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Prof. Dr. Sabri ORMAN Özel Sayısı s.527-553

TESTING THE VALIDITY of THE UNCOVERED EQUITY PARITY THEORY AMONG FOREIGN CAPITAL FLOWS, THE STOCK MARKET INDICES and THE EXCHANGE RATES: AN ECONOMETRIC ANALYSIS FOR JAPAN, S. KOREA, and TURKEY

Mustafa ÖZYEŞİL[1] ORCID ID: 0000-0002-4442-7087

ABSTRACT

In this study, the validity of the Uncovered Equity Parity (UEP) Theory is examined based on the data obtained from Japan, South Korea, and Turkey during the 2002:M01-2020:M04 period. According to long term analysis, it is observed that the 1st stage of the UEP in Japan is valid during the 2008 global economic crisis period, and the 3rd stage is valid during and after the 2008 global economic crisis. Only the 2nd phase of the UEP is valid in the post-2008 crisis in S. Korea. In Turkey, 1st phase of the UEP is valid for the entire 2002-2020 period. It is determined that the 3rd stage of the UEP is experienced during the 2008 global economic crisis and after. According to short term analysis, it is observed that, in Japan, the 2nd stage of the UEP is valid in the period after the 2008 global economic crisis and the 3rd stage of the UEP is valid throughout the 2002-2020 period. It is found that no stage of the UEP is valid in S. Korea. It has been found that the 1st phase of the UEP is valid only during the pre-crisis period in Turkey, the 2nd phase is valid during the 2002 to 2020 period, and the 3rd phase is found to be invalid in the short term.
Keywords: Uncovered Equity Parity, Stock Exchange Index, Foreign Exchange Rate, Foreign Capital Flows, Japan, South Korea, Turkey.
JEL Codes: E44, F37, G15.

YABANCI ALIMLARI, BORSA ENDEKSİ VE KUR ARASINDA KAPSANMAMIŞ VARLIK PARİTESİ TEORİSİNİN GEÇERLİLİĞİNİN SINANMASI: JAPONYA, G. KORE VE TÜRKİYE İÇİN EKONOMETRİK BİR ANALİZ

ÖZ

Bu çalışmada; Kapsanmamış Varlık Paritesi (Uncovered Equity Parity: UEP) Teorisinin geçerliliği; Japonya, G. Kore ve Türkiye'nin 2002:M01-2020:M04 dönemi verileriyle analiz edilmiştir. Uzun dönem analiz sonuçlarına göre, Japonya'da UEP Teorisinin 1. aşamasının 2008 küresel ekonomik krizi döneminde, 3. aşamasının 2008 küresel ekonomik krizi dönemi ve sonrasında geçerli olduğu görülmüştür. G. Kore'de sadece 2008 krizi sonrası dönemde 2. aşama geçerli çıkmıştır. Türkiye'de ise Teorinin 1. aşamasının tüm 2002-2020 dönemi boyunca geçerli olduğu 3. Aşamanın ise 2008 küresel ekonomik krizi ve sonrası dönemde yaşandığı belirlenmiştir. Kısa dönem analiz sonuçlarına göre, Japonya'da UEP'in 2. aşamasının 2008 küresel ekonomik krizi sonrası dönemde, 3. Aşamasının ise tüm 2002-2020 döneminde geçerli olduğu görülmüştür. G. Kore'de UEP Teorisinin hiçbir aşamasının geçerli olmadığı tespit edilmiştir. Türkiye'deyse UEP'in 1. aşamasının sadece küresel kriz öncesi dönemde geçerli olduğu, 2. aşamanın 2002-2020 döneminde geçerli olduğu, 3. aşamasınınsa kısa dönemde geçerli olmadığı bulunmuştur.
Anahtar Kelimeler: Kapsanmamış Varlık Paritesi, Borsa Endeksi, Döviz Kuru, Yabancı Portföy Alımları, Japonya, G. Kore, Türkiye.

[1] *Dr. Öğr. Üyesi, İstanbul Aydın Üniversitesi Anadolu Bil Meslek Yüksek Okulu İşletme Yönetimi (İngilizce), mozyesil@aydin.edu.tr*

1. Introduction

Stock exchanges are one of the most important financial centers of the countries and have a very important role in increasing the depth and width of the financial markets of the countries. Exchanges are vital especially for corporates to finance their new investments without getting into debt. In addition, small savings through individual and institutional investors trading in stock exchanges can play a major role in increasing investment, employment, production, and economic growth of countries.

