Journal Pre-proof

The Impacts of Foreign Portfolio Flows and Monetary Policy Responses on Stock Markets by Considering COVID-19 Pandemic: Evidence from Turkey

Mustafa Tevfik Kartal, Assoc. Prof. Dr. in Banking, Hasan Murat Ertuğrul, Assoc. Prof. Dr. in Economics, Talat Ulussever, Assoc. Prof. Dr. in Finance

PII: S2214-8450(21)00054-5

DOI: https://doi.org/10.1016/j.bir.2021.06.003

Reference: BIR 282

To appear in: *Borsa istanbul Review*

Received Date: 1 February 2021

Revised Date: 5 June 2021

Accepted Date: 5 June 2021

Please cite this article as: Kartal M.T., Ertuğrul H.M. & Ulussever T., The Impacts of Foreign Portfolio Flows and Monetary Policy Responses on Stock Markets by Considering COVID-19 Pandemic: Evidence from Turkey, *Borsa istanbul Review*, https://doi.org/10.1016/j.bir.2021.06.003.

This is a PDF file of an article that has undergone enhancements after acceptance, such as the addition of a cover page and metadata, and formatting for readability, but it is not yet the definitive version of record. This version will undergo additional copyediting, typesetting and review before it is published in its final form, but we are providing this version to give early visibility of the article. Please note that, during the production process, errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Copyright © 2021, Borsa Ä°stanbul Anonim Åžirketi. Production and hosting by Elsevier B.V. All rights reserved.

Journal Pre-proof

The Impacts of Foreign Portfolio Flows and Monetary Policy Responses on Stock Markets by Considering COVID-19 Pandemic: Evidence from Turkey

Mustafa Tevfik KARTAL[1], Hasan Murat ERTUĞRUL[2], Talat ULUSSEVER[3]

Disclosure statement

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Ethics Approval and Consent to Participate

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

Funding

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

Availability of Data and Materials

The data that support the findings of this study are available in Bloomberg Terminal, the Central Bank of Republic of Turkey at https://evds2.tcmb.gov.tr/index.php?/evds/serieMarket, and Turkish Ministry of Health at https://covid19.saglik.gov.tr, Apple Maps at https://covid19.apple.com/mobility, and the Central Securities Depositories of Turkey obtained via e-mail.

Acknowledgments

Not applicable.

Consent for Publication

The authors are willing to permit the Journal to publish the article.

Author Contributions

The authors have contributed equally to this work. All authors have read and agreed to the version of the manuscript.

[1]Assoc. Prof. Dr. in Banking, Borsa İstanbul Financial Reporting and Subsidiaries Directorate, İstanbul/Turkey, mustafatevfikkartal@gmail.com, orcid.org/0000-0001-8038-8241. Address: Reşitpaşa Mahallesi Borsa İstanbul Caddesi No: 4 34467 Sarıyer, İstanbul/Turkey.

[2]Assoc. Prof. Dr. in Economics, Ministry of Treasury and Finance, Florence/Italy, murat.ertugrul@hmb.gov.tr, orcid.org/0000-0001-9822-4683.

[3]Assoc. Prof. Dr. in Finance, Turkish Energy Exchange Board Member, Istanbul/Turkey, ulussever@gmail.com, orcid.org/0000-0002-5673-1238.

Journal Pre-proof

The Impacts of Foreign Portfolio Flows and Monetary Policy Responses on Stock Markets by Considering COVID-19 Pandemic: Evidence from Turkey

Abstract

This study researches the impacts of foreign portfolio flows (proxied by foreign investors' retention share) and monetary policy responses (proxied by the repurchase interest rate) on Turkey's stock market index taking the COVID-19 pandemic into consideration. A volatility index, credit default swap spreads, and foreign exchange rates are used as control variables, with a daily dataset between January 2, 2017, and October 20, 2020. After examining the stationarity and nonlinearity characteristics of the variables, we applied a nonlinear autoregressive distributed lag (NARDL) model and then conducted a Markov switching regression (MSR) for a robustness check. The results reveal that both foreign portfolio flows and monetary responses have an important effect on the index, and foreign portfolio flows have a higher effect than monetary responses. Accordingly, the results obtained from the NARDL and MSR models are robust and consistent.

Keywords: COVID-19 pandemic; Foreign Portfolio Flows; Monetary Policy Responses; MSR; NARDL; Stock Markets; Turkey.
JEL Classifications: C22; E44; E58.

1. Introduction

Stock markets are sensitive to developments in economics and finance, including announcements, crises, and uncertainty (Hillier & Loncan, 2019; Guo et al., 2020). Based on these characteristics, stock markets are barometers of financial markets (Younis et al., 2020) as they reflect the effects of news and developments on traded shares quickly. Therefore, stock markets have a significant role for investors and companies because of their efficiency (Kartal et al., 2020). Although stock markets have a positive reaction to good news and developments, they also react negatively to bad news and developments. In addition to acting as a barometer of fair pricing, stock markets have a key role in foreign portfolio flows.

Via stock markets, decisions about the buying and selling of shares are made rapidly based on the information available, and transactions are completed with the same speed. As expected, announcements regarding financial indicators can influence stock markets (Peiro, 2016).

Journal Pre-proof

In 2019, countries began to face a health crisis with the outbreak of COVID-19, a black swan event (Goodell, 2020) that was defined as a pandemic on March 11, 2020 (World Health Organization-WHO, 2020a). As of November 22, 2020, nearly 2.2 million people had died, and 100.5 million cases were confirmed (WHO, 2020b). The pandemic encompassed both advanced and emerging countries. For example, as of that date, the pandemic had caused 12,400 deaths in Turkey, with 446,800 confirmed cases (Ministry of Health of Turkey [MHT], 2020). Until the majority of the world's population has been vaccinated, the risk from the pandemic will continue.

Stock markets react rapidly to outbreaks of serious diseases such as Ebola, SARS, and MERS (Ichev & Marinč, 2018), so it is not surprising that they responded quickly to the COVID-19 pandemic because it led to a significant increase in uncertainty. Hence, stock markets are among the financial markets that are affected by the pandemic (Engelhardt et al., 2020).

To limit the spread and adverse impacts of the pandemic, countries have applied various measures, including social distancing, local lockdowns, and quarantines. Despite these efforts to mitigate negative effects, countries have experienced deleterious effects such as increases in unemployment, welfare loss, and foreign portfolio outflows. Hence, deterioration in economic and financial indicators was inevitable, with unprecedented and destructive consequences (Goodell, 2020) and an increasing risk level (Zhang et al., 2020) all over the world.

In addition to uncertainty, fears have also increased due to the pandemic. Investors evaluate alternatives to preserve and invest their savings by considering risk, return, and portfolio diversification (Yang et al., 2018). Shares are one of the investment alternatives that investors can consider. However, the pandemic has seriously affected stock markets of emerging countries as the high level of foreign portfolio outflows have occurred. For example, TRY 41 billion of foreign portfolio outflows were seen in 10 months of 2020 from the Turkish stock market (Central Securities Depositories of Turkey [CSD], 2020). The literature states that there are push and pull factors affecting foreign flows. Push factors are related with receiving countries, defined as common factors and present demand side of flows. Pull factors are related with sending countries, defined as country-specific factors and present supply side of flows (Fratzscher, 2012). No matter how the effect of push and pull factors differ, foreign portfolio flows are quite significant for emerging countries because they depend on foreign investments for the financing of economic activities due to lack of savings (Kartal et al., 2020). In one hand, foreign investment inflows can make considerable positive

effects on countries and stock markets as well as stock prices, stock returns (Bekaert & Harvey, 2003). On the other hand, foreign investment flows are criticized due to negative effects (Stiglitz, 2010). Nevertheless, providing sustainable foreign portfolio inflows can be beneficial for the development of emerging countries via stock markets, and stimulating foreign portfolio inflows is much easier than increasing foreign direct investments (Kartal et al., 2020).

In addition, monetary policy can affect stock markets. An expansionary monetary policy can support the development of stock markets whereas a contractionary monetary policy can cause a decline (Thorbecke, 1997; Lee et al., 2016; Kartal, 2020a). At first, most countries responded to the pandemic using monetary policy tools. Hence, monetary policy needs to be included when considering the use of monetary responses.

In sum, the pandemic continues, stock markets have reacted to it, and foreign portfolio flows have been affected. In this environment, multiple factors must be considered. All countries and related indicators are affected by the pandemic, but emerging countries are affected more negatively than developed countries because of their dependence on flows of foreign funds. Furthermore, emerging countries also suffer natural consequences such as underpricing of assets on underperforming stock market indices. In this paper, we take these facts into consideration, focusing on Turkey as an example of an emerging market because it has high net foreign fund outflows and is an outlier country in terms of the variables included in our analysis.

Our main hypothesis is that foreign investors' activities and monetary policy responses on stock markets have a large impact on the level of the stock market index. As control variables, we use not only foreign investors' retention share and repurchase (repo) interest rate but also the credit default swap (CDS) spreads in Turkey, the foreign exchange (FX) rate between the United States dollar (USD) and the Turkish lira (TRY), the volatility index (VIX), and the pandemic. We consider pull factors for foreign portfolio flows when evaluating all the variables. Daily data are used, with the NARDL model applied to test the hypothesis and a MSR conducted for a robustness check. The analysis results reveal that the foreign portfolio flows have larger effects on the stock market index than does monetary policy.

The main contribution of the study is in our use of two nonlinear techniques, as NARDL and MSR are performed for the first time in the same study to examine the impacts of foreign investors' retention share and monetary policy responses on the stock market index. The remainder of the study is organized as follows. Section 2 explains the variables, data, and

methods. Section 3 presents the results , discussion, and implications of our analysis. Section 4 concludes.

Journal Pre-proof

Journal Pre-proof

2. Variables, Data and Empirical Methodology

2.1. Variables

Both the level of stock market indices and returns on stock market indices are used in the literature. In line with Malagrino et al. (2018), Cao et al. (2020), Kartal (2020b), Kirikkaleli (2020), and Kartal et al. (2021), the stock market index values are considered the dependent variable, and the influence of the foreign portfolio flows and monetary policy responses on the stock market index is investigated using some control variables. Likewise, although there are a variety of stock market indices, we study the main stock market index of Turkey (hereafter, XU100 index) because it is the main index representing the Turkish stock market.

