Analysis of the Relationship between Economic Freedom Index and Stock Market Indices; Evidence from Turkey[1]

Esra N. KILCI[2]

Abstract

According to the Heritage Foundation Economic Freedom Index, Turkey, with a overall score of 65.4, seems below the regional average. On the other hand, BIST 100 has a good performance with a nearly %20 rise from 2016 to 2017 except the last nine-month period performance. The objective of this study is to analyze the causality relationship between Economic Freedom Index and BIST 100 in the period of 1995-2018 by employing Fourier KPSS Test and Fourier Granger Causality Test. The results supported no causality relationship between economic freedom index and stock market indices in Turkey in the period of 1995-2018.

JEL Codes: F43, I32, O10

Keywords: Economic Freedom Index, Stock Market, Market Openness

Ekonomik Özgürlük Endeksi ve Hisse Senedi Piyasası Endeksi Arasındaki İlişkinin Analizi; Türkiye Örneği

Öz

Heritage Ekonomik Özgürlük Endeksi'ne göre, Türkiye, 65,4 seviyesindeki puanıyla, bölgesel ortalamanın altında seyretmektedir. Diğer

---

[2]   Asst. Prof. Dr., Istanbul Arel University, Department of International Trade&Finance, esrakilci@arel.edu.tr, Orchid ID; 0000-0002-2239-4560

yandan, Türkiye hisse senedi piyasası (BIST100) endeks değeri, son dokuz aylık performansı hariç tutulduğunda, 2016-2017 döneminde kaydettiği %20'lik artışla olumlu bir performansa sahiptir. Bu çalışmanın amacı, 1995-2018 döneminde, sözkonusu değişkenlere ait yıllık verileri kullanarak, Ekonomik Özgürlük Endeksi ile BIST100 arasındaki nedensellik ilişkisini, Fourier KPSS Testi ve Fourier Granger Nedensellik Testi'ni kullanarak analiz etmektir. Analiz sonuçları, sözkonusu dönemde, Türkiye'de, Ekonomik Özgürlük Endeksi ile BIST100 arasında bir nedensellik ilişkisini desteklememektedir.

JEL Kodları: F43, I32, O10

Anahtar kelimeler: Ekonomik Özgürlük Endeksi, Hisse Senedi Piyasası, Piyasaların Açıklığı

1. Introduction

Economic freedom, a crucial factor in maintaining a free civil society, is the driving force behind why the conditions in some nations improve while the other countries can not thrive. It is commonly believed that economic freedom provides economic prosperity and that a country's economic freedom is correlated with the development of capital markets and financial stability (Luo, 2014: 3). Economic growth is mainly a consequence of capital investment, gains from trade, the discovery of advanced products, lower-cost manufacturing methods, and the benefits of doing better. Several studies have signaled that countries which have more economic freedom grow faster and manage more per-capita income than those with less freedom. Given the sources of growth and prosperity, it is obvious that rises in economic freedom and progresses in quality of life have gone parallel with each other the last century. The key components of economic freedom are; personal preferences, voluntary exchange organized by markets, free entry and competition in markets, and safekeeping of people and their assets from invasion by others (Lawson, 2009: 69).

According to the information obtained from the Heritage Organization, the Economic Freedom Index, which was planned to assess the consistency of the policies and institutions of countries with economic freedom, has been measuring the impact of frredom and free markets on the world for nearly twenty-five years. The Economic Freedom Index describes the positive relationship between economic

freedom and a number of positive social and economic goals, because the principles of economic freedom are powerfully correlated with cleaner environments, healthier societies, human development, greater per capita wealth, democracy and poverty eradication. The Index evaluates economic freedom in 186 countries based on 12 qualitative and quantitative factors which are grouped into four main categories. These categories are summarized as Rule of Law (government integrity, property rights and judicial effectiveness), Government Size (tax burden, government spending and fiscal health), Regulatory Efficiency (freedom of business, freedom of labor and monetary freedom) and Open Markets (freedom of trade, freedom of investment and financial freedom). Each of the twelve economic freedoms in these categories is rated on a range of 0 to 100. The overall score of a country is obtained by taking the average of these twelve economic freedoms by giving equal weight to each of them.