Along with the stocks, one of the most important macroeconomic variables that affect the economy is the exchange rates. Foreign exchange rates are very important factors for the economies of countries as they affect the foreign trade competitiveness of the countries (Bostan, Toderaşcu, and Firtescu, 2018: 1-2) and shape the inflation in terms of import costs (Monfared and Akın, 2017: 329-332). The currency wars that have been continuing between the USA and China since 2010, which accelerated with the election of Donald Trump as the President of the USA in November 2016, reveal the importance of this variable for the economies of the countries. Stocks and exchange rates are investment instruments that are usually substitutes (Park and Park, 2014: 5-7), and there is a close interaction between the stocks and the exchange rates (Ehrmann, Fratzscher, and Rigobon, 2005: 5).

Not only domestic residents but also international investors thanks to the rapid developments in information and communication technologies accompanying the financial liberalization and globalization, have also been able to easily trade on the stock exchange that they desire (Singh, 1997: 773). In the literature, foreign investment in the stock exchanges of the countries is named as Capital Flows (Capital Flows[2]: CF) (Davis, Valente, and Wincoop, 2019: 14). While CF affects the value of the any country's stock market indices, on the one hand, it can also be an important determinant of exchange rates by changing the amount of foreign currency in the country (Siourounis, 2004). Especially in the countries in need of external financing and having difficulty in finding new sources of foreign exchange such as Turkey, CF has a very important role (Combes, Kunda, and Plane, 2011).

In addition to the profitability and stability of the country markets, how much of the CF will occur in the countries is determined by the evaluations made by foreign investors. Among the most important financial indicators considered in this evaluation are stock exchange returns and exchange rates (Dimitrova, 2005: 1).

In this study, relationships among the stock market indices, foreign exchange, and capital flows of the stock market are examined in the framework of the UEP Theory and the results are compared. Time series analysis is made using the data from Japan, South Korea, and Turkey during each of 1999: M01-2020: M04 periods separately. To study the subject in more detail, these analyzes are also carried out for each country before the 2008 global economic crisis (2002: M01-2007: M06), the crisis period (2007: M07-2009: M12) and the post-crisis period (2010: M01-2020:

[2] Although the exact translation of this concept is Capital Flow, the expression of Foreign Purchases is more explanatory in the direction and purpose of this capital.

M04). In the second part of the study, theoretical information about UEP is given, and in the third part, information about the countries included in the analysis is presented. The summary of the studies on the subject is given in the fourth part. In the fifth part, econometric analyzes are carried out and the study is completed with the results and investment decision suggestions in the sixth section. This study is very important in terms of bringing the UEP concept to the Turkish financial literature, the way it handles the subject, and the sub-periods it focuses on, and it is expected to make significant contributions to the literature and financial market actors.

2. Theoretical Framework

The UEP Theory, which came to the agenda with the works of IMF and European Union Central Bank economist Prof. Dr. Harald Hau and London Business School and NBER economist Prof. Dr. Helene Rey published in 2004, examines the dynamic relationships between capital flows, stock market indices, and exchange rates. In the process of rebalancing the portfolio investments (Dahlquist and Robertsson, 2004: 616), the theory is based on the fact that foreign investors managing their portfolios in international markets reduce their positions and risks to rebalance their portfolios, as the investment weights in the markets of the best-performing countries increase automatically. In a sense, international investors sell some of their assets by realizing profit in countries with rising stock indices. Thus, capital flows (CF) decrease in the relevant country, there is a foreign currency outflow from the country, which makes the exchange rates in the host country[3] increase. This theory has three stages (Hau and Rey, 2004). These stages can be examined with the help of Figure 1:

[3] Here, it is assumed that the exchange rates are calculated according to the flat quote. Thus, the exchange rate refers to the amount of local currency that can be purchased for 1 unit of foreign currency. Ex: $ 1 = 6.83 TL