First, we use foreign portfolio flows as an independent variable. Their effects on stock market indices are examined with different variables, such as the amount of foreign investors' net purchases or sales and foreign portfolio inflows. This subject is extensively studied in the literature (see Dahlquist & Robertsson, 2004; Vo, 2015), and the main conclusion is that foreign portfolio inflows are beneficial for stock markets in terms of increasing efficiency and decreasing volatility in the long run. Likewise, stock market indices usually increase when foreign portfolio inflows surge. Although many variables can be used to proxy for foreign portfolio flows, we use foreign investors' retention share (hereafter, FS) because this ratio reflects all activities of foreign investors at the same time.

Second, we study monetary policy responses by considering the reality that countries have use precautionary measures to prevent/decrease the unprecedented effects of the pandemic and have prioritized monetary policy by applying expansionary monetary policies. The effects of monetary policy responses and monetary policy indicators on stock market indices are examined in the literature (Thorbecke, 1997; Lee et al., 2016). Similarly, the effects of other types of interest rates on stock markets are also examined (Tripathy, 2011). The general conclusions of these studies are that expansionary monetary policies have a positive effect on stock market indices whereas contractionary monetary policies have a negative effect. Although the main indicator of monetary policy is the one-week repo interest rate, this rate might have shortcomings in reflecting real economic and financial conditions. Similarly, the weighted average cost of funding of central banks can be considered as an indicator, but this rate also cannot be the right choice because it combines all the funding channels used by central banks and, accordingly, increases slowly when interest rates are rising. Hence, we use the Borsa Istanbul repo interest rate (hereafter, REPO) as a proxy for

Journal Pre-proof

monetary policy responses. It reflects the development of interest rates better and more rapidly, including the effects of monetary policy responses as well.

Although FS and REPO are included as the main independent variables, some other variables that are likely to affect stock market indices are considered as control variables. In this context, the COVID-19 pandemic, CDS spreads, the USD/TRY FX rate, and the VIX index are used as control variables.

The pandemic has continued, and so the literature on it has continued to evolve (Phan & Narayan, 2020). In this study, we analyze the unprecedented negative effects on stock markets caused by the pandemic, which is considered to have begun in Turkey on March 11, 2020 (MHT, 2020). This date is used as a dummy variable to examine the effect of the pandemic.

Furthermore, it is commonly accepted that CDS spreads reflect the risk level of countries in terms of credit default (Hibbert & Pavlova, 2017). Foreign portfolio flows to a country are expected to decrease while its CDS spreads increase. In line with Galil et al. (2014), Yang et al. (2018), Kartal (2020b), and Kartal et al. (2020), we include CDS spreads as an influential factor that affects the stock market index. We use the five-year sovereign USD CDS spreads in Turkey because this maturity has the highest liquidity (Hasan et al., 2016).

Moreover, foreign exchange is an important indicator in the analysis of stock markets. The effects of FX rates are analyzed in studies such as those by Demir (2019), Narayan et al. (2020), and He et al. (2021), which reveal a negative nexus between stock market indices and FX rates because they are investment alternatives, so one decreases while the other increases. We use the USD/TRY FX rate as a variable because this is the most important FX rate for Turkey as well as other emerging countries (Atmaca & Karadaş, 2020).

Lastly, volatility is also a significant parameter for stock market indices, as indicated by Lee et al. (2016), Liew et al. (2018), and Kartal et al. (2021). Indeed, volatility has increased since the beginning of the pandemic because of increasing uncertainty. Increasing volatility negatively affects stock market indices because foreign fund flows to emerging countries decrease when volatility increases, which leads to growing fear (Liew et al., 2018). Therefore, including volatility in an analysis of stock market indices is common and definitely beneficial. In this regard, we use VIX index as a volatility indicator, which is also a common practice.

2.2. Data

We study daily data from January 2, 2017, to October 20, 2020. The sample period begins in 2017 because a military coup attempt was made in July 2016, and conditions returned to normal in 2017.

Data on the XU100 index and REPO come from the Central Bank of the Republic of Turkey (2020). Data on the FS is obtained from the CSD (2020), and data on the VIX index, five-year sovereign USD CDS spreads in Turkey, and the USD/TRY FX rate come from Bloomberg (2020). Moreover, we create a dummy variable for the COVID-19 pandemic, which is 1 for the period after March 11, 2020, and 0 for the period before it. Table 1 presents the descriptive statistics.

Table 1. Descriptive Statistics

	LXU100	LFS	LREPO	LCDS	LUSD/TRY	LVIX
Mean	6.9235	4.1325	2.6356	5.7286	1.6123	2.7777
Std. Dev.	0.0965	0.0729	0.3494	0.3869	0.2470	0.4117
Minimum	6.6352	3.8801	2.0242	5.0665	1.2245	2.2127
Maximum	7.1193	4.1929	3.2387	6.4542	2.0713	4.4151
Skewness	- 0.1171	- 1.9269	0.3877	- 0.0730	- 0.1236	1.1419
Kurtosis	2.4424	5.6650	1.9199	1.7954	1.6375	4.1550
Jarque-Bera	14.4018	864.4274	69.6096	57.9772	75.4981	257.9083
Probability	0.0007	0.000	0.000	0.000	0.000	0.000
Observations	945	945	945	945	945	945

2.3. Empirical Methodology

In the empirical modeling, we analyze stationarity firstly by employing both Zivot-Andrews (ZA, 1992) that takes structural breaks into account, and Ng-Perron (NP, 2001) unit root tests. After stationarity analysis, non-linearity is analyzed via BDS (1996) test. Lastly, we employ the NARDL and MSR models to analyze the effects of foreign portfolio flows and monetary policy responses on stock market index. Equation (1) indicates the basic regression setup for our modeling approach:

$$LXU100_t = \alpha_0 + \alpha_1 LREPO_t + \alpha_2 LFS_t + \alpha_{3i} Control_t + \varepsilon_t \quad (1)$$

where $LXU100_t$ indicates the natural logarithm of the stock market index of Turkey, LFS_t is the natural logarithm of the foreign investors' retention share, $LREPO_t$ is the natural logarithm of the repo interest rate, and *Control* is our control variables; $LVIX_t$ is the natural logarithm of the volatility index, $LCDS_t$ is the natural logarithm of the CDS spreads of

Turkey, $LUSD/TRY_t$ is the natural logarithm of the USD/TRY FX rate. ε_t shows the error term.

In the empirical modeling, we estimate the NARDL model, developed by Shin et al. (2014), to examine the reaction of the stock market index of Turkey to changes in foreign portfolio flows and monetary policy responses. We first employ the nonlinear bound test approach, which is developed by Shin et al. (2014) as an extended version of Pesaran et al. (2001), to investigate the cointegration relationship.

Equation (2) indicates the linear version of the Unrestricted Error Correction Model (UECM) specification for the study that is parallel to the Pesaran et al. (2001):

$$\Delta LXU100_t = \alpha_0 + \alpha_{1,i}\sum_{i=1}^{m}\Delta LXU100_{t-i} + \alpha_{2,i}\sum_{i=0}^{m}\Delta LREPO_{t-i} + \alpha_{3,i}\sum_{i=0}^{m}\Delta LFS_{t-i} + \alpha_{4,i}\sum_{i=0}^{m}\Delta CONTROL_{t-i} + \alpha_5 LXU100_{t-1} + \alpha_6 LREPO_{t-1} + \alpha_7 LFS_{t-1} + \alpha_8 CONTROL_{t-1} + \varepsilon_t \quad (2)$$

Shin et al. (2014) extend the linear UECM model by decomposing selected independent variables into positive and negative parts. The NARDL approach decomposes independent variables into positive and negative changes to see whether they have a nonlinear impact on the dependent variable (Chowdhury et al., 2020). Following the methodology of Shin et al. (2014), we decomposed REPO and FS variables into positive and negative parts in Equation (3).

$$\begin{aligned} REP_t^+ &= \sum_{m=1}^{t}\Delta REPO_t^+ = \sum_{m=1}^{t}\max(\Delta REP_t^+, 0) \\ REP_t^- &= \sum_{m=1}^{t}\Delta REPO_t^- = \sum_{m=1}^{t}\min(\Delta REP_t^-, 0) \\ FS_t^+ &= \sum_{m=1}^{t}\Delta FS_t^+ = \sum_{m=1}^{t}\max(\Delta FS_t^+, 0) \\ FS_t^- &= \sum_{m=1}^{t}\Delta FS_t^- = \sum_{m=1}^{t}\min(\Delta FS_t^-, 0) \end{aligned} \quad (3)$$

Extended UECM model with positive ($REPO^+$, FS^+) and negative ($REPO^-$, FS^-) variables parallel with the Shin et al. (2014) methodology is presented in Equation (4).

$$\Delta LXU100_t = \alpha_0 + \alpha_{1,i}\sum_{i=1}^{m}\Delta LXU100_{t-i} + \alpha_{2,i}\sum_{i=0}^{m}\Delta LREPO^+{}_{t-i} + \alpha_{3,i}\sum_{i=0}^{m}\Delta LREPO^-{}_{t-i} + \alpha_{4,i}\sum_{i=0}^{m}\Delta LFS^+{}_{t-i} + \alpha_{5,i}\sum_{i=0}^{m}\Delta LFS^-{}_{t-i} + \alpha_{6,i}\sum_{i=0}^{m}\Delta CONTROL_{t-i} + \alpha_7 LXU100_{t-1} + \alpha_8 LREPO^+{}_{t-1} + \alpha_9 LREPO^-{}_{t-1} + \alpha_{10} LFS^+{}_{t-1} + \alpha_{11} LFS^-{}_{t-1} + \alpha_{12} CONTROL_{t-1} + \varepsilon_t \quad (4)$$

We employ NARDL bound test by using Equation (4) to analyze the long-term cointegration relationship. The NARDL bound test approach has some superior properties over the traditional models. Besides, NARDL model presents effective coefficients irrespective of the investigated variables are I(0), I(1), or I(0) and I(1). NARDL is superior to

smooth transition error correction models (ECM) and Markov switching ECM as it jointly estimates cointegration and asymmetries. Furthermore, NARDL provides efficient and valid results for data that has a small sample (Chishti et al., 2020).

