ANALYSIS OF THE IMPACT OF FOREIGN INVESTORS ON ISTANBUL STOCK EXCHANGE WITH MAKI STRUCTURAL BREAK COINTEGRATION TEST

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Abstract

Foreign investments are of great importance for developing countries with high funding needs. Developing countries' macroeconomic elements are crucially affected by foreign portfolios, which are viewed as a capital flow opportunity for developing countries. One of the macroeconomic factors that foreign portfolio investments affect is capital markets. In the study, it has been examined whether foreign portfolio investments made in Turkey have an effect on the Istanbul Stock Exchange. In this regard, the original model generated using the BIST100 index, the foreign investor volume, and foreign portfolio value monthly data for the 2010–2022 period was analyzed with the cointegration test devised by Maki (2012) that allows up to five breaks. According to the Maki cointegration test, it was found that there is a cointegration relationship between the variables. According to the findings obtained from the FMOLS long-term coefficient estimator, it is observed that the increase in the share of foreign investors in the total investors has a negative effect on the BIST100 index, while the increase in the share of the value of foreign portfolios in the total value has a positive effect on the BIST100 index

Key words: Stock Exchange, Maki Structural Break Test, Foreign investment

YABANCI YATIRIMCILARIN BORSA İSTANBUL ÜZERİNDEKİ ETKİLERİNİN MAKİ YAPISAL KIRILMALI EŞBÜTÜNLEŞME TESTİ İLE ANALİZİ

ÖZET

Yabancı yatırımlar, özellikle finansman ihtiyacı yüksek olan gelişmekte olan ülkeler için büyük önem taşımaktadır. Gelişmekte olan ülkelerin makroekonomik göstergeleri, kendileri için sermaye akımı fırsatı olarak görülen yabancı portföy yatırımlarından etkilenmektedir. Yabancı portföy yatırımlarının etkilediği makroekonomik faktörlerden biri de sermaye piyasalarıdır. Çalışmada Türkiye'ye yönelik yabancı portföy yatırımlarının İstanbul Menkul Kıymetler Borsası üzerine etkisinin olup olmadığı incelenmiştir. Bu bağlamda, 2010-2022 dönemi için BİST100 endeksi, yabancı yatırım hacmi ve yabancı portföy değeri aylık verileri kullanılarak oluşturulan model, Maki (2012) tarafından geliştirilen ve beş kırılmaya kadar izin veren eşbütünleşme testi ile analiz edilmiştir. Maki eşbütünleşme testine göre değişkenler arasında eşbütünleşme ilişkisi olduğu bulunmuştur. FMOLS uzun dönemli katsayı tahmincisinden elde edilen bulgulara göre yabancı yatırımcı sayısının toplam yatırımcılar içindeki payındaki artışın BİST100 endeksini olumsuz etkilediği ancak yabancı yatırımların toplam yatırımlar içindeki payının artmasının BİST100 endeksini olumlu etkilediği sonucuna ulaşılmıştır.

Anahtar kelimeler: Borsa, Maki Yapısal Kırılma Testi, Yabancı yatırım,

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1. INTRODUCTION

The boundaries between national financial markets have vanished as a result of financial liberalization, and international capital flows have accelerated. Thus, savings began to flow from countries with surplus funds to countries with fund deficits. Countries with a surplus of funds are generally developed countries, while countries with a fund deficit are developing countries. Therefore, international capital mobility is from developed countries to developing countries, and emerging countries such as Turkey want to attract foreign capital to their countries with direct or foreign portfolio investments.

When investors add foreign investments to their portfolios, they have some additional risks, such as political risk, asymmetric information risk, and exchange rate risk that they would not face if they invested in their country. Many factors, such as countries' having different legal systems and traditions; lack of policy coordination between countries; being subject to different procedures, make foreign investments more risky than local investments (Somuncu, 2021: 2963; Alp, 2002: 114-115; Somuncu, 2018: 9).