There are some other indexes around the world trying to measures the level of economic freedom of the countries such as Fraser and the Freedom House Indexes. Some researchers emphasize that the Economic Freedom Index developed by Heritage Foundation differs from these Indexes. According to them, the Heritage Economic Freedom Index not only tries to assess macroeconomic outlook and fundamentals for each individual country such as government expenditure, inflation and tariff rates but it also qualitatively examines the capability of the institutions currently in operation in each country to support and sustain economic freedom (Rasiah et al, 2016: 216). The Economic Freedom Index provides a transparent and simple tool to help entrepreneurs understand the risks of starting a business in their own country, as well as giving a solution to help both domestic and foreign investors assess the economic and institutional impacts of laws and policies that are implemented in these countries. One of the major tenants of the Index is the focus on encouraging competitiveness through the principles of economic freedom. As global markets grow and become more interconnected, businesses are increasingly seeking for resources to help identify competitive and profitable opportunities in both the U.S.A and overseas. The Economic Freedom Index is has a critical role in meeting this need. The Index, drawn from a team of researchers, economists, and regional experts at The Heritage Foundation, includes objective measurements, historical backgrounds and policy analysis of 186 economies worldwide. Attracting investment is key to creating good and sound public policies,

including economic freedom, and is essential for the countries that want to increase their international attractiveness. In recent years, branding has been an critical factor in terms of global investors for marketing countries. Countries have turned into investment incentives and industrial development agencies to develope their economies. As a measure of economic freedom and competitiveness, the Heritage Economic Freedom Index can help these countries market themselves (Olson, 2014).

The Economic Freedom Index has a comprehensive view of economic freedom. Some of the viewpoints of economic freedom attempt to evaluate the countries' interactions with the rest of the world such as the extent of an economy's openness to global trade or investment. Many, however, concentrate on the policies implemented in a country and evaluate the freedom of individuals to use their properties, finances or labor without restriction and government intervention. Each of the assessed characteristic of economic freedom plays a critical role in promoting and sustaining personal and national welfare. Although they are all complementary in terms of their impacts, progress in one area is likely to strenghten or even stimulate progress in another. Similarly, pressured economic freedom in one area such as lack of respect for property rights can make it much more difficult to obtain higher levels of freedom in other categories. (Miller et al, 2018: p. 11). The Economic Freedom Index of 2018 affirms the tremendous positive relationship between economic freedom and progress and also shows that economic freedom has risen in most economies in the world. The global average economic freedom score of 61.1 is the highest level recorded in the 24-year history of the Index. Of the 180 economies rated in the 2018 Index, the scores of three seem unchanged, the scores of 75 are worse and the scores of 102 economies are better (Miller et al, 2018: 1).

Although empirical evidence suggests that higher economic freedom lead to better living standards, improvement in social welfare and higher incomes (Easton and Walker; 1997, Gehrig; 2013, Hall and Lawson; 2014), there are not many studies which examine the concept of Economic Freedom Index in the academic literature. When the factors related to Economic Freedom Index are examined, it is seen that there are various factors such as level of economic growth per capita, democratic governance, economic reforms, financial openness and financial freedom have relationship economic freedom. Financial freedom, a key element of economic freedom, is seperated into two schemes of which, the internal plan that is associated with private

banks and liberating interest rates and the external plan that is dealing with freeing capital flows. In recent years, studies have progressively been changing into stock market which is an significant indicator in the financial markets because stock markets contribute significantly to economic growth. Therefore, the relationship between development of stock market and economic freedom is directly investigated in many studies. Bekaert et al. (2005), observed that in countries where financial markets were liberalized at the end of 2000s, the liberalization of stock markets resulted in an additional %1 rise in economic growth than the normal rate. Chami et al. (2009) argued that although the emerging economies benefited more from the restructuring in financial sector, the impacts mainly depends on the level of investment and capital inflows to these economies as a result of liberalization process. Hawkings (2002) found that the improvement of stock markets in emerging economies enabled companies to benefit from the presence of various channels to finance their operations and it contributed to the economic growth in a significant manner (Eldomiaty, 2015: 8).

In Turkey, financial liberalization process which was initiated in 1980's, had a great importance in terms of both economic growth and deepening of financial markets. The objective of the policy experiment was to deepen and strenghten the financial sector by changing the composition of domestic savings. The financial sector was expected to efficiently allocate resources to promote the growth of the real sector. Thus, it was believed that the growth process of the Turkish economy gained a new momentum with the financial liberalization reforms (Ozatay and Sak, 2002: 20). Istanbul Stock Exchange (BIST) started to operate in the year of 1985 and has recorded a rapid growth after 2000-01 Turkish Economic Crisis due to restructuring and reformation process. The development of new financial instruments and entry of new financial players supported financial system and contributed to economic growth in Turkey by encouraging capital inflows and improving financial deepening. With the liberalization of stock market, Turkey financial markets have become more integrated into the global markets by attracting international investors and capital flows and the liberalization process led to increase in liquidity, transparency and efficiency.