After finding a long-term cointegration, we obtain long-run coefficients from the NARDL model to find the co-integration equation. Finally, we employ a nonlinear MSR model to estimate the co-integration equation for robustness check. The MSR model is an extended version of the simple exogenous probability models that define two volatility regimes as high and low volatility. The baseline MSR model is presented in Equations (5) and (6):

Low Volatility Regime:

$$LXU100_t = \alpha_{1,0} + \alpha_{1,1}LREPO_{t-i} + \alpha_{1,2}LFS_{t-i} + \alpha_{1,3}Control_{t-1} + \varepsilon_{1,t} \quad (5)$$

High Volatility Regime:

$$LXU100_t = \alpha_{2,0} + \alpha_{2,1}LREPO_{t-i} + \alpha_{2,2}LFS_{t-i} + \alpha_{2,3}Control_{t-1} + \varepsilon_{2,t} \quad (6)$$

where α_{10} and α_{20} denotes the regime-dependent constants, while α_{11} and α_{21} are the autoregressive coefficients. ε_{1t} and ε_{2t} are the error terms.

Regime-switching model has some advantages with regard to the single regime models as superior forecasting performance and lower volatility persistence (Dueker, 1997).

3. Empirical Results, Discussion and Implications

First, we conduct NP and ZA tests to test for stationarity. The results are presented in Appendix S1 (in Supplementary Material, available online), in which both tests indicate that all variables are I(1) except the LVIX variable that is I(0).

Then, we investigate the nonlinearity characteristics by performing a BDS test, for which the results are in Appendix S2 (in Supplementary Material, available online). According to these results, the null hypothesis that the variables are linearly dependent is rejected. Hence, the results indicate the nonlinearity of the variables. Next, we investigate the cointegration relationship between the variables. To check for cointegration, we conduct an asymmetric cointegration analysis developed by Shin et al. (2014), as seen in Equation (4), which we use because our variables are found to be both I(0) and I(1) and indicate nonlinear characteristics. If the estimated F-statistics are greater (less) than the upper (lower) bound, the null hypothesis of no cointegration is rejected (not rejected). If the calculated F-statistics are between the lower and upper values, no precise decision can be made (Narayan & Narayan, 2004). Table 2 shows the results of the asymmetric cointegration test.

Table 2. Asymmetric Co-integration Test Results

Journal Pre-proof

F statistics	Critical Value at %1 Significance Level	
	Bottom Bound	Upper Bound
9.68	3.29	4.37

The F-statistics in Table 2 are greater than the upper bound values. Hence, the null hypothesis (implying no cointegration) is rejected. The asymmetric cointegration test indicates a significant long-run cointegration relationship. After determining the presence of cointegration between the variables, we obtain long-term coefficients to determine the cointegration equation. Table 3 presents the error correction coefficients and long-term coefficients.

Table 3. NARDL (1,0,0) Model Long-Term Parameter Estimations and ECM Coefficients

Estimated Long Term Coefficients Using NARDL (1,0,0,0,0) Model		
Variables	**Coefficient**	**T statistics**
LREPO_POS	0.116	2.637*
LREPO_NEG	0.084	2.525**
LFS_POS	-0.497	-2.037**
LFS_NEG	-0.406	-2.020**
LVIX	-0.142	-4.821*
LCDS	-0.504	-7.746*
LUSD/TRY	0.477	2.908*
COVID	0.196	3.325*
C	9.308	44.158*
Error Correction Coefficient from the NARDL (1,0,0,0,0) Model		
Variables	**Coefficient**	**T statistics**
ECT(1)	-0.070	-7.256*
Diagnostic Checks[1]		
X^2_{BG} (A)		0.763 [0.382]
χ^2_{WHITE} (B)		2.273 [0.132]
X^2_{RAMSEY} (C)		0.796 [0.372]

Notes:

[1]According to diagnostic tests, there are not problems like heteroscedasticity, misspecification, and serial correlation in NARDL model.

1) *According to the diagnostic tests, there are no problems such as heteroskedasticity, misspecification, and serial correlation in the NARDL model.*
2) *Significance level of *1% and **5%.*
3) *(A) Breusch–Godfrey LM test, (B) White heteroskedasticity test, (C) Ramsey's RESET test. The values in brackets show the probability values.*

As Table 3 indicates, both FS and REPO have a statistically significant effect. Similarly, VIX and CDS spreads have statistically significant and negative coefficients, whereas the USD/TRY FX rate has a statistically significant and positive coefficient. Moreover, the pandemic (COVID) has an important effect on the index. Thus, the NARDL results reveal that all variables, including control variables, have an important effect on the XU100 index.

Specifically, FS has a greater effect on the index. The results mean that a one-percentage-point positive shock to FS causes a 0.497-percentage-point decrease, and a one-percentage-point negative shock to FS causes a 0.406-percentage-point decrease in the index. In addition, a one-percentage-point positive shock to monetary responses causes a 0.116-percentage-point increase, and a one-percentage-point negative shock to FS causes a 0.084-percentage-point increase in the index.

Actually, it was expected that an increase in FS causes an increase in the index, and an increase in the repo interest rate causes a decrease in the index when other conditions are constant. Surprisingly, the results for the effect of FS and monetary policy responses (REPO) produce conflicting consequences to the expectations. Indeed, FS has a negative coefficient and REPO has a positive coefficient.

The adverse effect of REPO can be explained that an increase in monetary policy responses causes an increase in the XU100 index implying that Turkey has been taking various measures (e.g., increasing interest rates) to stabilize the economy, however, they have not made a positive effect. Besides, the adverse effect of FS can be explained by the increasing domestic investor demand for the stock market. This results from the negative real interest rate environment in Turkey, excessive funding provided by the central bank of Turkey because of the pandemic, and higher effect of domestic investors' demand increases with regard to the negative effect of decreasing FS. The results of NARDL refer that Turkey should focus on the managing FS primarily. In addition to the NARDL, we also employ a nonlinear MSR model for robustness check. Table 4 presents the results of the MSR model.

Table 4. Markov Switching Regression Results

Journal Pre-proof

Variable/Model	Markov Model
Regime 1: Low Volatility	
LREPO	0.022*
LFS	-0.660*
C	11.783*
Regime 2: High Volatility	
LREPO	0.068*
LFS	-0.557*
C	11.160*
Common Coefficients	
LVIX	-0.042*
LCDS	-0.532*
LUSD/TRY	0.630*
COVID	0.060*
Observations	945

*Notes: * 1% significance level. The LXU100, LREPO, LFS, LVIX, LCDS, and LUSD/TRY represent the natural logarithm for the stock market index of Turkey, repo interest rate, foreign investors' retention share, volatility index, CDS spreads of Turkey, USD/TRY FX rate, respectively. COVID represents the presence of the COVID-19 pandemic in Turkey as a dummy variable. C is the constant term.*

As Table 4 shows, the results of MSR in different regimes (i.e., low or high) are consistent and the results reveal that all variables used in the analysis are statistically significant and influential on the XU100 index. In other words, FS has a statistically significant and negative coefficient while REPO has a statistically significant and positive coefficient in both regimes. Besides, VIX and CDS spreads have statistically significant and negative coefficients while USD/TRY has a significant and positive coefficient. The MSR results reveal that all variables including control variables are statistically significant on the XU100 index in both regimes.

More specifically, the coefficient of the FS falls into the values of -0.557 and -0.660 and indicates that one-percentage-point increase of FS causes (0.557-0.660) percentage-point decrease in the XU100 index. Also, the coefficient of REPO is found between 0.022 and 0.068 indicating that one-percentage-point increase in REPO causes an increase in the XU100 index of (0.022 - 0.068) percentage points.

The MSR analysis results reveal that FS has a larger effect than REPO in both high- and low-volatility regimes. These results infer that Turkey should focus primarily on managing FS in both high- and low-volatility periods. The results of the NARDL and MSR analyses are generally consistent and support each other. The results of the NARDL and MSR together show that FS has a larger effect on the index than REPO and that all the control variables are significant.

Our findings lead us to make a few recommendations. First, Turkey should focus on the factors with the highest impact on the index, that is, managing foreign investors' retention share. For example, the authorities should consider making the stock market much more competitive by removing barriers such as banning short sales. As the Turkish economy gradually reopens and returns to normal, it can benefit from increasing foreign portfolio flows in the short term, because a normal economic environment is expected to have a positive real interest rate, stabilized domestic investor demand, and a high foreign investors' retention share. In this environment, an increase in FS would contribute to progress in the XU100 index.

Then, Turkey can turn to other (less influential) factors on the index, such as focusing on monetary policy responses because they have a significant impact on the XU100 index. Turkey should revise its monetary policy framework and take necessary measures to stabilize the economy through monetary policy. Supporting monetary policy with fiscal policy and implementing structural reforms can enhance the positive effects of the monetary policy responses to the index. Moreover, implementing structural reforms in a timely way can also contribute to foreign direct investment, which helps to increase the central bank's reserves and thereby the credibility and effects of monetary policy responses. Moreover, structural reforms support a decrease in country risk premiums (i.e., CDS spreads) and thus make a positive contribution to growth in the stock market index.

Turkey should develop and apply other policies related to the economic and financial realities in the country. Although the coefficient and signs of coefficients for the variables in this study do not change, Turkey should consider the effect of the regimes. Finally, the policy framework, which has an impact on FS, and monetary policy responses should be reshaped because some factors highly influence the index, which causes negative pricing of Turkish assets.

4. Conclusion

This study examines the impacts of foreign portfolio flows and monetary policy responses to the stock market index in Turkey, considering the effects of the pandemic. Using a daily dataset between January 2, 2017, and October 20, 2020, which includes the outbreak

of the COVID-19 pandemic, we apply a NARDL model and study the stationarity and nonlinearity properties of the variables, with an MSR model for a robustness check. FS, which is a proxy for foreign portfolio flows, and the repo interest rate are the main independent variables. The volatility index, CDS spreads, and the USD/TRY FX rate are also included as control variables because they are expected to be influential factors on the index.

The results of the NARDL analysis show that both FS and REPO have a statistically significant effect on the index, and both affect the XU100 index. However, FS has a larger effect on the index than the monetary policy responses. In other words, although FS and REPO both influence the index, positive (FS) and negative (REPO) shocks have different effects on the XU100 index. Indeed, positive shocks have a much larger impact than negative shocks. The MSR results show that FS has a high and significant effect in both high- and low-volatility regimes whereas REPO has a relatively small effect on the XU100 index. The results of the MSR analysis are consistent with those of the NARDL analysis and demonstrate their robustness.

The results of the NARDL and MSR analyses underline the significance of FS and REPO on the XU100 index. They indicate that Turkey would benefit from re-evaluating policies such as the ban on short sales and from implementing structural reforms as they would support growth in the stock market index. Turkey could also benefit from fair pricing of the assets on the stock market by preventing the negative effects of the variables on the XU100 index. Turkey's economic growth and financial development would be positively affected by a reallocation of financial sources among alternatives, including the XU100 index. Moreover, a stable and increasing XU100 index would have a positive effect on capital markets, financial markets, and the economy.

