.7768*	0.0508	-0.2779	0.287*	1		3.29
5-year CDS (7)	0.0399	0.2826	0.1668	-0.0482	0.4541*	0.3807*	1	1.12

Note: ** p<0.05.

Table 5 indicates the panel quantile regression results from 0.05 to 0.95 quantiles. The graph of quantile regression for each variable is shown in the Appendix. According to the results, fake news has a negative nonlinear U-shaped effect on quantiles, indicating that malicious firms can use fake news to manipulate people's decisions and preferences regarding investments (Zhang & Ghorbani, 2020). At the time of a bearish (0.05 quantile or lower) and bullish (0.95 quantile or upper) market, fake news does not influence the indices returns (Cepoi, 2020). The increase of the country sentiment index is positive and significant from the 0.10 to the 0.95 quantiles. On the other hand, interestingly, the country sentiment index influences indices negatively for the bearish quantile. The infodemic index has a negative but decreasing trend from the lowest to the highest quantiles. After the 0.90 quantiles, the returns of the index are negative but insignificant. Also, the media coverage index has a negative and significant effect on all quantiles. Fang & Peress (2009) find that stocks with no media coverage have a higher return than stocks with higher media coverage and suggest that the extent of information propagation affects stock returns. Index returns are affected by the coverage of COVID-19 – related news in the media and the increase in news about the entities (Cepoi, 2020; Haroon & Rizvi, 2020). The effect of CDS premiums on index returns decreases from the lowest to the highest quantile. The index returns are statistically significant and have a negative impact from 0.05 to 0.50 quantiles.

Table 5: Panel Quantile Regression Results for Borsa Istanbul

Variables	*0.05*	*0.10*	*0.25*	*0.50*	*0.75*	*0.90*	*0.95*
Panic Index	0.00353***	0.00313***	0.00221**	0.000111	-0.00112*	-0.00116	-0.000557
	(0.00113)	(0.000771)	(0.000914)	(0.000369)	(0.000616)	(0.000993)	(0.000980)
Media Hype Index	-0.00198**	-0.000795*	0.00110***	0.00128***	0.000763***	0.000852***	0.000625**
	(0.000797)	(0.000434)	(0.000415)	(0.000223)	(0.000237)	(0.000236)	(0.000318)
Fake News Index	0.00226	0.000558	-0.0033***	-0.00239***	-0.00147*	-0.00152*	-0.00142
	(0.00182)	(0.00109)	(0.000873)	(0.000641)	(0.000826)	(0.000810)	(0.00121)
Sentiment Index	-0.00138*	-0.000492	0.000935**	0.000604***	0.000394*	0.000581*	0.000738**
	(0.000796)	(0.000462)	(0.000416)	(0.000176)	(0.000214)	(0.000335)	(0.000345)
Infodemic Index	-0.0016***	-0.0017***	-0.0010***	-0.00113***	-0.00119***	-0.000403	-0.0000
	(0.000319)	(0.000197)	(0.000128)	(0.000225)	(0.000293)	(0.000402)	(0.000423)
Media Coverage Index	-0.000611	-0.0019***	-0.0037***	-0.00332***	-0.00191***	-0.00223***	-0.0018***
	(0.000885)	(0.000510)	(0.000631)	(0.000423)	(0.000404)	(0.000527)	(0.000547)

5-year CDS	-0.0595	-0.0436**	-0.00922	-0.0103**	0.00434	0.0276	0.0125
	(0.0395)	(0.0214)	(0.0215)	(0.00475)	(0.0147)	(0.0288)	(0.0396)
Constant	-0.0554***	-0.0417***	-0.0174***	0.00458***	0.0270***	0.0459***	0.0583***
	(0.00552)	(0.00319)	(0.00262)	(0.00118)	(0.00148)	(0.00295)	(0.00399)
Observations	725	725	725	725	725	725	725

Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Additionally, we examine the model's robustness by equal testing among the different quantile levels. Table 6 displays the F-tests for each pair of quantile levels. The test results reject the null hypothesis that (coefficients of each quantile level are equal or homogeneous). These results confirmed that each independent variable has different effects on the dependent variables (Nguyen, 2020).