Economic Freedom Index has great importance in terms of evaluating a country's economic and social outlook in comparison to the other countries. The index which implies the positive relationship between economic freedom and economic and social goals of countries has been

widely taken into consideration by investors in their decision making process and market researchers in their country analysis. Turkey, with a overall score of 65.4, which seems below the regional average has experienced a stressful period as a result of increasing political instability in especially two-year-period according to the Index. The concerns as to erosion of the rule of law, lack of transparency in government, increasing political influence and deterioration in some macro-economic indicators might have negative impacts on the index. On the other hand, BIST 100 has a good performance with a nearly %20 rise from 2016 to 2017 except the last nine-month period performance. In this study, the relationship between economic freedom index and stock market index is analyzed by employing Fourier Granger Causality Test and by using annually data obtained from Bloomberg and Heritage Foundation. After briefly reviewing economic freedom index and emphasizing the importance of financial freedom for a country in Section 1, Section 2 focuses on the studies in the academic literature that investigate the relationship between stock markets and economic freedom. While Section 3 introduces empirical analysis, Section 4 includes conclusion and some implications regarding the subject.

2. Literature Review

This section reviews the relevant literature on the relationship between economic freedom and stock market performances. Although it is expected that there is positive relationship between economic freedom and stock market performance as financial freedom, openness and deepening generally lead to decrease in uncertainty and risk premia thereby promote the stock market, there have been obtained different findings in the studies. Therefore, it is seen that while some of the studies support the relationships between economic freedom and stock market performance, some other studies signaled little or no relationship. Below are the some studies regarding the subject.

Stocker (2005) investigated the relationship between economic freedom which was developed from 45 seperate measures of economic freedom and stock returns which were calculated by using Morgan Stanley Capital International (MSCI) Index for the period of 1970-2002. The findings show that cross-country stock returns were directly related to changes in economic freedom. That is, %1 increase in economic freedom (a country's normalized EFW summary score) brought with a %2.66 increase in the country's stock market index. Stocker suggested

that countries having experienced an upward trend in economic free-
dom should be selected by investors for their portfolios.

Chen and Huang (2009) empirically examined the relationships
between the Heritage Economic Freedom Index and stock market per-
formance as well as volatility in the period of 1996-2006 by using data
of 55 countries. They tested whether the level of economic freedom was
significant for a country's stock market performance and volatility. Their
findings indicated that while economic freedom exerted little impact on
stock market returns and individual elements of the index exhibited no
measurable effects on stock performance, greater economic freedom
was correlated with lower stock market volatility, as stock market stabi-
lity decreased investment risk.

Smimou and Karabegovic (2010) analyzed the relationship bet-
ween economic freedom and stock returns in 11 emerging markets inclu-
ding Egypt, Jordan, Bahrain, Kuwait, Oman, Lebanon, Morocco, Saudi
Arabia, Turkey, Tunisia and United Arab Emirates. After examining five
areas including Area 1 (size of government including taxes, expenditu-
res and enterprises), Area 2 (security of property rights and legal struc-
ture), Area 3 (access to sound money), Area 4 (freedom to trade with
foreigners) and Area 5 (regulation of credit, labor and business) in the
period of 2000-2007, they found that the level of economic freedom of
all five areas had positive effect on stock market returns. This signaled
that stock market returns depended not only on regulations and restric-
tions directly concerning stock markets but also on broader economic
institutions that affected the investment atmosphere in general.

Blau et al (2014) examined the relationship between economic
freedom and the price stability of individual securities in a setting by
using a group of 327 American Depositary Receipts (ADRs). They found
a negative relation between the economic freedom of a ADRs' home co-
untry and the price volatility of the ADR. They indicated that this inverse
correlation was driven mainly by certain elements of economic freedom,
the soundness of the money, such as property right protection and the
level of free trade in the home country. Moreover, they found evidence
that less government control of markets and less regulation in the home
country contributed to more stable ADR prices.

Luo (2014) tried to explore the relationship between the Economic
Freedom Index and stock market volatility for 22 emerging economies
in the period of 1995-2010 by taking into consideration the impacts

of financial crisis. They found the overall index and its components did have significant effects on stock market volatility. Especially, the index constituents within the categories of regulatory efficiency such as monetary freedom and business freedom and limited government size such as government spending and fiscal freedom showed strong and significant explaining powers to the stock market volatilities. Nevertheless, the other index components within the categories of rule of law and open markets were not significant. In addition, the stock market volatilities were significantly higher when the country faced either one of the inflation crisis, currency crisis, stock market crash or banking crisis.