The main limitation of the study is that it focuses only on Turkey. Future studies should include other countries, especially those with the highest foreign portfolio inflows (e.g., the US, China, the UK), the largest government subsidies and monetary and fiscal policy reactions to mitigate the negative effects of the pandemic (e.g., the US, Japan, Germany), the countries that fared best in economic recovery (e.g., South Korea, Singapore, Hong Kong), and those that fared the worst (e.g., the US, India, Brazil) in the pandemic according to the recent information available. Moreover, this study does not include country-level macroeconomic factors such as inflation and economic growth and financial indicators such as the real interest rate and the number of domestic investors. Future studies should examine these indicators as well. Furthermore, dividing the dataset into subperiods based on the development of the pandemic is recommended in future studies, which would also do well

to employ other methods than those used here, such as machine learning algorithms and quantile regression.

References

Atmaca, S., & Karadaş, H. A. (2020). Decision Making on Financial Investment in Turkey by Using ARDL Long-Term Coefficients and AHP. *Financial Innovation*, 6(1), 1-22.

Bekaert, G., & Harvey, C. R. (2003). Emerging Markets Finance. *Journal of Empirical Finance*, 10(1-2), 3-55.

Bloomberg. (2020). Bloomberg Terminal, November 5, 2020.

Cao, K. H., Li, Q., Liu, Y., & Woo, C. K. (2020). Covid-19's Adverse Effects on a Stock Market Index. *Applied Economics Letters*, 1-5.

Central Bank of the Republic of Turkey. (2020). Electronik Data Distribution System (EVDS), https://evds2.tcmb.gov.tr/index.php?/evds/serieMarket, November 5, 2020.

CSD. (2020). Data of foreign investors' retention share. Obtained via e-mail on 11.05.2020.

Chishti, M. Z., Ullah, S., Özturk, İ., & Usman, A. (2020). Examining the Asymmetric Effects of Globalization and Tourism on Pollution Emissions in South Asia. *Environmental Science and Pollution Research*, 27, 27721–27737.

Chowdhury, M. A. F., Meo, M. S., Uddin, A., & Haque, M. M. (2020). Asymmetric Effect of Energy Price on Commodity Price: New Evidence from NARDL and Time Frequency Wavelet Approaches. *Energy*, 119461.

Dahlquist, M., & Robertsson, G. (2004). A Note on Foreigners' Trading and Price Effects across Firms. *Journal of Banking & Finance*, 28(3), 615-632.

Demir, C. (2019). Macroeconomic Determinants of Stock Market Fluctuations: The Case of BIST-100. *Economies*, 7(1), 8.

Dueker, M. J. (1997). Markov Switching in GARCH Processes and Mean-Reverting Stock-Market Volatility. *Journal of Business & Economic Statistics*, 15(1), 26-34.

Engelhardt, N., Krause, M., Neukirchen, D., & Posch, P. (2020). What Drives Stocks during the Corona-Crash? News Attention vs. Rational Expectation. *Sustainability*, 12(12), 5014.

Fratzscher, M. (2012). Capital Flows, Push versus Pull Factors and the Global Financial Crisis. *Journal of International Economics*, 88(2), 341-356.

Galil, K., Shapir, O. M., Amiram, D., & Ben-Zion, U. (2014). The Determinants of CDS Spreads. *Journal of Banking & Finance*, 41, 271-282.

Goodell, J. W. (2020). COVID-19 and Finance: Agendas for Future Research. *Finance Research Letters*, 101512.

Guo, M., Kuai, Y., & Liu, X. (2020). Stock Market Response to Environmental Policies: Evidence from Heavily Polluting Firms in China. *Economic Modelling*, 86, 306-316.

Hasan, I., Liu, L., & Zhang, G. (2016). The Determinants of Global Bank Credit-Default-Swap Spreads. *Journal of Financial Services Research*, 50(3), 275-309.

He, X., Gökmenoğlu, K. K., Kirikkaleli, D., & Rizvi, S. K. A. (2021). Co-Movement of Foreign Exchange Rate Returns and Stock Market Returns in An Emerging Market: Evidence from the Wavelet Coherence Approach. *International Journal of Finance & Economics*. https://doi.org/10.1002/ijfe.2522.

Hibbert, A. M., & Pavlova, I. (2017). The Drivers of Sovereign CDS Spread Changes: Local Versus Global Factors. *Financial Review*, 52(3), 435-457.

Hillier, D., & Loncan, T. (2019). Political Uncertainty and Stock Returns: Evidence from the Brazilian Political Crisis. *Pacific-Basin Finance Journal*, 54, 1-12.

Ichev, R., & Marinč, M. (2018). Stock Prices and Geographic Proximity of Information: Evidence from the Ebola Outbreak. *International Review of Financial Analysis*, 56, 153-166.

Kartal, M. T. (2020a). Do Activities of Foreign Investors Affect Main Stock Exchange Indices? Evidence from Turkey Before and in Time of Covid-19 Pandemic. *National Accounting Review*, 2(4), 384-401.

Kartal, M. T. (2020b). The Behavior of Sovereign Credit Default Swaps (CDS) Spread: Evidence from Turkey with the Effect of Covid-19 pandemic. *Quantitative Finance and Economics*, 4(3), 489-502.

Kartal, M. T., Depren, Ö., & Kılıç Depren, S. (2020). The Determinants of Main Stock Exchange Index Changes in Emerging Countries: Evidence from Turkey in Covid-19 Pandemic Age. *Quantitative Finance and Economics*, 4(4), 526-541.

Kartal, M. T., Kılıç Depren, S., & Depren, Ö. (2021). How Main Stock Exchange Indices React to Covid-19 Pandemic: Daily Evidence from East Asian Countries. *Global Economic Review*, 50(1), 54-71.

Kirikkaleli, D. (2020). The Effect of Domestic and Foreign Risks on An Emerging Stock Market: A Time Series Analysis. *The North American Journal of Economics and Finance*, 51, 100876.

Lee, J., Ryu, D., & Kutan, A. M. (2016). Monetary Policy Announcements, Communication, and Stock Market Liquidity. *Australian Economic Papers*, 55(3), 227-250.

Liew, P. X., Lim, K. P., & Goh, K. L. (2018). Foreign Equity Flows: Boon or Bane to the Liquidity of Malaysian Stock Market? *The North American Journal of Economics and Finance*, 45, 161-181.

Malagrino, L. S., Roman, N. T., & Monteiro, A. M. (2018). Forecasting Stock Market Index Daily Direction: A Bayesian Network approach. *Expert Systems with Applications*, 105, 11-22.

MHT. (2020). COVID-19 Numbers. https://COVID19.saglik.gov.tr, November 23, 2020.

Narayan, S., & Narayan, P. K. (2004). Determinants of Demand for Fiji's Exports: An Empirical investigation. *The Developing Economies*, 42(1), 95-112.

Narayan, P. K., Devpura, N., & Wang, H. (2020). Japanese Currency and Stock Market-What Happened During the COVID-19 Pandemic? *Economic Analysis and Policy*, 68, 191-198.

Ng, S., & Perron, P. (2001). Lag Length Selection and the Construction of Unit Root Tests with Good Size and Power. *Econometrica*, 69(6), 1519-1554.

Peiro, A. (2016). Stock Prices and Macroeconomic Factors: Some European Evidence. *International Review of Economics and Finance*, 41, 287-294.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16(3), 289-326.

Phan, D. H. B., & Narayan, P. K. (2020). Country Responses and the Reaction of the Stock Market to COVID-19-A Preliminary Exposition. *Emerging Markets Finance and Trade*, 56(10), 2138-2150.

Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework, in: Sickles, R.C., Horrace, W.C. (Eds.), Festschrift in Honor of Peter Schmidt. Springer, New York, NY, 281-314. Springer, New York.

Stiglitz, J. E. (2010). Risk and Global Economic Architecture: Why Full Financial Integration May be Undesirable. *American Economic Review*, 100(2), 388-392.

Thorbecke, W. (1997). On Stock Market Returns and Monetary Policy. *The Journal of Finance*, 52(2), 635-654.

Tripathy, N. (2011). Causal Relationship between Macro-Economic Indicators and Stock Market in India. *Asian Journal of Finance & Accounting*, 3(1), 208-226.

Vo, X. V. (2015). Foreign Ownership and Stock Return Volatility-Evidence from Vietnam. *Journal of Multinational Financial Management*, 30, 101-109.

WHO. (2020a). Coronavirus Disease (COVID-19) Outbreak Situation, https://www.who.int/emergencies/diseases/novel-coronavirus-2019, November 5, 2020.

WHO. (2020b). Covid-19 Numbers, https://covid19.who.int, November 23. 2020.

Yang, L., Yang, L., & Hamori, S. (2018). Determinants of Dependence Structures of Sovereign Credit Default Swap Spreads between G7 and BRICS Countries. *International Review of Financial Analysis*, 59, 19-34.

Younis, I., Longsheng, C., Basheer, M. F., & Joyo, A. S. (2020). Stock Market Comovements among Asian Emerging Economies: A Wavelet-Based Approach. *Plos One*, 15(10), e0240472.

Zhang, D., Hu, M., & Ji, Q. (2020). Financial Markets under the Global Pandemic of COVID-19. *Finance Research Letters*, 101528.

Zivot, E., & Andrews, D.W.K. (1992). Further Evidence on the Great Crash, the Oil-Price Shocok and the Unit-Root Hypothesis. *Journal of Business and Economic Statistics*, 10(3), 251-270.

Journal Pre-proof

Manuscript.docx

Journal Pre-proof

WORD COUNT 5802
TIME SUBMITTED 05-JUN-2021 09:23PM
PAPER ID 73074398

Journal Pre-proof

The Impacts of Foreign Portfolio Flows and Monetary Policy Responses on Stock Markets by Considering COVID-19 Pandemic: Evidence from Turkey

Abstract

This study researches the impacts of foreign portfolio flows (proxied by foreign investors' retention share) and monetary policy responses (proxied by the repurchase interest rate) on Turkey's stock market index taking the COVID-19 pandemic into consideration. A volatility index, credit default swap spreads, and foreign exchange rates are used as control variables, with a daily dataset between January 2, 2017, and October 20, 2020. After examining the stationarity and nonlinearity characteristics of the variables, we applied a nonlinear autoregressive distributed lag (NARDL) model and then conducted a Markov switching regression (MSR) for a robustness check. The results reveal that both foreign portfolio flows and monetary responses have an important effect on the index, and foreign portfolio flows have a higher effect than monetary responses. Accordingly, the results obtained from the NARDL and MSR models are robust and consistent.