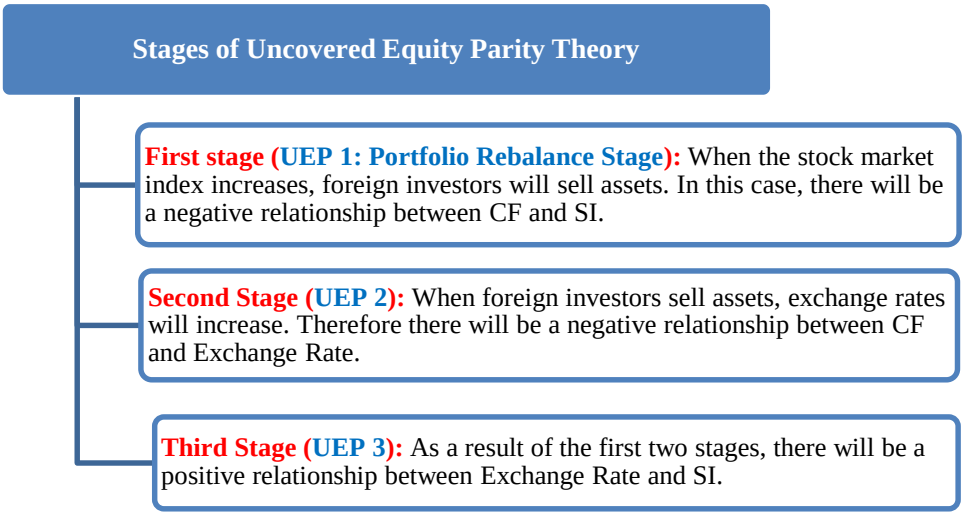

Figure 1: Stages of Uncovered Equity Parity Theory

Source: Hau and Rey (2004).

As seen in Figure 1, in the first stage (UEP 1), when the stock market index (and therefore the returns on the stock market) in a country increases, the value of the assets owned by foreign investors and the weights of the assets of this country increase in their total portfolios. In this case, foreign investors can sell some of their assets in the country stock exchange, both to realize profit and to rearrange the national weights of the assets in their portfolios. In such cases, CF in the relevant country will decrease and foreign currency will exit from the country. The decrease in the amount of foreign currency in the country may cause some exchange rates to go upwards.[4]. In this case, the second stage of the UEP will take place and a negative relationship will be seen between CF and exchange rates. When the first and second stages of the UEP take place, there will be a positive relationship between the stock market index and the exchange rate.[5] Thus, countries with higher stock exchange returns will lose their local

[4] Of course, in such cases, the level of foreign currency reserves of the relevant country and the depth and width of the financial markets will also be important determinants.

[5] This relationship is opposite to a priori expectations. Because when we look at the economic data, it is seen that there is a generally opposite relationship between the stock market index and exchange rates. When the stock market index starts to increase, domestic investors can enter the stock market by changing their foreign currency assets, which brings a decrease in the exchange rate. On the other hand, when foreign exchange rates start to increase rapidly in a country, domestic and foreign investors, who consider this as a risk of instability and crisis, are leaving the stock

currencies against the US Dollar. This relationship can be further clarified by the following arrow diagram:

i. $SI \uparrow \rightarrow CF \downarrow$
ii. $CF \downarrow \rightarrow Exc.Rate \uparrow$
iii. $SI \uparrow \rightarrow Exc.Rate \uparrow$

This arrow diagram will facilitate the validation of the UEP Theory. As seen here, for the UEP Theory to be valid, when the stock index increases, CF should decrease, when CF decreases, the exchange rate should increase. Looking at the general result, when the stock index increases, the exchange rate will increase. The realization of all three stages will show that the UEP Theory is valid in the country concerned (Andriansyah and Messinisa (2019: 4).

When the arrow diagram above is considered, it is also conceivable that a certain period of time delay is expected, since the effect of a change in the stock index on the exchange rate is expected to occur over CF. Therefore, in cases where the validity of the UEP Theory is tested, it will be useful to consider the lagged values of these series (Kodongo, 2011: 180).

The reason why this theory is called Uncovered Equity Parity is because, as seen in the arrow diagram above, the first step is that foreign investors make their portfolio decisions in the relevant country while ignoring the exchange rates (Hau and Rey, 2004: 127).