In addition to the additional risks that international investors bear, the foreign portfolios invested in affect a country's macroeconomic variables. Since capital movements can move very quickly from countries to countries with the effect of technological developments, it can cause the capital structures of developing countries to become more fragile. For this reason, it is very important to determine the effect of foreign portfolios on macroeconomic factors. The main macroeconomic factor affected by foreign portfolio investments is capital markets.

In Turkey, it is observed that foreign investors have a significant share in the Istanbul Stock Exchange. In 2021, the number of foreign investors increased by 20% compared to the previous year and reached 156,386. While the percentage of foreign investors is 0.5% in 2021, the portfolio value of foreign investors is 42% of the total (VAP, 2022). Thus, despite the small number of foreign investors, the importance of examining foreign investments can be mentioned since their portfolio values are quite high. In this direction, it aims to examine the effect of foreign portfolio investments made in Turkey on the BIST100 index.

The study consists of four parts, and in the first part, general information about international foreign investments is given. In the second part, a literature review has been conducted about the effects of foreign investors on stock markets, which is one of the macroeconomic factors. In the third part, whether foreign portfolio investments made in Turkey have an effect on BIST100 was analyzed with the Maki structural break cointegration test and the findings of the FMOLS long-term coefficient estimator were included. In the fourth part, the findings obtained in the third part were compared with the literature, interpreted, and suggestions were made for future studies.

2. LITERATURE

There are many studies on foreign investors in the literature. Some of these studies examining the relationship between macroeconomic factors and foreign portfolio investments can be listed as Choe, Kho and Stulz (1999), Kula (2003), Lin

and Swanson (2003), Albeni and Demir (2005), Pal (2006), Şimşek and Behdioğlu (2006), Doğukanlı and Çetenak (2008), Pal (2010), Anayochukwu (2012), Albayrak, Öztürk and Tüylüoğlu (2012), Yıldız (2012), Ayhan (2014), Demireli and Hepkorucu (2014), Kaya (2015), Haider, Khan, Saddique and Hashmi (2017), Arslan and Çiçek (2017), Çilingirtürk and Çetiner (2018), Şenol and Koç (2018), Topaloğlu, Şahin and Ege (2019), Kılıç, Delikanlı and Alp (2020), Şit, et al.(2020), Atik and Yılmaz (2021), Somuncu (2021), Yıldız (2021).

Anayochukwu (2012) examined the relationship between foreign portfolio investment and stock market return in Nigeria with multiple linear regression analysis and a Granger causality test. He found a unidirectional causality between stock returns and foreign portfolio investment in Nigeria, which has a positive and considerable impact on stock returns. Haider et al. (2017) examined the relationship between foreign portfolio investment and stock market return in China with the ARDL method. The study also showed that some historical occurrences, like the 2008 financial crisis, strongly impacted foreign portfolio investment in China. Meurer (2016) examined the relationship between foreign portfolio investments, growth, and investment in Brazil with the Granger causality test. The analysis's findings showed that the variables had a positive and statistically significant link with each others. Pal (2010) examined the impact of foreign portfolio investments on the Indian economy and industry. Their findings suggest that the belief that the influx of foreign portfolio investors will boost a country's stock market does not work in India.

The findings of some of the studies examining the effect of foreign investors on Turkey are as follows. Şit et al. (2020) used the Hatemi-J method to examine foreign portfolio investments in Turkey and the BIST100 Index and concluded that there is a relationship between the variables. Şenol and Koç (2018) analyzed the relations between foreign portfolio investments, the stock market, and other macroeconomic variables using the VAR method. Şimşek and Behdioğlu (2006) conducted an econometric analysis based on the Cobb-Douglas production function to examine the impact of foreign capital investments on Turkish economic growth. They found that foreign direct investment in Turkey has a positive effect on GNP growth.

Since the relationship between foreign portfolio investments and BIST is evaluated with the original econometric model in different periods than existing studies, it is anticipated that this research will contribute to the literature.

3. MODEL AND FINDINGS

In this study, which aims to investigate whether the foreign portfolio investments made in Turkey have an effect on the BIST100 index, the cointegration relationship between the BIST100 index and the foreign investor volume and foreign portfolio value monthly data in the period 2010:01-2022:06 was examined. The data was obtained from the Data Analysis Platform. The variables used in the study and their explanations are presented in Table 1.