Keywords: COVID-19 pandemic; Foreign Portfolio Flows; Monetary Policy Responses; MSR; NARDL; Stock Markets; Turkey.

JEL Classifications: C22; E44; E58.

1. Introduction

Stock markets are sensitive to developments in economics and finance, including announcements, crises, and uncertainty (Hillier & Loncan, 2019; Guo et al., 2020). Based on these characteristics, stock markets are barometers of financial markets (Younis et al., 2020) as they reflect the effects of news and developments on traded shares quickly. Therefore, stock markets have a significant role for investors and companies because of their efficiency (Kartal et al., 2020). Although stock markets have a positive reaction to good news and developments, they also react negatively to bad news and developments. In addition to acting as a barometer of fair pricing, stock markets have a key role in foreign portfolio flows.

Via stock markets, decisions about the buying and selling of shares are made rapidly based on the information available, and transactions are completed with the same speed. As expected, announcements regarding financial indicators can influence stock markets (Peiro, 2016).

In 2019, countries began to face a health crisis with the outbreak of COVID-19, a black swan event (Goodell, 2020) that was defined as a pandemic on March 11, 2020 (World Health Organization-WHO, 2020a). As of November 22, 2020, nearly 2.2 million people had died, and 100.5 million cases were confirmed (WHO, 2020b). The pandemic encompassed both advanced and emerging countries. For example, as of that date, the pandemic had caused 12,400 deaths in Turkey, with 446,800 confirmed cases (Ministry of Health of Turkey [MHT], 2020). Until the majority of the world's population has been vaccinated, the risk from the pandemic will continue.

Stock markets react rapidly to outbreaks of serious diseases such as Ebola, SARS, and MERS (Ichev & Marinč, 2018), so it is not surprising that they responded quickly to the COVID-19 pandemic because it led to a significant increase in uncertainty. Hence, stock markets are among the financial markets that are affected by the pandemic (Engelhardt et al., 2020).

To limit the spread and adverse impacts of the pandemic, countries have applied various measures, including social distancing, local lockdowns, and quarantines. Despite these efforts to mitigate negative effects, countries have experienced deleterious effects such as increases in unemployment, welfare loss, and foreign portfolio outflows. Hence, deterioration in economic and financial indicators was inevitable, with unprecedented and destructive consequences (Goodell, 2020) and an increasing risk level (Zhang et al., 2020) all over the world.

In addition to uncertainty, fears have also increased due to the pandemic. Investors evaluate alternatives to preserve and invest their savings by considering risk, return, and portfolio diversification (Yang et al., 2018). Shares are one of the investment alternatives that investors can consider. However, the pandemic has seriously affected stock markets of emerging countries as the high level of foreign portfolio outflows have occurred. For example, TRY 41 billion of foreign portfolio outflows were seen in 10 months of 2020 from the Turkish stock market (Central Securities Depositories of Turkey [CSD], 2020). The literature states that there are push and pull factors affecting foreign flows. Push factors are related with receiving countries, defined as common factors and present demand side of flows. Pull factors are related with sending countries, defined as country-specific factors and present supply side of flows (Fratzscher, 2012). No matter how the effect of push and pull factors differ, foreign portfolio flows are quite significant for emerging countries because they depend on foreign investments for the financing of economic activities due to lack of savings (Kartal et al., 2020). In one hand, foreign investment inflows can make considerable positive effects on countries and stock markets as well as stock prices, stock returns (Bekaert & Harvey, 2003). On the other hand,

foreign investment flows are criticized due to negative effects (Stiglitz, 2010). Nevertheless, providing sustainable foreign portfolio inflows can be beneficial for the development of emerging countries via stock markets, and stimulating foreign portfolio inflows is much easier than increasing foreign direct investments (Kartal et al., 2020).

In addition, monetary policy can affect stock markets. An expansionary monetary policy can support the development of stock markets whereas a contractionary monetary policy can cause a decline (Thorbecke, 1997; Lee et al., 2016; Kartal, 2020a). At first, most countries responded to the pandemic using monetary policy tools. Hence, monetary policy needs to be included when considering the use of monetary responses.

In sum, the pandemic continues, stock markets have reacted to it, and foreign portfolio flows have been affected. In this environment, multiple factors must be considered. All countries and related indicators are affected by the pandemic, but emerging countries are affected more negatively than developed countries because of their dependence on flows of foreign funds. Furthermore, emerging countries also suffer natural consequences such as underpricing of assets on underperforming stock market indices. In this paper, we take these facts into consideration, focusing on Turkey as an example of an emerging market because it has high net foreign fund outflows and is an outlier country in terms of the variables included in our analysis.

Our main hypothesis is that foreign investors' activities and monetary policy responses on stock markets have a large impact on the level of the stock market index. As control variables, we use not only foreign investors' retention share and repurchase (repo) interest rate but also the credit default swap (CDS) spreads in Turkey, the foreign exchange (FX) rate between the United States dollar (USD) and the Turkish lira (TRY), the volatility index (VIX), and the pandemic. We consider pull factors for foreign portfolio flows when evaluating all the variables. Daily data are used, with the NARDL model applied to test the hypothesis and a MSR conducted for a robustness check. The analysis results reveal that the foreign portfolio flows have larger effects on the stock market index than does monetary policy.

The main contribution of the study is in our use of two nonlinear techniques, as NARDL and MSR are performed for the first time in the same study to examine the impacts of foreign investors' retention share and monetary policy responses on the stock market index. The remainder of the study is organized as follows. Section 2 explains the variables, data, and methods. Section 3 presents the results , discussion, and implications of our analysis. Section 4 concludes.

Journal Pre-proof

2. Variables, Data and Empirical Methodology

2.1. Variables

Both the level of stock market indices and returns on stock market indices are used in the literature. In line with Malagrino et al. (2018), Cao et al. (2020), Kartal (2020b), Kirikkaleli (2020), and Kartal et al. (2021), the stock market index values are considered the dependent variable, and the influence of the foreign portfolio flows and monetary policy responses on the stock market index is investigated using some control variables. Likewise, although there are a variety of stock market indices, we study the main stock market index of Turkey (hereafter, XU100 index) because it is the main index representing the Turkish stock market.

First, we use foreign portfolio flows as an independent variable. Their effects on stock market indices are examined with different variables, such as the amount of foreign investors' net purchases or sales and foreign portfolio inflows. This subject is extensively studied in the literature (see Dahlquist & Robertsson, 2004; Vo, 2015), and the main conclusion is that foreign portfolio inflows are beneficial for stock markets in terms of increasing efficiency and decreasing volatility in the long run. Likewise, stock market indices usually increase when foreign portfolio inflows surge. Although many variables can be used to proxy for foreign portfolio flows, we use foreign investors' retention share (hereafter, FS) because this ratio reflects all activities of foreign investors at the same time.

Second, we study monetary policy responses by considering the reality that countries have use precautionary measures to prevent/decrease the unprecedented effects of the pandemic and have prioritized monetary policy by applying expansionary monetary policies. The effects of monetary policy responses and monetary policy indicators on stock market indices are examined in the literature (Thorbecke, 1997; Lee et al., 2016). Similarly, the effects of other types of interest rates on stock markets are also examined (Tripathy, 2011). The general conclusions of these studies are that expansionary monetary policies have a positive effect on stock market indices whereas contractionary monetary policies have a negative effect. Although the main indicator of monetary policy is the one-week repo interest rate, this rate might have shortcomings in reflecting real economic and financial conditions. Similarly, the weighted average cost of funding of central banks can be considered as an indicator, but this rate also cannot be the right choice because it combines all the funding channels used by central banks and, accordingly, increases slowly when interest rates are rising. Hence, we use the Borsa Istanbul repo interest rate (hereafter, REPO) as a proxy for monetary policy responses. It reflects the development of interest rates better and more rapidly, including the effects of monetary policy responses as well.

Although FS and REPO are included as the main independent variables, some other variables that are likely to affect stock market indices are considered as control variables. In this context, the COVID-19 pandemic, CDS spreads, the USD/TRY FX rate, and the VIX index are used as control variables.

The pandemic has continued, and so the literature on it has continued to evolve (Phan & Narayan, 2020). In this study, we analyze the unprecedented negative effects on stock markets caused by the pandemic, which is considered to have begun in Turkey on March 11, 2020 (MHT, 2020). This date is used as a dummy variable to examine the effect of the pandemic.

Furthermore, it is commonly accepted that CDS spreads reflect the risk level of countries in terms of credit default (Hibbert & Pavlova, 2017). Foreign portfolio flows to a country are expected to decrease while its CDS spreads increase. In line with Galil et al. (2014), Yang et al. (2018), Kartal (2020b), and Kartal et al. (2020), we include CDS spreads as an influential factor that affects the stock market index. We use the five-year sovereign USD CDS spreads in Turkey because this maturity has the highest liquidity (Hasan et al., 2016).

Moreover, foreign exchange is an important indicator in the analysis of stock markets. The effects of FX rates are analyzed in studies such as those by Demir (2019), Narayan et al. (2020), and He et al. (2021), which reveal a negative nexus between stock market indices and FX rates because they are investment alternatives, so one decreases while the other increases. We use the USD/TRY FX rate as a variable because this is the most important FX rate for Turkey as well as other emerging countries (Atmaca & Karadaş, 2020).

Lastly, volatility is also a significant parameter for stock market indices, as indicated by Lee et al. (2016), Liew et al. (2018), and Kartal et al. (2021). Indeed, volatility has increased since the beginning of the pandemic because of increasing uncertainty. Increasing volatility negatively affects stock market indices because foreign fund flows to emerging countries decrease when volatility increases, which leads to growing fear (Liew et al., 2018). Therefore, including volatility in an analysis of stock market indices is common and definitely beneficial. In this regard, we use VIX index as a volatility indicator, which is also a common practice.

2.2. Data

We study daily data from January 2, 2017, to October 20, 2020. The sample period begins in 2017 because a military coup attempt was made in July 2016, and conditions returned to normal in 2017.