Chen et al (2015) analysed whether convex relations, which equity value has with earnings and book value of equity, vary with the economic freedom level of a country for 30 countries by using Fraser Economic Freedom Index over the period of 2000-2010. Their results indicated that as the degree of economic freedom increases, equity value became enhanced through more efficient management of investment alternatives. They suggested that international stock valuation which used accounting-based multiples should prefer peer firms which were matched on both firm-spesific factors and institutional feautures such as economic freedom.

Eldomiaty et al (2015) examined the empirical and quantitative relations between components of Economic Freedom Index as a proxy for institutional quality and stock market volatility. By classifying the institutional quality into three levels as low, medium and high and using the data belonged to the period of 1996-2014 for the MENA countries, they found that stock market volatility might be alleviated and decreased when economic freedom was associated with an effective regulations and efficient enforcement of law. However, the high level of freedom from corruption resulted in increase in cost of financing.

Rasiah et al (2016) investigated the relationship between Economic Freedom Index and equity returns in Malaysia during the period of 1995-2013. Bu using Capital Asset Pricing Model (CAPM) framework in their study, they found that while economic freedom index had significant impact on equity returns in the short-term, index did not have significant impact on equity returns in the long-term. They also observed that the components did not have significant long-run impact on equity returns, the components as open markets and limited government size had strong short-term significant explaining powers. The findings signa-

led that investors might acquire better mean-variance efficiency when a country exhibited greater economic freedom.

Blau (2017) analyzed how economic freedom contributed to collapses in financial markets by using empirical approach that explain the possibility that financial market collapses were endogenously determined by market structures. The findings of the study supported the idea that economic freedom might mitigate regulatory uncertainty thus allowing for a level of transparency that reduced the probability of crashes as countries with higher economic freedom experienced lower possibilities of market crashes and more positive skewness in returns of assets. The results also indicated that the elements of economic freedom that contributed most to the decrese in crash risk was the strength of property right protection and the level of free trade.

Masrorkhah and Lehnert (2017) argued that press freedom had impact on stock prices and emphasized that stock markets should be better processors of economic information in countries with a free press. After employing an equilibrium asset-pricing model in an economy under jump dissemination and using stock market data for a balanced panel of 50 countries, their findings revealed that in countries with a free press, the better processing of bad news led to more repeated negative jumps in stock prices. Therefore, stock markets in those countries were characterized by higher volatility, driven by higher jump risk and more negative return asymmetry. They also concluded that a free press improved welfare and increased economic growth.

Li and Liu (2018) analyzed the relative importance of domestic financial freedom and financial globalization in determining the risk sharing outcomes by using a large cross-country panel dataset because they noticed that domestic financial fredom, apart from financial openness, was a critical factor that shaped a country's ability to insure against consumption risks. They developed a modified model of domestic and intranational risk sharing in order to motivate their analysis. Their results indicated that domestic financial environment mattered more in stabilizing fluctuations in consumption than financial integration for most countries in the world. They also revealed that agents were willing to give up a great amount of their consumption in order to achieve complete domestic and international risk sharing.

3. Econometric Analysis

3.1. Data and Methodology

In this study, the causality relationship between the Heritage Economic Freedom Index and the stock market index of Turkey, an emerging market economy which has high growth potential and strong performance in recent years, is tried to be investigated. The stock market index variable includes annually stock market indices of BIST100 over the period of 1995-2018 which are obtained from Bloomberg and are expressed in the U.S dollars to isolate currency risk. Data on economic freedom index is obtained from the Heritage Foundation website. According to The Heritage Foundation (2018), the index consists of 12 freedoms for 186 countries, which are measured based on 12 qualitative and quantitative factors, that are classified into four main categories. The 12 factors are averaged equally into as total score. The total score rank from 0 to 100. The higher score means there is more freedom in the country. While, a country which does have a score of 0 is described as a 'repressive' country and a country which does have a score of 100 is perceived as a country that is 'negligible government interference'.

The causality relationship between the Heritage Economic Freedom Index and BIST100 over the period of 1995-2018 is analyzed by using Fourier Approach in this study. In the first stage, Fourier KPSS Stationary Test has been employed to test the stationary of the variables. The Fourier test developed by Becker et al (2006) can detect not only sudden changes but also smooth changes and the position, number and form of structural changes do not affect the power of the test. In the second stage, Fourier Granger Causality Test has been employed to test the causality relationship between variables. The VAR with Fourier Frequencies which has been employed by Enders and Jones (2016) that uses Flexible Fourier Form yields powerful results. After introducing trigonometric functions into the model, they detected a richer set of interactions between the variables.