Table 1. Variables Used in Analysis

Variables	**Definition**

BIST100	BIST100 Index
Foreign Investor Volume	$\frac{\text{Number of Foreign Investors}}{\text{Total Number of Investors}}$
Foreign Portfolio Value	$\frac{\text{Foreign Portfolio Value}}{\text{Total Portfolio Value}}$

Descriptive statistics of the variables used in the analysis are given in Table 2.

Table 2. Descriptive Statistics

	BIST100 Index	**Foreign Investor Volume**	**Foreign Portfolio Value**
Mean	939.9627	0.0078	0.6019
Median	836.0750	0.0081	0.6321
Maximum	2547.0900	0.0093	0.6809
Minimum	497.0500	0.0049	0.3307
Std. Dev.	377.9099	0.0012	0.0818
Jarque-Bera	254.4977	11.8437	114.0981
Probability	0.05610	0.0672	0.05883
Observations	150	150	50

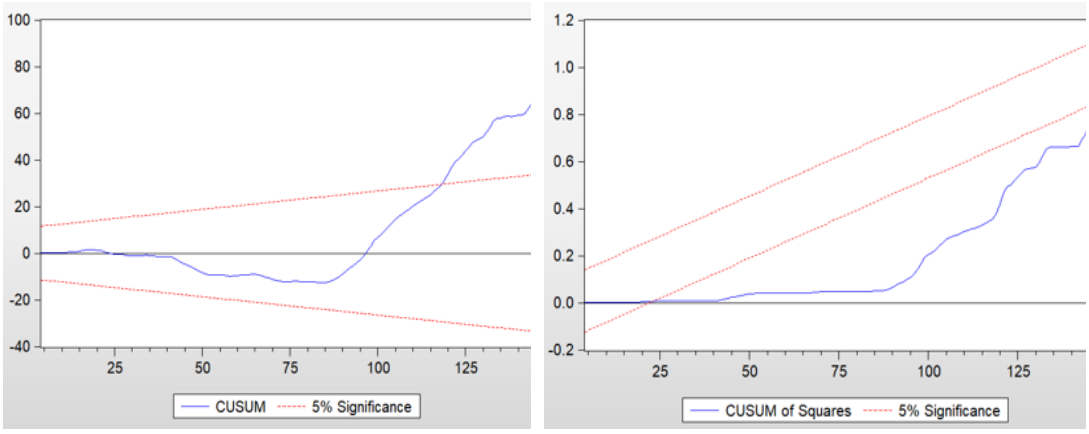
The error terms of both variables exhibit a normal distribution per Table 2 because the probability value of the Jarque-Bera test statistic is greater than the 0.05 significance level. The BIST100 index's standard deviation is 377.9099, the foreign investor volume's standard deviation is 0.0012, and the foreign portfolio value's standard deviation is 0.0818.

The model created to examine the impact of foreign portfolio investments in Turkey on BIST100 index is given below..

$$BIST100 = \beta_0 + \beta_1 \text{Foreign Investor Volume} + \beta_3 \text{Foreign Portfolio Value} + u_t$$

In order to decide which cointegration analysis is applicable in the created model, whether the model has a structural break or not, was examined with CUSUM and CUSUM of square graphics. Accordingly, the CUSUM and CUSUM of Square graphics of the model are given in Figure 1.

Figure 1. CUSUM and CUSUM of Square Graphs



It is decided that there is a structural break when the graph goes out of the confidence limits, and there is no structural break when it does not cross the confidence limits and stays within the limits (Küreş, 2019: 20). Accordingly, when the CUSUM and CUSUM of square graphs in Figure 1 are examined, it is observed that there are structural breaks. Therefore, the Gregory and Hansen cointegration test (for a single structural break), the Hatemi-J test (for two structural breaks), or the Maki cointegration test (for multiple structural breaks) can be used as cointegration analysis (Eric, 2022).

To determine if the variables are stationary or not, the Kapetanios unit root test was used. The results of the tests are presented in Table 3 below.