Data on the XU100 index and REPO come from the Central Bank of the Republic of Turkey (2020). Data on the FS is obtained from the CSD (2020), and data on the VIX index,

five-year sovereign USD CDS spreads in Turkey, and the USD/TRY FX rate come from Bloomberg (2020). Moreover, we create a dummy variable for the COVID-19 pandemic, which is 1 for the period after March 11, 2020, and 0 for the period before it. Table 1 presents the descriptive statistics.

Table 1. Descriptive Statistics

	LXU100	LFS	LREPO	LCDS	LUSD/TRY	LVIX
Mean	6.9235	4.1325	2.6356	5.7286	1.6123	2.7777
Std. Dev.	0.0965	0.0729	0.3494	0.3869	0.2470	0.4117
Minimum	6.6352	3.8801	2.0242	5.0665	1.2245	2.2127
Maximum	7.1193	4.1929	3.2387	6.4542	2.0713	4.4151
Skewness	- 0.1171	- 1.9269	0.3877	- 0.0730	- 0.1236	1.1419
Kurtosis	2.4424	5.6650	1.9199	1.7954	1.6375	4.1550
Jarque-Bera	14.4018	864.4274	69.6096	57.9772	75.4981	257.9083
Probability	0.0007	0.000	0.000	0.000	0.000	0.000
Observations	945	945	945	945	945	945

2.3. Empirical Methodology

In the empirical modeling, we analyze stationarity firstly by employing both Zivot-Andrews (ZA, 1992) that takes structural breaks into account, and Ng-Perron (NP, 2001) unit root tests. After stationarity analysis, non-linearity is analyzed via BDS (1996) test. Lastly, we employ the NARDL and MSR models to analyze the effects of foreign portfolio flows and monetary policy responses on stock market index. Equation (1) indicates the basic regression setup for our modeling approach:

$$LXU100_t = \alpha_0 + \alpha_1 LREPO_t + \alpha_2 LFS_t + \alpha_{3i} Control_t + \varepsilon_t \quad (1)$$

where $LXU100_t$ indicates the natural logarithm of the stock market index of Turkey, LFS_t is the natural logarithm of the foreign investors' retention share, $LREPO_t$ is the natural logarithm of the repo interest rate, and *Control* is our control variables; $LVIX_t$ is the natural logarithm of the volatility index, $LCDS_t$ is the natural logarithm of the CDS spreads of Turkey, $LUSD/TRY_t$ is the natural logarithm of the USD/TRY FX rate. ε_t shows the error term.

In the empirical modeling, we estimate the NARDL model, developed by Shin et al. (2014), to examine the reaction of the stock market index of Turkey to changes in foreign portfolio flows and monetary policy responses. We first employ the nonlinear bound test approach, which is developed by Shin et al. (2014) as an extended version of Pesaran et al. (2001), to investigate the cointegration relationship.

Equation (2) indicates the linear version of the Unrestricted Error Correction Model (UECM) specification for the study that is parallel to the Pesaran et al. (2001):

$$\Delta LXU100_t = \alpha_0 + \alpha_{1,i}\sum_{i=1}^{m}\Delta LXU100_{t-i} + \alpha_{2,i}\sum_{i=0}^{m}\Delta LREPO_{t-i} + \alpha_{3,i}\sum_{i=0}^{m}\Delta LFS_{t-i} + \alpha_{4,i}\sum_{i=0}^{m}\Delta CONTROL_{t-i} + \alpha_5 LXU100_{t-1} + \alpha_6 LREPO_{t-1} + \alpha_7 LFS_{t-1} + \alpha_8 CONTROL_{t-1} + \varepsilon_t \quad (2)$$

Shin et al. (2014) extend the linear UECM model by decomposing selected independent variables into positive and negative parts. The NARDL approach decomposes independent variables into positive and negative changes to see whether they have a nonlinear impact on the dependent variable (Chowdhury et al., 2020). Following the methodology of Shin et al. (2014), we decomposed REPO and FS variables into positive and negative parts in Equation (3).

$$\begin{aligned} REP_t^+ &= \sum_{m=1}^{t}\Delta REPO_t^+ = \sum_{m=1}^{t}\max(\Delta REP_t^+, 0) \\ REP_t^- &= \sum_{m=1}^{t}\Delta REPO_t^- = \sum_{m=1}^{t}\min(\Delta REP_t^-, 0) \\ FS_t^+ &= \sum_{m=1}^{t}\Delta FS_t^+ = \sum_{m=1}^{t}\max(\Delta FS_t^+, 0) \\ FS_t^- &= \sum_{m=1}^{t}\Delta FS_t^- = \sum_{m=1}^{t}\min(\Delta FS_t^-, 0) \end{aligned} \quad (3)$$

Extended UECM model with positive ($REPO^+, FS^+$) and negative ($REPO^-, FS^-$) variables parallel with the Shin et al. (2014) methodology is presented in Equation (4).

$$\Delta LXU100_t = \alpha_0 + \alpha_{1,i}\sum_{i=1}^{m}\Delta LXU100_{t-i} + \alpha_{2,i}\sum_{i=0}^{m}\Delta LREPO^+_{t-i} + \alpha_{3,i}\sum_{i=0}^{m}\Delta LREPO^-_{t-i} + \alpha_{4,i}\sum_{i=0}^{m}\Delta LFS^+_{t-i} + \alpha_{5,i}\sum_{i=0}^{m}\Delta LFS^-_{t-i} + \alpha_{6,i}\sum_{i=0}^{m}\Delta CONTROL_{t-i} + \alpha_7 LXU100_{t-1} + \alpha_8 LREPO^+_{t-1} + \alpha_9 LREPO^-_{t-1} + \alpha_{10} LFS^+_{t-1} + \alpha_{11} LFS^-_{t-1} + \alpha_{12} CONTROL_{t-1} + \varepsilon_t \quad (4)$$

We employ NARDL bound test by using Equation (4) to analyze the long-term cointegration relationship. The NARDL bound test approach has some superior properties over the traditional models. Besides, NARDL model presents effective coefficients irrespective of the investigated variables are I(0), I(1), or I(0) and I(1). NARDL is superior to smooth transition error correction models (ECM) and Markov switching ECM as it jointly estimates cointegration and asymmetries. Furthermore, NARDL provides efficient and valid results for data that has a small sample (Chishti et al., 2020).

After finding a long-term cointegration, we obtain long-run coefficients from the NARDL model to find the co-integration equation. Finally, we employ a nonlinear MSR model to estimate the co-integration equation for robustness check. The MSR model is an extended version of the simple exogenous probability models that define two volatility regimes as high and low volatility. The baseline MSR model is presented in Equations (5) and (6):

Low Volatility Regime:

$$LXU100_t = \alpha_{1,0} + \alpha_{1,1}LREPO_{t-i} + \alpha_{1,2}LFS_{t-i} + \alpha_{1,3}Control_{t-1} + \varepsilon_{1,t} \quad (5)$$

High Volatility Regime:

$$LXU100_t = \alpha_{2,0} + \alpha_{2,1}LREPO_{t-i} + \alpha_{2,2}LFS_{t-i} + \alpha_{2,3}Control_{t-1} + \varepsilon_{2,t} \quad (6)$$

where α_{10} and α_{20} denotes the regime-dependent constants, while α_{11} and α_{21} are the autoregressive coefficients. ε_{1t} and ε_{2t} are the error terms.

Regime-switching model has some advantages with regard to the single regime models as superior forecasting performance and lower volatility persistence (Dueker, 1997).

3. Empirical Results, Discussion and Implications

First, we conduct NP and ZA tests to test for stationarity. The results are presented in Appendix S1 (in Supplementary Material, available online), in which both tests indicate that all variables are I(1) except the LVIX variable that is I(0).

Then, we investigate the nonlinearity characteristics by performing a BDS test, for which the results are in Appendix S2 (in Supplementary Material, available online). According to these results, the null hypothesis that the variables are linearly dependent is rejected. Hence, the results indicate the nonlinearity of the variables. Next, we investigate the cointegration relationship between the variables. To check for cointegration, we conduct an asymmetric cointegration analysis developed by Shin et al. (2014), as seen in Equation (4), which we use because our variables are found to be both I(0) and I(1) and indicate nonlinear characteristics. If the estimated F-statistics are greater (less) than the upper (lower) bound, the null hypothesis of no cointegration is rejected (not rejected). If the calculated F-statistics are between the lower and upper values, no precise decision can be made (Narayan & Narayan, 2004). Table 2 shows the results of the asymmetric cointegration test.

Table 2. Asymmetric Co-integration Test Results

F statistics	Critical Value at %1 Significance Level	
	Bottom Bound	Upper Bound
9.68	3.29	4.37

The F-statistics in Table 2 are greater than the upper bound values. Hence, the null hypothesis (implying no cointegration) is rejected. The asymmetric cointegration test indicates a significant long-run cointegration relationship. After determining the presence of cointegration between the variables, we obtain long-term coefficients to determine the cointegration equation. Table 3 presents the error correction coefficients and long-term coefficients.

Table 3. NARDL (1,0,0) Model Long-Term Parameter Estimations and ECM Coefficients

Estimated Long Term Coefficients Using NARDL (1,0,0,0,0) Model		
Variables	**Coefficient**	**T statistics**
LREPO_POS	0.116	2.637*
LREPO_NEG	0.084	2.525**
LFS_POS	-0.497	-2.037**
LFS_NEG	-0.406	-2.020**
LVIX	-0.142	-4.821*
LCDS	-0.504	-7.746*
LUSD/TRY	0.477	2.908*
COVID	0.196	3.325*
C	9.308	44.158*
Error Correction Coefficient from the NARDL (1,0,0,0,0) Model		
Variables	**Coefficient**	**T statistics**
ECT(1)	-0.070	-7.256*
Diagnostic Checks[1]		
X^2_{BG} (A)	0.763 [0.382]	
χ^2_{WHITE} (B)	2.273 [0.132]	
X^2_{RAMSEY} (C)	0.796 [0.372]	

Notes:

1) *According to the diagnostic tests, there are no problems such as heteroskedasticity, misspecification, and serial correlation in the NARDL model.*
2) *Significance level of *1% and **5%.*
3) *(A) Breusch–Godfrey LM test, (B) White heteroskedasticity test, (C) Ramsey's RESET test. The values in brackets show the probability values.*

As Table 3 indicates, both FS and REPO have a statistically significant effect. Similarly, VIX and CDS spreads have statistically significant and negative coefficients, whereas the USD/TRY FX rate has a statistically significant and positive coefficient. Moreover, the pandemic (COVID) has an important effect on the index. Thus, the NARDL results reveal that all variables, including control variables, have an important effect on the XU100 index.