Table 1: Economic Freedom Index, 1995-2018
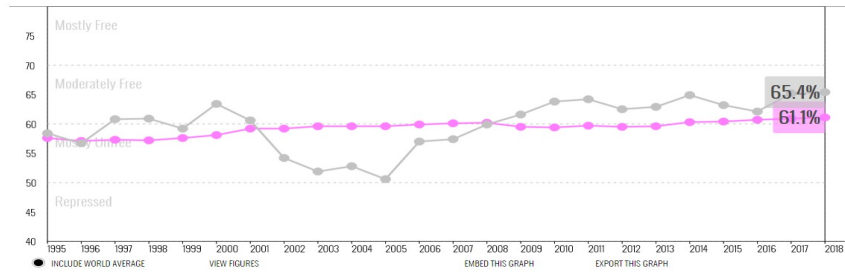
Source; Heritage Organization, https://www.heritage.org/index/visualize

Table 2: Variables and Expected Relationship

	Variables	Measure	Expected Relationship
Dependent Variable	Stock Market Indices	BIST100	(+)
Independent Vaiable	Economic Freedom	Economi c Freedom Index	(+)

3.2. Analysis and Results

Since there is generally no specific information relating to the definite nature of the breaks and no practical knowledge about the location and the number of breaks to use in testing for stationary, using an incorrect specification for the number or form of breaks might create some dilemma such as ignoring the breaks together. Becker et al (2006) developed a stationary test in which a chosen frequency component of a Fourier function was used to estimate the deterministic components of the model. A Fourier series could effectively model the behavior of an unknown function even though this function is not regular. In this stationary test, that the Fourier function capturing the movements of the unknown function is the primary reason for applying it. The Fourier test developed by Becker et al (2006) can detect not only sudden changes but also smooth changes and the position, number and form of structural changes do not affect the power of the test. For this reason, the performance of the tests was substantially robust to several kinds of structural breaks often seen in economic analysis, including the breaks of opposite signs (Tsong, 2016).

The methodology developed by Becker et al (2006) seems strong to notice sharp and u-shaped breaks as well as smooth breaks near the

end of a series and it functions best when breaks are gradual. Becker et al (2006) employ trigonometric terms to capture unknown nonlinearities. The test they developed is a KPSS-type stationary test (Becker et al, 2006).

Becker et al (2006) take into account the following DGP:

$$y_t = Xt'\beta + Zt'\gamma + r_t + \varepsilon_t \tag{1}$$

$$r_t = r_{t-1} + u_t,$$

where ε_t are stationary errors and u_t are independent and identically distributed with variance σ_u^2. It is chosen $Z_t = [sin(2\pi kt/T), cos(2\pi kt/T)]'$ to catch a break in the deterministic term, where k represents the frequency and T is the sample size. Here, to test whether y_t is stationary or not, it is defined as $X_t = [1]$ for a level-stationary process for y_t and $X_t = [1, t]'$ for a trend-stationary process.

At the start, one of the models described below is estimated and the residuals are obtained, in order to acquire the t-statistic required for testing the null hypothesis ($H_0 = \sigma_u^2 = 0$);

$$y_t = \alpha_0 + \gamma_1 \sin\left(\frac{2\pi kt}{T}\right) + \gamma_2 \cos\left(\frac{2\pi kt}{T}\right) + e_t \tag{2}$$

$$y_t = \alpha_0 + \beta t + \gamma_1 \sin\left(\frac{2\pi kt}{T}\right) + \gamma_2 \cos\left(\frac{2\pi kt}{T}\right) + e_t \tag{3}$$

The following test statistics is obtained;

$$\tau_\mu(k) \, or \, \tau_\tau(k) = \frac{1}{T^2} \frac{\sum_{t=1}^{T} \tilde{S}_t(k)^2}{\tilde{\sigma}^2} \tag{4}$$

where $\tilde{S}_t(k) = \sum_{j=1}^{t} \tilde{e}_j$ and $\tilde{e}_j$ are the OLS residuals from the regression (2) for $\tau_\mu(k)$ or (3) for $\tau_\tau(k)$. As in KPSS, a nonparametric estimate $\tilde{\sigma}^2$ of the long-run variance could be acquired by selecting a truncation lag parameter l and a set of weights w_j, j = 1,...,l;

$$\tilde{\sigma}^2 = \tilde{\gamma}_0 + 2 \sum w_j \tilde{\gamma}_j, \tag{5}$$

where $\tilde{\gamma}_j$ is the jth sample auto-covariance of the residuals $\tilde{e}_t$ from eqn (2) or (3).