UEP Theory can be formulated with the help of Equation (1) below (Cappiello and De Santis, (2005: 9-11):

$$E\{(1+R_{x,t+1})|\mathfrak{H}_t\} = E\{(1+R_{y,t+1})|\mathfrak{H}_t\}\left\{\frac{S_{ij,t+1}}{S_{ij,t}}|\mathfrak{H}_t\right\} \quad (1)$$

Here, $E\{(1+R_{x,t+1})|\mathfrak{H}_t\}$, and $E\{(1+R_{y,t+1})|\mathfrak{H}_t\}$; expresses expected total return of the x investment in country$-i$ and y investment in country$-j$, $\mathfrak{H}_t$; refers to information set that foreign investors have about international markets and $S_{ij,t}$; i the nominal spot exchange rate between the country-i and the country-j currencies. Using the inequality of Jensen (1906) shown in Equation (2), when the natural logarithm of both sides of Equation (1) is taken, Equation (3) is obtained:

$$LnE\{h_{t+1}|\mathfrak{H}_t\} > E\{h_{t+1}|\mathfrak{H}_t\} \quad (2)$$

$$E\{(s_{ij,t+1})|\mathfrak{H}_t\} - s_{ij,t} = -E\{r_{j,t+1} - r_{i,t+1}|\mathfrak{H}_t\} \quad (3)$$

Here $s_{ij,t+1} \equiv Ln(S_{ij,t+1})$, $r_{i,t+1} \equiv Ln(1+R_{x,t+1})$ and $r_{j,t+1} \equiv Ln(1+R_{y,t+1})$. Especially here $E\{r_{i,t+1}|\mathfrak{H}_t\}$ and $E\{r_{j,t+1}|\mathfrak{H}_t\}$ show expected asset (stock

market quickly, foreign investors are trying to get out of the country by turning the local currency into foreign currency in exchange for the shares they sell, and domestic investors are turning towards dollarization and exchange rates increase even more rapidly.

market, stock) returns in i and j country respectively, and $\mathfrak{H}_t$; referring to the information set about the country concerned.

When the first stage of UEP is valid in an economy and when the stock market index rises, foreign investors are expected to turn to profit realization. At this point, individual investors and brokerage house representatives should take this issue into consideration.

When the second stage of UEP is valid when foreign currency entering the country increases, exchange rates decrease (or foreign exchange investments, which see this as an indicator of stability when foreign exchange rates decrease), are expected to show more interest in that country exchange, and investors should not ignore this factor.

When the third stage of the UEP theory is valid, the increase in the stock is expected to be accompanied by an increase in the exchange rate (or, conversely, an increase in the exchange rate accompanied by an increase in the stock), and investors must take positions accordingly.

3. Basic Information on Countries Included In The Analysis

Japan, which suffered great physical and economic devastation in World War II, started to recover rapidly afterward and founded the Tokyo Stock Exchange on April 1, 1949. Japan produces high-tech products[6] and has the third-largest economy in the world as of 2018 thanks to developed financial markets (World Bank, 2020a). S. Korea also made efforts to recover rapidly after the Great War with North Korea in the period of 1950-1953, established the Korea Exchange in 1956, and today, with the liberal economic policies it implemented, the R&D and innovation studies it carried out, it has become one of the few countries in the world which can produce technology today.[7] As of 2018, the world's 11th largest economy (World Bank, 2020), South Korea, is an important role model for Turkey. Turkey, adopted the economic growth model based on exports with the January 24, 1980 Stability Decisions, has established the Istanbul Stock Exchange on January 1, 1986, and began the process of financial liberalization in 1989, by decree number 32. Turkey is the World's 19th largest economy since the year 2018 (World Bank, 2020). The main macroeconomic sizes of the countries included in the analysis as of 2018 are given in Table 1.

[6] Automobile brands produced by Japan are Toyota, Honda, Mazda, Mitsubishi, Nissan, Subaru, Suzuki, Daihatsu, and Kawasaki. It has brands such as Sony and Toshiba in the field of computers, and brands such as Hitachi, Panasonic, Pioneer, Kenwood, Canon, Casio, Citizen, Daikin, Sony, Sharp, Epson and Fujitsu in the field of electronics.

[7] Auto brands produced by S. Korea are Hyundai, Daewoo, Kia, and SsangYong. Samsung and LG can be categorized under mobile phones and electronics.