Table 3. Unıt Root Test Results

	Breaks / Variables	1	2	3
Level	BIST100	2.1207 (0.0099)	0.5394 (0.0147)	2.9719 (0.0138)
	Foreign Investor Volume	-0.3481 (0.0026)	0.0897 (0.0097)	-0.0629 (0.0095)
	Foreign Portfolio Value	2.5190 (0.0001)	0.7789 (0.0015)	2.5981 (0.0098)
First Difference	BIST100	-11.0185 (0.0000)	-11.2839 (0.0000)	-10.9922 (0.0000)
	Foreign Investor Volume	-3.9903 (0.0019)	-4.6823 (0.0011)	-10.7531 (0.0000)
	Foreign Portfolio Value	-5.6077 (0.000)	-10.0791 (0.0000)	-11.2263 (0.0000)

All variables remain stationary at the same level when Table 3 is evaluated. In this case, cointegration analysis can be done between the variables. The existence of a long-term cointegration relationship between the variables was investigated using the Maki (2012) cointegration test, which contends that structural breaks in accordance

with the established model cannot be predicted in advance. With this test, the number of structural breaks is determined by the model according to the structure of the series (Zeren and Koç, 2013:140). The results of the Maki test, which is a multi-break cointegration analysis that examines the effect of foreign portfolio investments in Turkey on BIST100, are given in Table 4.

Table 4. Maki Cointegration Test Results

Test Statistic	Critical Value	Result	Break Number
20.7390	17.5200	Cointegration exists	3

Table 4 shows the results of Maki (2012) multiple structural break cointegration test. According to the model created according to the results obtained, cointegration has emerged. Therefore, spurious regression will not be encountered in the cointegration analysis to be conducted at the level of the series. The FMOLS long-term coefficient estimator was used to assess the cointegration coefficients because of the long-term link between the series. Accordingly, the results of the FMOLS long-run coefficient estimator are given in Table 5.

Table 5. Results of FMOLS Long-Run Coefficient Estimator

Variables	Coefficient	Coefficient Test Statistic
Constant	5.7390**	2.57
Foreign Investor Volume	-0.1190*	3.22
Foreign Portfolio Value	0.0015*	1.98
D1	-0.0009	-1.78
D2	2.0334	-0.05
D3	3.9801	7.34

NOTE: * indicates 1%, ** indicates 5% significance level.

According to the findings obtained from the FMOLS long-term coefficient estimator in Table 5, it is observed that the variables other than the D1, D2 and D3 dummy variables, which express the structural break periods, are statistically significant. The 1% increase in the share of foreign investors in the total investors causes a 0.1190% decrease in the BIST100 index. The 1% increase in the value of foreign portfolios in the total value causes an increase of 0.0015% in the BIST100 index.

4. CONCLUSION

Foreign investments are of great importance for emerging countries with high funding needs. It is seen as a potential source of capital flow for developing countries.

However, in addition to this opportunity, there are also disadvantages. So much so that capital movements can move very quickly from countries to countries with the effect of technological developments, which can cause the capital structures of developing countries to become more fragile. For this reason, it is very important to examine the effect of foreign portfolio investments on the stock markets of countries.

The purpose of this study is to determine the impact of foreign portfolio investments made in Turkey on the BIST100 index. In this direction, the original model, which was created by using the BIST100 index, foreign investor volume, and foreign portfolio value monthly data in the period 2010:01–2022:06, was analyzed with the Maki (2012) cointegration test. In Maki cointegration test results, similar to the results of Anayochukwu (2012), Meurer (2016), Şenol and Koç (2018) and Şit et al. (2020), it was determined that there is a cointegration relationship and the series will move together in the long run. According to the findings obtained from the FMOLS long-term coefficient estimator, it is observed that the variables other than the D1, D2 and D3 dummy variables, which express the structural break periods, are statistically significant. It has been observed that the increase in the share of foreign investors in the total investors has a negative effect on the BIST100 index, while the increase in the share of the value of foreign portfolios in the total value has a positive effect on the BIST100 index. In future studies, the relationship between other macroeconomic variables of countries and foreign portfolio investments can be examined.

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