Table 6: Robust Tests of the Equality of Slope Estimates across Various Quantiles

Quantiles	Panic Index	Media Hype Index	Fake News Index	Sentiment Index	Infodemic Index	Media Coverage Index	5-year CDS
q[.05 – .10]	0.22	7.70***	5.79**	2.74*	0.02	7.30***	0.15
q[.05 – .25]	2.12	18.53***	15.00***	7.92***	3.06*	12.45***	1.11
q[.05 – .50]	9.22***	22.85***	10.82***	6.61**	1.72	8.53***	1.01
q[.05 – .75]	13.63***	27.86***	5.46**	5.55**	0.8	3.62*	1.18
q[.05 – .90]	14.38***	21.97***	4.42**	6.60**	4.05**	3.92**	1.87
q[.05 – .95]	13.66***	21.10***	4.93**	7.25***	11.31***	2.49	1.5
q[.10 – .25]	1.91	19.83***	12.74***	6.55**	22.39***	11.31***	2.83*
q[.10 – .50]	12.62***	25.68***	7.69***	4.70**	5.43**	5.62**	2.13
q[.10 – .75]	12.50***	18.85***	2.48	3.95**	1.65	0.01	1.81
q[.10 – .90]	16.13***	11.72***	1.83	4.60**	8.26***	0.13	3.39*
q[.10 – .95]	15.28***	8.30**	1.84	5.90**	14.07***	0.03	2.43
q[.25 – .50]	7.93***	0.66	2.96*	1.04	0.22	1.37	0.00
q[.25 – .75]	11.30***	0.54	1.65	1.88	0.16	7.97***	0.16
q[.25 – .90]	14.83***	0.24	1.31	0.6	2.86*	3.17*	0.91
q[.25 – .95]	13.16***	0.67	1.01	0.27	5.13**	4.32**	0.4
q[.50 – .75]	2.66	2.17	0.67	1.23	0.03	6.19**	0.5
q[.50 – .90]	2.7	1.06	0.44	0.01	4.21**	2.35	1.83
q[.50 – .95]	1.35	2.07	0.35	0.37	5.76***	4.15*	0.65
q[.75 – .90]	0.00	0.08	0.00	0.65	3.87**	0.38	1.98
q[.75 – .95]	0.5	0.22	0.00	2.16	5.36**	0.02	0.07
q[.90 – .95]	0.99	0.57	0.01	0.4	0.48	0.43	0.23

The coefficient numbers indicate the F-statistics. *** p<0.01, ** p<0.05, * p<0.1.

Conclusion

The COVID-19 pandemic has negatively affected the financial markets and caused social and economic consequences. With the spread of the disease, there is extensive media coverage on the pandemic, and this affects the decisions of investors. This study analyzed the effect of

COVID-19-related news on Borsa Istanbul from 10 March 2020 to 17 April 2020 by applying panel quantile regression. For the news-based proxy, the panic, media hype, fake news, country sentiment, infodemic and media coverage indices are used for the analysis. The results of the analysis, which are consistent with the literature, reveal that COVID-19-related news has negatively affected Borsa Istanbul, indicating that returns decrease with more media coverage on the pandemic (Corbet et al., 2020; Cepoi, 2020; Haroon & Rizvi, 2020; Salisu & Vo, 2020). Cepoi (2020) analyzes the impact of these news indices on developed markets and present asymmetric dependencies with COVID-19-related news. The results of this study are consistent with that of his study and reveal that the effect of the COVID-19-related news varies amongst the quantiles, and there is an asymmetric dependence between the returns of Borsa Istanbul and pandemic news. To verify the results, an equality test is also conducted, and the effect is not found to be homogenous on quantiles. As a result, there is a need for more intensive use of proper communication channels to mitigate the financial turmoil associated with COVID-19.

Finally, since the study is limited to examining the effect of pandemic news on the returns of Borsa Istanbul, future studies can investigate the effect of pandemic news on the volatility and volume of Borsa Istanbul

Acknowledgments

I thank the editor and two anonymous reviewers for their constructive comments.

This research did not receive any specific grant from funding agencies in the public, commercial, or non-profit sectors.