[1]According to diagnostic tests, there are not problems like heteroscedasticity, misspecification, and serial correlation in NARDL model.

Specifically, FS has a greater effect on the index. The results mean that a one-percentage-point positive shock to FS causes a 0.497-percentage-point decrease, and a one-percentage-point negative shock to FS causes a 0.406-percentage-point decrease in the index. In addition, a one-percentage-point positive shock to monetary responses causes a 0.116-percentage-point increase, and a one-percentage-point negative shock to FS causes a 0.084-percentage-point increase in the index.

Actually, it was expected that an increase in FS causes an increase in the index, and an increase in the repo interest rate causes a decrease in the index when other conditions are constant. Surprisingly, the results for the effect of FS and monetary policy responses (REPO) produce conflicting consequences to the expectations. Indeed, FS has a negative coefficient and REPO has a positive coefficient.

The adverse effect of REPO can be explained that an increase in monetary policy responses causes an increase in the XU100 index implying that Turkey has been taking various measures (e.g., increasing interest rates) to stabilize the economy, however, they have not made a positive effect. Besides, the adverse effect of FS can be explained by the increasing domestic investor demand for the stock market. This results from the negative real interest rate environment in Turkey, excessive funding provided by the central bank of Turkey because of the pandemic, and higher effect of domestic investors' demand increases with regard to the negative effect of decreasing FS. The results of NARDL refer that Turkey should focus on the managing FS primarily. In addition to the NARDL, we also employ a nonlinear MSR model for robustness check. Table 4 presents the results of the MSR model.

Table 4. Markov Switching Regression Results

Variable/Model	Markov Model
Regime 1: Low Volatility	
LREPO	0.022*
LFS	-0.660*
C	11.783*
Regime 2: High Volatility	
LREPO	0.068*
LFS	-0.557*
C	11.160*
Common Coefficients	
LVIX	-0.042*

Journal Pre-proof

LCDS	-0.532*
LUSD/TRY	0.630*
COVID	0.060*
Observations	945

*Notes: * 1% significance level. The LXU100, LREPO, LFS, LVIX, LCDS, and LUSD/TRY represent the natural logarithm for the stock market index of Turkey, repo interest rate, foreign investors' retention share, volatility index, CDS spreads of Turkey, USD/TRY FX rate, respectively. COVID represents the presence of the COVID-19 pandemic in Turkey as a dummy variable. C is the constant term.*

As Table 4 shows, the results of MSR in different regimes (i.e., low or high) are consistent and the results reveal that all variables used in the analysis are statistically significant and influential on the XU100 index. In other words, FS has a statistically significant and negative coefficient while REPO has a statistically significant and positive coefficient in both regimes. Besides, VIX and CDS spreads have statistically significant and negative coefficients while USD/TRY has a significant and positive coefficient. The MSR results reveal that all variables including control variables are statistically significant on the XU100 index in both regimes.

More specifically, the coefficient of the FS falls into the values of -0.557 and -0.660 and indicates that one-percentage-point increase of FS causes (0.557-0.660) percentage-point decrease in the XU100 index. Also, the coefficient of REPO is found between 0.022 and 0.068 indicating that one-percentage-point increase in REPO causes an increase in the XU100 index of (0.022 - 0.068) percentage points.

The MSR analysis results reveal that FS has a larger effect than REPO in both high- and low-volatility regimes. These results infer that Turkey should focus primarily on managing FS in both high- and low-volatility periods. The results of the NARDL and MSR analyses are generally consistent and support each other. The results of the NARDL and MSR together show that FS has a larger effect on the index than REPO and that all the control variables are significant.

Our findings lead us to make a few recommendations. First, Turkey should focus on the factors with the highest impact on the index, that is, managing foreign investors' retention share. For example, the authorities should consider making the stock market much more competitive by removing barriers such as banning short sales. As the Turkish economy gradually reopens and returns to normal, it can benefit from increasing foreign portfolio flows in the short term, because a normal economic environment is expected to have a positive real interest rate,

stabilized domestic investor demand, and a high foreign investors' retention share. In this environment, an increase in FS would contribute to progress in the XU100 index.

Then, Turkey can turn to other (less influential) factors on the index, such as focusing on monetary policy responses because they have a significant impact on the XU100 index. Turkey should revise its monetary policy framework and take necessary measures to stabilize the economy through monetary policy. Supporting monetary policy with fiscal policy and implementing structural reforms can enhance the positive effects of the monetary policy responses to the index. Moreover, implementing structural reforms in a timely way can also contribute to foreign direct investment, which helps to increase the central bank's reserves and thereby the credibility and effects of monetary policy responses. Moreover, structural reforms support a decrease in country risk premiums (i.e., CDS spreads) and thus make a positive contribution to growth in the stock market index.

Turkey should develop and apply other policies related to the economic and financial realities in the country. Although the coefficient and signs of coefficients for the variables in this study do not change, Turkey should consider the effect of the regimes. Finally, the policy framework, which has an impact on FS, and monetary policy responses should be reshaped because some factors highly influence the index, which causes negative pricing of Turkish assets.

4. Conclusion

This study examines the impacts of foreign portfolio flows and monetary policy responses to the stock market index in Turkey, considering the effects of the pandemic. Using a daily dataset between January 2, 2017, and October 20, 2020, which includes the outbreak of the COVID-19 pandemic, we apply a NARDL model and study the stationarity and nonlinearity properties of the variables, with an MSR model for a robustness check. FS, which is a proxy for foreign portfolio flows, and the repo interest rate are the main independent variables. The volatility index, CDS spreads, and the USD/TRY FX rate are also included as control variables because they are expected to be influential factors on the index.

The results of the NARDL analysis show that both FS and REPO have a statistically significant effect on the index, and both affect the XU100 index. However, FS has a larger effect on the index than the monetary policy responses. In other words, although FS and REPO both influence the index, positive (FS) and negative (REPO) shocks have different effects on the XU100 index. Indeed, positive shocks have a much larger impact than negative shocks. The MSR results show that FS has a high and significant effect in both high- and low-volatility regimes whereas REPO has a relatively small effect on the XU100 index. The results of the

MSR analysis are consistent with those of the NARDL analysis and demonstrate their robustness.

The results of the NARDL and MSR analyses underline the significance of FS and REPO on the XU100 index. They indicate that Turkey would benefit from re-evaluating policies such as the ban on short sales and from implementing structural reforms as they would support growth in the stock market index. Turkey could also benefit from fair pricing of the assets on the stock market by preventing the negative effects of the variables on the XU100 index. Turkey's economic growth and financial development would be positively affected by a reallocation of financial sources among alternatives, including the XU100 index. Moreover, a stable and increasing XU100 index would have a positive effect on capital markets, financial markets, and the economy.

11

The main limitation of the study is that it focuses only on Turkey. Future studies should include other countries, especially those with the highest foreign portfolio inflows (e.g., the US, China, the UK), the largest government subsidies and monetary and fiscal policy reactions to mitigate the negative effects of the pandemic (e.g., the US, Japan, Germany), the countries that fared best in economic recovery (e.g., South Korea, Singapore, Hong Kong), and those that fared the worst (e.g., the US, India, Brazil) in the pandemic according to the recent information available. Moreover, this study does not include country-level macroeconomic factors such as inflation and economic growth and financial indicators such as the real interest rate and the number of domestic investors. Future studies should examine these indicators as well. Furthermore, dividing the dataset into subperiods based on the development of the pandemic is recommended in future studies, which would also do well to employ other methods than those used here, such as machine learning algorithms and quantile regression.

Journal Pre-proof

References

Atmaca, S., & Karadaş, H. A. (2020). Decision Making on Financial Investment in Turkey by Using ARDL Long-Term Coefficients and AHP. *Financial Innovation*, 6(1), 1-22.

Bekaert, G., & Harvey, C. R. (2003). Emerging Markets Finance. *Journal of Empirical Finance*, 10(1-2), 3-55.

Bloomberg. (2020). Bloomberg Terminal, November 5, 2020.

Cao, K. H., Li, Q., Liu, Y., & Woo, C. K. (2020). Covid-19's Adverse Effects on a Stock Market Index. *Applied Economics Letters*, 1-5.

Central Bank of the Republic of Turkey. (2020). Electronik Data Distribution System (EVDS), https://evds2.tcmb.gov.tr/index.php?/evds/serieMarket, November 5, 2020.

CSD. (2020). Data of foreign investors' retention share. Obtained via e-mail on 11.05.2020.

Chishti, M. Z., Ullah, S., Özturk, İ., & Usman, A. (2020). Examining the Asymmetric Effects of Globalization and Tourism on Pollution Emissions in South Asia. *Environmental Science and Pollution Research*, 27, 27721–27737.

Chowdhury, M. A. F., Meo, M. S., Uddin, A., & Haque, M. M. (2020). Asymmetric Effect of Energy Price on Commodity Price: New Evidence from NARDL and Time Frequency Wavelet Approaches. *Energy*, 119461.

Dahlquist, M., & Robertsson, G. (2004). A Note on Foreigners' Trading and Price Effects across Firms. *Journal of Banking & Finance*, 28(3), 615-632.

Demir, C. (2019). Macroeconomic Determinants of Stock Market Fluctuations: The Case of BIST-100. *Economies*, 7(1), 8.

Dueker, M. J. (1997). Markov Switching in GARCH Processes and Mean-Reverting Stock-Market Volatility. *Journal of Business & Economic Statistics*, 15(1), 26-34.

Engelhardt, N., Krause, M., Neukirchen, D., & Posch, P. (2020). What Drives Stocks during the Corona-Crash? News Attention vs. Rational Expectation. *Sustainability*, 12(12), 5014.

Fratzscher, M. (2012). Capital Flows, Push versus Pull Factors and the Global Financial Crisis. *Journal of International Economics*, 88(2), 341-356.

Galil, K., Shapir, O. M., Amiram, D., & Ben-Zion, U. (2014). The Determinants of CDS Spreads. *Journal of Banking & Finance*, 41, 271-282.

Goodell, J. W. (2020). COVID-19 and Finance: Agendas for Future Research. *Finance Research Letters*, 101512.

Guo, M., Kuai, Y., & Liu, X. (2020). Stock Market Response to Environmental Policies: Evidence from Heavily Polluting Firms in China. *Economic Modelling*, 86, 306-316.

Hasan, I., Liu, L., & Zhang, G. (2016). The Determinants of Global Bank Credit-Default-Swap Spreads. *Journal of Financial Services Research*, 50(3), 275-309.