To determine the optimal number of k, the value which gives the minimum sum of residuals (OLS) is being selected. In case the non-linear trend is not present in DGP, it can be applied the standard KPSS test in order to obtain increased power. As it seems useful to test for the absence of a non-linear trend, Becker et al (2006) proposed that F-test statistic

to be used. Therefore, the following F-test statistic for this hypothesis (absence of a nonlinear trend (i.e. $\gamma_1 = \gamma_2 = 0$) can be calculated against the alternative of a nonlinear trend with a given frequency k.

$$F_i(k) = \frac{(SSR_0 - SSR_1(k))/2}{SSR_1(k)/(T-q)} \quad \text{i=}\mu,\tau, \tag{6}$$

The F-test could be used only if the null of stationary is rejected. The standard KPSS test statistic would be used in case trigonometric terms are not significant. In comparison with the critical values related to Fourier Test which are shown in the study of Becker et al (2006), the results of the stationary test are stated below;

Table 2: Stationary Test Results

Variable	Frequency	FKPSS	F-Statistic
BIST100	1	0,094013	34,01869
Economic Freedom Index	1	0,067633	13,32836

	FKPSS Critical Values	F-Statistic Critical Values
1%	0,2699	6.730
5%	0,1720	4,929
10%	0,1318	4.133

As seen in the Table 2, the BIST100 and Economic Freedom Index variables are stationary. According to the F-Test results which are used to test the significancy of the trigonometric terms, it seems that trigonometric terms for both variables are significant when the values are compared with the F-Statistic Critical Values which are shown in the study of Becker et al (2006).

In the second stage, it is employed Fourier Granger Causality Test proposed by Enders and Jones (2016) in this study in order to investigate the causal linkages between economic freedom index and BIST100. Since the linkages between the variables have been subjected to gradual shifts and linear specifications are mostly inappropriate to capture the relationships, econometric examinations are not generally direct and simple. Enders and Jones (2016) allows the Flexible Fourier form to capture the multiple smooth mean shifts that are probably to be present in the VAR system. In this regard, their results complement those of Enders and Holt (2014) who approximate a VAR with LSTAR mean shifts. While they concentrate on long-term mean shifts, Enders and Jones focus on Granger-causality tests and on the short-term dynamics of the system.

Rather than estimating the size, number and form of the breaks, Enders and Jones tested the Flexible Fourier Form to control for breaks in a VAR and after they tried the non-stationary of variables, they considered the linear VAR as following;

$$z_t = \delta + \sum_{i=1}^{11} A_i z_{t-i} + e_t \tag{7}$$

where δ is a (4x1) vector of intercepts, A_i is a (4×4) coefficient vector and is the vector of innovations. Although the responses seem sensible, they have some complications for two reasons. First, to the extent that there are neglected structural breaks, the system given by (7) is misspecified. Second, given that an unrestricted VAR is probably to be overparameterized, the confidence intervals shown in the figure may be unnecessarily large. In order to show how neglected breaks can interfere with Granger causality tests, they pursued a standard recommendation and restricted the VAR by imposing the limitations implied by the Granger causality tests. Their results indicated that there is very little interaction among the variables. The significant responses are such that series tend to react only to their own shocks.

Then, Enders and Jones allowed the deterministic regressors be as following, instead of the VAR given by (7);

$$z_t = \delta(t) + \sum_{i=1}^{11} A_i z_{t-i} + e_t \tag{8}$$

$$\delta(t) = [\delta_1(t), \delta_2(t), \delta_3(t), \delta_4(t)]' \tag{9}$$

and each intercept depends on n Fourier frequencies such that;

$$\delta_i(t) = a_i + b_i t + \sum_{k=1}^{n} a_{ik} \sin\left(\frac{2\pi k t}{T}\right) + b_{ik} \cos\left(\frac{2\pi k t}{T}\right) \tag{10}$$

When the Fourier terms are used to control for breaks, the Granger causality results change from those documented before in several important ways. In contrast to the Granger-causality results indicated by the linear VAR, when Enders and Jones (2016) put trigonometric functions into the model, they detected stronger relations and richer sets of interactions between the variables.