Table 1. Basic Macroeconomic Sizes of Countries

	GDP (Billion $)	Population (Million People)	Income Per Capita ($)	Stock Exchange Market Value (Billion $)	Stock Exchange Transaction Volume (Billion $)	Number of Firms Traded in the Stock Market
Japan	4971	126.5	39289	6170	6888	3566
S. Korea	1619	51.6	31380	1413	2455	2186
Turkey	771	82.3	9370	149.3	369.8	490

Source: World Bank (2020a, 2020b, 2020c)

According to the data in Table 1, Japan is one of the most important economies of the world with its national income of 4971 billion dollars, a population of 126.5 million people, and a national income of 39399 dollars per capita. The market value of the Tokyo Stock Exchange is 6 Trillion 170 Billion Dollars, the transaction volume is 6 Trillion 888 Billion Dollars, and there are 3566 companies traded in this market. South Korea has become one of the most important countries in the world, with a national income of 1 trillion 619 billion dollars, a population of 51.6 million people, and a national income of 31380 dollars per capita. The market value of the South Korean Exchange is 1 Trillion 413 Billion Dollars, the trading volume is 2 Trillion 455 Billion Dollars and the number of firms traded in this stock exchange is 2186. With a national income of 771 Billion Dollars, a population of 82.3 million people, and the national income of 9370 dollars per capita, Turkey is trying to trace the first two countries. As of the end of 2018, the market value of Borsa Istanbul (Istanbul Stock Exchange) was 149.3 Billion Dollars, while the transaction volume was 369.8 Billion Dollars. The number of companies traded on Borsa Istanbul is 490.

4. Literature Review

UEP Theory was first brought to the agenda by Hau and Rey (2004), in their study, the authors determined that there was a positive relationship between the asset prices (stock market index) and the exchange rate. They also found out that the third phase of the UEP Theory was valid based on the VAR method, using foreign investors' purchases, stock index returns, and foreign exchange rates in the USA and 5 developed countries (France, Germany, Japan, Switzerland, and England) during 1990: M01-2003 period. On the other hand, they found that US Dollar as the local currency gains value, (in other words exchange rate decreases), net foreign investor purchases towards the US market have increased and the second stage of the UEP Theory is valid for the USA. When the stock market index increased in countries other than the USA, it was determined that US investors went to profit realization and sold assets, and thus the first phase of the UEP Theory was also experienced.

Cappiello and De Santis (2005), by examining relationships between the capital flows among the USA and the Eurozone, Japan, Switzerland, Canada, France and Germany, stock exchange index returns and exchange rates within the framework

of the UEP Theory, based on the data of the period between 1991: M01-2003: 12, determined that the increases in the stock markets were observed with the appreciation of the dollar against foreign currency, using the method of GARCH. Briefly, the countries whose stock market returns increased observed a loss in their local currencies against the US Dollar. In other words, the exchange rates calculated according to the flat quote are increasing. The authors thus reached conclusions supporting the UEP Theory of Hau and Rey (2004) in the respective countries.

Richards (2005) found out that the positive feedback approach is valid in 5 Asian countries [8](Indonesia, S. Korea, Philippines, Thailand, and Taiwan), not the UEP Theory Using the data of 1999: M01-2002: M09 period and the VAR method.

Hau and Rey (2006), using the daily data of the USA and 17 OECD countries, analyzed the mutual net foreign purchases between these countries, stock exchange returns, and exchange rates, using correlation analysis and regression analysis methods. In this study, the authors carried out their analysis separately for the periods 1980-2001, 1990-2001, and 1995-2001. As a result of these analyzes, the authors determined that foreign investors in these countries were following the portfolio rebalancing strategy (First Phase of UEP). The authors stated that the exchange rate dynamics depend on the developments in the asset market (stock exchange), especially in economies with high market capitalization[9].

Cappiello and De Santis (2007) analyzed the UEP approach using 1981: M01-2006: M10 period data on the effects of mutual stock purchases between the USA and Germany, the UK, and Switzerland on the expected exchange rate and risky assets. At the end of the study, it was determined that the local currency gained value against the US Dollar in Germany and Switzerland in the periods when stock markets had lower returns than the US market. Thus, it was determined that the UEP approach is valid in these two countries, but definitive findings are not available for England.