He, X., Gökmenoğlu, K. K., Kirikkaleli, D., & Rizvi, S. K. A. (2021). Co-Movement of Foreign Exchange Rate Returns and Stock Market Returns in An Emerging Market: Evidence from the Wavelet Coherence Approach. *International Journal of Finance & Economics*. https://doi.org/10.1002/ijfe.2522.

Hibbert, A. M., & Pavlova, I. (2017). The Drivers of Sovereign CDS Spread Changes: Local Versus Global Factors. *Financial Review*, 52(3), 435-457.

Hillier, D., & Loncan, T. (2019). Political Uncertainty and Stock Returns: Evidence from the Brazilian Political Crisis. *Pacific-Basin Finance Journal*, 54, 1-12.

Ichev, R., & Marinč, M. (2018). Stock Prices and Geographic Proximity of Information: Evidence from the Ebola Outbreak. *International Review of Financial Analysis*, 56, 153-166.

Kartal, M. T. (2020a). Do Activities of Foreign Investors Affect Main Stock Exchange Indices? Evidence from Turkey Before and in Time of Covid-19 Pandemic. *National Accounting Review*, 2(4), 384-401.

Kartal, M. T. (2020b). The Behavior of Sovereign Credit Default Swaps (CDS) Spread: Evidence from Turkey with the Effect of Covid-19 pandemic. *Quantitative Finance and Economics*, 4(3), 489-502.

Kartal, M. T., Depren, Ö., & Kılıç Depren, S. (2020). The Determinants of Main Stock Exchange Index Changes in Emerging Countries: Evidence from Turkey in Covid-19 Pandemic Age. *Quantitative Finance and Economics*, 4(4), 526-541.

Kartal, M. T., Kılıç Depren, S., & Depren, Ö. (2021). How Main Stock Exchange Indices React to Covid-19 Pandemic: Daily Evidence from East Asian Countries. *Global Economic Review*, 50(1), 54-71.

Kirikkaleli, D. (2020). The Effect of Domestic and Foreign Risks on An Emerging Stock Market: A Time Series Analysis. *The North American Journal of Economics and Finance*, 51, 100876.

Lee, J., Ryu, D., & Kutan, A. M. (2016). Monetary Policy Announcements, Communication, and Stock Market Liquidity. *Australian Economic Papers*, 55(3), 227-250.

Liew, P. X., Lim, K. P., & Goh, K. L. (2018). Foreign Equity Flows: Boon or Bane to the Liquidity of Malaysian Stock Market? *The North American Journal of Economics and Finance*, 45, 161-181.

Malagrino, L. S., Roman, N. T., & Monteiro, A. M. (2018). Forecasting Stock Market Index Daily Direction: A Bayesian Network approach. *Expert Systems with Applications*, 105, 11-22.

MHT. (2020). COVID-19 Numbers. https://COVID19.saglik.gov.tr, November 23, 2020.

Narayan, S., & Narayan, P. K. (2004). Determinants of Demand for Fiji's Exports: An Empirical investigation. *The Developing Economies*, 42(1), 95-112.

Narayan, P. K., Devpura, N., & Wang, H. (2020). Japanese Currency and Stock Market-What Happened During the COVID-19 Pandemic? *Economic Analysis and Policy*, 68, 191-198.

Ng, S., & Perron, P. (2001). Lag Length Selection and the Construction of Unit Root Tests with Good Size and Power. *Econometrica*, 69(6), 1519-1554.

Peiro, A. (2016). Stock Prices and Macroeconomic Factors: Some European Evidence. *International Review of Economics and Finance*, 41, 287-294.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16(3), 289-326.

Phan, D. H. B., & Narayan, P. K. (2020). Country Responses and the Reaction of the Stock Market to COVID-19-A Preliminary Exposition. *Emerging Markets Finance and Trade*, 56(10), 2138-2150.

Shin, Y., Yu, B., & Greenwood-Nimmo, M. (2014). Modelling Asymmetric Cointegration and Dynamic Multipliers in a Nonlinear ARDL Framework, in: Sickles, R.C., Horrace, W.C. (Eds.), Festschrift in Honor of Peter Schmidt. Springer, New York, NY, 281-314. Springer, New York.

Stiglitz, J. E. (2010). Risk and Global Economic Architecture: Why Full Financial Integration May be Undesirable. *American Economic Review*, 100(2), 388-392.

Thorbecke, W. (1997). On Stock Market Returns and Monetary Policy. *The Journal of Finance*, 52(2), 635-654.

Tripathy, N. (2011). Causal Relationship between Macro-Economic Indicators and Stock Market in India. *Asian Journal of Finance & Accounting*, 3(1), 208-226.

Vo, X. V. (2015). Foreign Ownership and Stock Return Volatility-Evidence from Vietnam. *Journal of Multinational Financial Management*, 30, 101-109.

WHO. (2020a). Coronavirus Disease (COVID-19) Outbreak Situation, https://www.who.int/emergencies/diseases/novel-coronavirus-2019, November 5, 2020.

WHO. (2020b). Covid-19 Numbers, https://covid19.who.int, November 23. 2020.

Yang, L., Yang, L., & Hamori, S. (2018). Determinants of Dependence Structures of Sovereign Credit Default Swap Spreads between G7 and BRICS Countries. *International Review of Financial Analysis*, 59, 19-34.

Younis, I., Longsheng, C., Basheer, M. F., & Joyo, A. S. (2020). Stock Market Comovements among Asian Emerging Economies: A Wavelet-Based Approach. *Plos One*, 15(10), e0240472.

Zhang, D., Hu, M., & Ji, Q. (2020). Financial Markets under the Global Pandemic of COVID-19. *Finance Research Letters*, 101528.

Zivot, E., & Andrews, D.W.K. (1992). Further Evidence on the Great Crash, the Oil-Price Shocok and the Unit-Root Hypothesis. *Journal of Business and Economic Statistics,* 10(3), 251-270.

Journal Pre-proof

Manuscript.docx

ORIGINALITY REPORT

7%
SIMILARITY INDEX

PRIMARY SOURCES

1	Hasan Murat Ertuğrul, Ünal Seven. "Dynamic spillover analysis of international and Turkish food prices", International Journal of Finance & Economics, 2021 Crossref	37 words — 1%
2	www.tandfonline.com Internet	31 words — 1%
3	Abdulazeez Y.H. Saif-Alyousfi, Asish Saha. "The impact of COVID-19 and non-pharmaceutical interventions on energy returns worldwide", Sustainable Cities and Society, 2021 Crossref	20 words — < 1%
4	Ousama Ben Salha. "Economic Globalization, Wages and Wage Inequality in Tunisia: An ARDL Bounds Testing Approach", Review of Middle East Economics and Finance, 2013 Crossref	20 words — < 1%
5	Shabir Mohsin Hashmi, Bisharat Hussain Chang. " Asymmetric effect of macroeconomic variables on the emerging stock indices: A quantile approach ", International Journal of Finance & Economics, 2021 Crossref	20 words — < 1%
6	Assad Ullah, Xinshun Zhao, Muhammad Abdul Kamal, JiaJia Zheng. "Modeling the relationship	17 words — < 1%

Journal Pre-proof

Journal Pre-proof

between military spending and stock market development (d) symmetrically in China: An empirical analysis via the NARDL approach", Physica A: Statistical Mechanics and its Applications, 2020
Crossref

7 Omar Harb, Mutasem Jaloudi. "Determinants of Jordan-Turkish bilateral trade balance", Pressacademia, 2019 — 14 words — < 1%
Crossref

8 Mohammad Ashraful Ferdous Chowdhury, Mohammad Saeed Meo, Ajim Uddin, Md. Mahmudul Haque. "Asymmetric Effect of Energy Price on Commodity Price: New Evidence from NARDL and Time Frequency Wavelet Approaches", Energy, 2020 — 13 words — < 1%
Crossref

9 Yener Coskun, Unal Seven, H. Murat Ertugrul, Ali Alp. "Housing price dynamics and bubble risk: the case of Turkey", Housing Studies, 2017 — 13 words — < 1%
Crossref

10 www.emeraldinsight.com — 13 words — < 1%
Internet

11 Mustafa Tevfik Kartal, Derviş Kirikkaleli, Fatih Ayhan. " Nexus between loans and economic growth in emerging countries: Evidence from Turkey with wavelet coherence approach ", International Journal of Finance & Economics, 2021 — 12 words — < 1%
Crossref

12 www.acarindex.com — 12 words — < 1%
Internet

13 www.ci.tuwien.ac.at — 12 words — < 1%
Internet

Journal Pre-proof

14	Journal of Property Investment & Finance, Volume 31, Issue 2 (2013-03-09) Publications	11 words — < 1%
15	mafiadoc.com Internet	11 words — < 1%
16	www.econjournals.com Internet	11 words — < 1%
17	Afees A. Salisu, Xuan Vinh Vo, Adedoyin Lawal. "Hedging oil price risk with gold during COVID-19 pandemic", Resources Policy, 2020 Crossref	10 words — < 1%
18	Dervis Kirikkaleli. "The effect of domestic and foreign risks on an emerging stock market: A time series analysis", The North American Journal of Economics and Finance, 2018 Crossref	10 words — < 1%
19	Nusrat Akber, Megha Gupta, Kirtti Ranjan Paltasingh. "The Crowding-in/ out Debate in Investments in India: Fresh Evidence from NARDL Application", South Asian Journal of Macroeconomics and Public Finance, 2020 Crossref	10 words — < 1%
20	ideas.repec.org Internet	10 words — < 1%
21	link.springer.com Internet	10 words — < 1%
22	vdocuments.mx Internet	9 words — < 1%

Journal Pre-proof

Journal Pre-proof

23	www.fma.org Internet	9 words — < 1%
24	www.repository.cam.ac.uk Internet	9 words — < 1%
25	www.researchgate.net Internet	9 words — < 1%
26	www.sosyoekonomijournal.org Internet	9 words — < 1%
27	Özer Depren, Mustafa Tevfik Kartal, Serpil Kılıç Depren. "Changes of gold prices in COVID-19 pandemic: Daily evidence from Turkey's monetary policy measures with selected determinants", Technological Forecasting and Social Change, 2021 Crossref	9 words — < 1%

EXCLUDE QUOTES ON
EXCLUDE BIBLIOGRAPHY ON
EXCLUDE MATCHES < 5 WORDS

Journal Pre-proof