Table 3: Causality Test Results

Relationship	Wald-stat	Asymptotic p-value	Bootstrap p-value	Optimal Lag
1	10.112	0.182	0.483	7
2	14.862	0.038	0.369	7

1- Economic Freedom Index → BIST100
2- BIST100 → Economic Freedom Index

Notes: → denotes to causality. Optimal k (frequency) and p (lag) are determined by Akaike information criterion. Bootstrap p-values are based on 1000 replications. ***, **, and * denote %1, %5, and %10 levels of statistical significance, respectively. Because n<50 in this study, we will take bootstrap p-value in comparison.

Table 3 shows the results of Fourier Granger Causality Test. According to the results, as bootstrap p-value is greater than 0.05 in both directions, there seems to be no causality relationship between Economic Freedom Index and BIST100. The findings indicate that neither the changes in Economic Freedom Index do have impacts on BIST100 nor the changes in BIST100 do have impacts on Economic Freedom Index.

4. Conclusion

Economic freedom means that people can use their choices to produce, consume, work and invest freely and that these fundamental rights are protected and not restricted by the government. Therefore, in countries with a high degree of economic freedom, free movement of goods, labor and capital is possible in additon to the mentioned freedoms. Economic freedom is expected to increase wealth in an economy as a result of realized several social and economic goals. Because of the importance it does have, the degree of economic freedom of the countries is tried to be measured. Economic Freedom Index published by Heritage Foundation, one of these measures, annually tries to evaluate economic freedom based on some qualitative and quantitative factors in terms of countries in the world including Turkey.

Heritage Economic Freedom Index which includes the categories as Rule of Law, Government Size, Regulatory Efficiency and Market Openness has great importance in terms of evaluating a country's economic and social outlook in comparison to the other countries. The index which implies the positive relationship between economic freedom and economic and social goals of countries including fiscal health, financial freedom, monetary independence, judicial effectiveness has been widely taken into consideration by investors in their decision-making process and market researchers in their country analysis. According to the report by Heritage Foundation Economic Freedom Index which

covers 12 freedoms in 186 countries, Turkey, with a score 65.4 was seen in the category of "moderately free". Among 44 countries in Europe, Turkey's overall score is below the regional average but above the world average.

According to the report, sound public finances, well-capitalized and well-regulated banking sector as well as diversified private sector contributed being strong of Turkish economy despite of political instability experienced in Turkey. In the case of the recent volatility experienced since 2016, it has been predicted that foreign capital inflows might have been negatively affected by exacarbating political instability. Among the critical problems emphasized in the report can be stated that there has been lack of transparency in the government and that the rule of law has been considered to have been eroded significantly. In addition, it is highly indicated that the judicial system has been seriously damaged and has become more sensitive to political influence.

"Open Markets" which focuses on trade freedom, investment freedom, financial freedom is one of four sub-groups examined in the Economic Fredom Index. Since the stock markets are key indicators relating to soundness and level of development of the financial system in an economy, the relationship between Economic Freedom Index and BIST100 is tried to be analyzed in this study. After employing Fourier KPPS Test and Fourier Granger Causality Test by using annual data obtained from Heritage Foundation and Bloomberg, the findings indicate that there seems no significant relationship between variables.

When analyzed the studies focusing on the relationship between economic freedom and stock market performance in the academic literature, it is seen that Stocker (2005), Smimou and Karabegovic (2010), Luo (2014), Chen (2015) and Rasiah (2016) found that evidence supporting that there was relationship between economic freedom and stock market indices. Unlike these studies carried out for the other countries, results of this study imply that the Economic Freedom Index does have no impact on changes in BIST100 in the short-run. It could be referred from the results that other factors regarding country-spesific factors might have impacts on the stock market of Turkey. Besides, the limited data regarding the values of Economic Freedom Index might have negatively affected the analysis. Finally, econometric analysis could be extended in the future by using other techniques and it might be possible to acquire different findings.

REFERENCES

Becker, R., Enders, W. & Lee, J. (2006). A Stationarity Test in the Presence of an Unknown Number of Smooth Breaks, Journal of Time Series Analysis, 3(5), 381-409.

Bekaert, G., Harvey, C.R. & Lundblad, C. (2005). Does Financial Liberalization Spur Growth?, Journal of Financial Economics, 77, 3-55.

Blau, B. M., Brough, T. J. & Thomas, D. W. (2014). Economic Freedom and the Stability of Stock Prices: A Cross-country Analysis, Journal of International Money and Finance, 41, 182-196.