In their study, Hau and Rey (2008) aimed to analyze the validity of the portfolio revaluation strategy, which is the first stage of the UEP Theory, using 6500 data from the 1997-2002 period, globally. The study focused on 4 geographical regions (USA, Canada, England, and Euro Area) so that 88% of the countries in the relevant regions and 91% of their portfolio assets could be considered. As a result of the analysis, strong evidence has been obtained for portfolio rebalancing behavior aimed at balancing exchange rate risk and equity risk at desired levels.

Dunne, Hau, and Moore (2010) analyzed the relationships between asset prices, foreign purchases, and exchange rate returns with daily data from the USA and France for the period 1999-2003. As a result of the analysis made with the VAR method, in both countries, it was found that exchange rates and foreign purchases affect stock market returns, and the UEP Theory is valid between these two countries.

Kim (2011) analyzed the validity of the risk-adjusted UEP Theory using foreign capital flows between the USA, Japan and the UK using data from the period

[8] Although the author stated that he took six countries at the beginning of this study, this is because he used two different stock market indices together for S. Korea.

[9] The ratio of the market value of the stock market to the national income.

1994: M01-2008: M06. In this study, the author also took into account the market risk and found that the traditional UEP Theory has expired.

Curcuru et al. (2014) examined the validity of the UEP Theory with the help of correlation matrices, using data from 42 countries for the period 1990: M01-2010: M12. In the analyzes, it has been found that there are positive relations between exchange rates and stock returns in Austria, Belgium, Greece, Portugal, Switzerland, Brazil, Malaysia, S. Africa, and Thailand, indicates that the UEP Theory is valid.

Andriansyah and Messinis (2019), within the framework of the positive relationship between the stock market index and exchange rates, analyzed the validity of the UEP Theory through data from 1993: Q1-2008: Q4 period for the Australia, Canada, Indonesia, Japan, S. Korea, Sweden, Thailand, and the UK through structural refractive time series and panel data analysis methods. As a result of the analysis, it is determined that there are one-way causality relations from the stock market index and foreign purchases to exchange rates. As a result of the study, there is no clear conclusion about the validity of the 1st stage of the UEP Theory across these countries. Only in Indonesia it has been found that stock returns affect exchange rates through foreign purchases.

In a literature search, no studies were found regarding the UEP theory, using data from Turkey. Thus, this study is expected to provide an important contribution to the literature.

5. Econometric Analysis

5.1. Data Set

In this study, to test the validity of the UEP Theory in Japan, South Korea, and Turkey, capital flows (CF), stock index (SI), and exchange rate (ER) data for the 2002: M01-2020: M04 period are used. These countries are included in the analysis because Japan is an developed country, Korea is a fast developing country, and Turkey is taking these two countries as a role model. When choosing the period, starting from the time when the effects of the economic crisis in South Asia in 1997 and Turkey in 2001 finished have been preferred. This period is also divided into sub-periods as 2002: M01-2007: M06, 2007 M07-2009: M12, and 2010: M01-2020: M04 based on the 2008 global economic crisis. The reason for the start of the crisis period in 2007: M07 is that the leading signals of this crisis in the USA emerged in that period (Özatay, 2009: 105). In this regard, the graphics in Annex 1 and Annex 2 can also be viewed. Thus, it is aimed to analyze the validity of the UEP Theory in detail during the period of 2002-2020, before the 2008 crisis, in the period when the leading and successive effects of the 2008 crisis were experienced, and in the period when the effects of the crisis passed.

From these data, CF demonstrates the monthly foreign asset purchases in the stock market in Million Dollars, SI demonstrates the closing value of the each stock exchange for the last trading day of each month (Nikkei for Japan 225, KOSPI for S. Korea, and BIST100 for Turkey), and exchange rate shows the value of each country's currency for per USD according to the flat quote (the amount of national currency that can be purchased in exchange for 1 USD). Natural logarithms of all series are used in

the analysis. In the study, a total of 220 period data is used for each country. The data is obtained from Trading Economics.