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APPENDIX

Table: Definition of Variables

Variables	Description	Source
Index Return	Daily index returns are calculated. $R_{i,t} = (P_{i,t} - P_{i,t-1})/P_{i,t-1}$ in where *i* is the return of the index at day *t*.	Thomson Reuters DataStream
Panic Index	It measures the level of news chatter that makes reference to panic or hysteria and coronavirus. Values range between 0 and 100 where a value of 8.00 indicated that 8 percent of all news globally is talking about panic and COVID-19. The higher the index value, the more references to panic found in the media.	https://coronavirus.ravenpack.com/turkey
Media Hype Index	It measures the percentage of news talking about the coronavirus. Value range between 0 and 100 where a value of 70.00 indicates that 75 percent of all news globally is talking about COVID-19.	https://coronavirus.ravenpack.com/turkey
Fake News Index	It measures the level of media chatter about the novel virus that makes reference to misinformation or fake news alongside COVID-19. Values range between 0 and 100 where a value of 3.00 indicates that 3 percent of all news globally is talking about fake news and COVID-19. The higher the index value, the more references to fake news found in the media.	https://coronavirus.ravenpack.com/turkey
Country Sentiment Index	It measures the level of sentiment across all entities mentioned in the news alongside the coronavirus. The index ranges between – 100 and 100 where a value of 100 is the most positive sentiment, – 100 is the most negative, and 0 is neutral.	https://coronavirus.ravenpack.com/turkey
Infodemic Index	It calculates the percentage of all entities (places, companies, etc.) that are somehow linked to COVID-19. Value range between 0 and 100 where a value of 70.00 means that 70 percent of all entities covered by the media are being linked or co-mentioned with COVID-19.	https://coronavirus.ravenpack.com/turkey
Media Coverage Index	It calculates the percentage of all news sources covering the topic of the novel coronavirus. Value range between 0 and 100 where a value of 50.00 means that 50 percent of all sampled news providers are currently covering stories about the COVID-19.	https://coronavirus.ravenpack.com/turkey
5-year CDS	Credit Default Swaps rate on 5-year bonds issued by the national government.	https://tr.investing.com

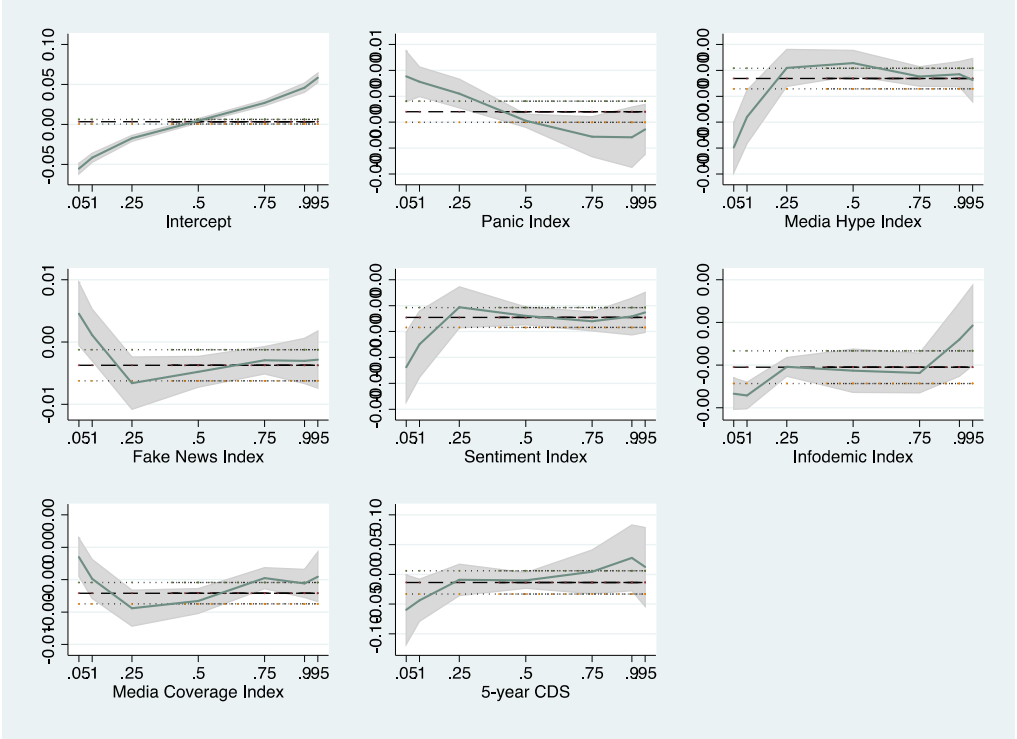

Figure: Estimated coefficients of the model. Grey line quantile regression (QR) and shaded area (%95 confidence interval of QR)