Blau, B. M. (2017). Economic Freedom and Crashes in Financial Markets, Journal of International Financial Markets, Institutions and Money, 47(C), 33-46.

Chami, R., Fullenkamp, C. & Sharma, S. (2009). A Framework for Financial Market Development, IMF Working Paper, WP/09/156, 1-58.

Chen, C.R. & Huang, Y.S. (2009). Economic Freedom, Equity Performance and Market Volatility, International Journal of Accounting and Information Management, 17(2), 189-197.

Chen, C.Y, Chen, P. F. &Jin, Q. (2015). Economic Freedom, Investment Flexibility, and Equity Value: A Cross-Country Study, Accounting Review, 90(5), 1839-1870.

Easton, S., & Walker, A. (1997). Income, Growth, and Economic Freedom, American Economic Review, 87(2), 328-332.

Enders, W. & Jones, P. (2016). Grain Prices, Oil Prices, and Multiple Smooth Breaks in a VAR, Studies in Nonlinear Dynamics & Econometrics, 20(4), 399-419.

Eldomiaty, T.I., Al Qassemi, T., Mabrouk, A.F. & Abdelghany, L.S. (2015). Economic Freedom and Stock Market Volatility in the MENA Region, Macroeconomics and Finance in Emerging Market Economies, 9(3), 262-283.

Gehring, K. (2013). Who Benefits from Economic Freedom? Unraveling the Effect of Economic Freedom on Subjective Well-Being." World Development, 50, 74-90.

Hall, J., & Lawson, R. (2014). Economic Freedom of the World: An Accounting of the Literature, Contemporary Economic Policy, 32(1), 1-19.

Hawkings, J. (2002). Bond Markets and Banks in Emerging Economies, A Chapter in the Development of Bond Markets in Emerging Economies, 11, 42–48. Available at; http://www.bis.org/publ/bppdf/bispap11d.pdf.

Helmy, H.E. (2017). The Index of "Economic Independence": A New Measure of an Economy's Ability to Survive Unilaterally, Journal of Economic Issues, 51(3), 782-812.

Lawson, R.A. (2009). Economic Freedom and the Wealth and Well-Being of Nations, The Annual Proceedings of the Wealth and Well-Being of Nations, 65-80. Available at; https://www.beloit.edu/upton/assets/Lawson.pgs.pdf

Li, Z. & Liu, L. (2018). Financial Globalization, Domestic Financial Freedom and Risk Sharing across Countries, Journal of International Financial Markets, Institutions and Money, 55(C), 151-169.

Luo, Y. (2014). Economic Freedom, Financial Crisis and Stock Volatilities in Emerging Markets, International Journal of Financial Management, 4(1), 1-10.

Olson, R. (2014). Using the Index of Economic Freedom A Practical Guide for Citizens and Leaders, The Heritage Foundation, 1-16. Available at; http://thf_media.s3.amazonaws.com/2014/pdf/UsingTheIndexOfEconomicFreedomBooklet.pdf

Ozatay, F. & Sak, G. (2002). Financial Liberalization in Turkey. Why Was the Impact on Growth Limited?, Emerging Markets Finance and Trade, 38(5), 6-22.

Masrorkhah, S. A. & Lehnert, T. (2017). Press Freedom and Jumps in Stock Prices, Economic Systems, 41(1), 151-162.

Rejeb, A.B. & Boughrara, A. (2013). Financial Liberalization and Stock Markets Efficiency: New Evidence from Emerging Economies, Emerging Markets Review, 17, 186-208.

Smimou, K. & Karabegovic, A. (2010). On the Relationship between Economic Freedom and Equity Returns in the Emerging Markets: Evidence from the Middle East and North Africa (MENA) Stock Markets, Emerging Markets Review, 11(2), 119-151.

Stocker, M. (2005). Equity Returns and Economic Freedom, Cato Journal, 25(3), 583-594.

Rasiah, D., Ying, T.L. & Solarin, A. (2016). Economic Freedom Index and Stock Returns in Malaysia, Theoretical and Applied Economics, 1(606), 213-236.

Miller, T., Kim, A.B. & Roberts, J.M. (2018). 2018 Index of Economic Freedom, The Heritage Foundation, 1-470 Available at; https://www.heritage.org/index/pdf/2018/book/index_2018.pdf

Tsong, C.C., Lee, C.F., Tsai, L.J. & Hu, T.C. (2016). The Fourier Approximation and Testing for the Null of Cointegration, Empirical Economics, 51(3), 1085-1113.