5.2. Correlation Analysis

Pearson's correlation coefficients between variables in each country are calculated and presented in Table 2 as follows:

Table 2. Correlation Coefficients

Japan

	Ln SI	**Ln ER**	**Ln CF**
Ln SI	1	0.53	0.02
Ln ER	0.53	1	0.15
Ln CF	0.02	0.15	1

S. Korea

	Ln SI	**Ln ER**	**Ln CF**
Ln SI	1	-0.23	0.20
Ln ER	-0.23	1	0.10
Ln CF	0.20	0.10	1

Turkey

	Ln SI	**Ln ER**	**Ln CF**
Ln SI	1	0.65	-0.11
Ln ER	0.65	1	0.30
Ln CF	-0.11	0.30	1

According to Table 2, it is observed that there is a positive but relatively high correlation between the stock market index and exchange rate, and a positive but rather low correlation between the stock market index and net foreign purchases. The coefficient determined between SI and the exchange rate for Japan indicates that the third stage of the UEP Theory is valid in this country. In Korea, negative relationships between SI and exchange rate, positive and relatively low relationships between SI and CF are detected. According to these results, it can be said that CF has a greater impact on the Korean economy. Based on the findings of the correlation coefficient obtained for Turkey, positive and strong relationships between SI and the exchange rate, and negative and weak relationships between SI and CF are determined. While a positive relationship between the exchange rate and SI indicates that the third stage of the UEP theory is valid in Turkey, on the other hand, the negative correlation between SI and CF suggests that the first phase of the UEP Theory is valid in Turkey. In three countries, positive relations have been determined between the exchange rate and CF, and these relations are not compatible with our prior expectations. Because, when the amount of CF coming to a country increases, the amount of foreign currency in the country is expected to increase and therefore the exchange rates will decrease. In this case, it is thought that the basic determinant of the exchange rate in these countries is not CF.

5.3. Econometric Model

In this study, the following models have been established to analyze the relations between the stock market index, capital flows, and exchange rates in all aspects and to test the validity of the UEP Theory.[10]:

[10] The order of construct the models is arranged according to the stages of the UEP Theory.

$$LnCF_t = \theta_0 + \theta_1 LnSI_t + \theta_2 LnER_t + \varepsilon_t \quad (4)$$

$$LnER_t = \varphi_0 + \varphi_1 LnCF_t + \varphi_2 LnSI_t + \epsilon_t \quad (5)$$

$$LnSI_t = \delta_0 + \delta_1 LnCF_t + \delta_2 LnER_t + \omega_t \quad (6)$$

$LnCF_t$; denotes the natural logarithm of foreign purchases (Million Dollars) in the stock exchanges in these models, $LnSI_t$ denotes the natural logarithm of the stock index closing values, and $LnER_t$ denotes the natural logarithm of the amount of local currency that can be purchased for 1 USD. t; denotes the time,$\varepsilon_t, \epsilon_t$, and ω_t; shows the series of error terms that are free from econometric problems.

5.4. Methodology

In the study, the stationarity of the series is examined by Ng and Perron (2001) unit root test. The existence of cointegration relations between the series in the models is analyzed by Phillips and Ouliaris (1990) cointegration test. Long and short term analyzes are performed using Dynamic Ordinary Least Squares: DOLS method developed by Stock and Watson (1993).

5.5. Unit Root Test

In the study, the stationarity of the series is examined by Ng and Perron (2001) unit root test. In this method, four different test statistics have been developed by Ng and Perron (2001):

$$MZ_\alpha^d = (T^{-1}\left(Y_T^d\right)^2 - f_0)/(2K) \quad (7)$$

$$MZ_t^d = MZ_\alpha x MSB \quad (8)$$

$$MSB^d = (\frac{K}{f_0})^{\frac{1}{2}} \quad (9)$$

$$MPT^d = \begin{cases} \dfrac{(\bar{c}^2 K - \bar{c} T^{-1}(Y_T^D)^2)}{f_0} & if\ x_t = \{1\} \\ \dfrac{(\bar{c}^2 K + (1-\bar{c}) T^{-1}(Y_T^d)^2)}{f_0} & if\ x_t = \{1, t\} \end{cases} \quad (10)$$

AS can be seen here $c = \begin{cases} -7 & if\ x_t = \{1\} \\ -13.5 & if\ x_t = \{1, t\} \end{cases}$ and here $K = \sum_{t=2}^{T} (Y_{t-1}^d)^2 / T^2$.

H_0 hypothesis of the MZ_α and MZ_t tests is that "The series is not stationary," while H_0 hypothesis of the MSB and MPT tests is that "The series is stationary".

Ng and Perron (2001) unit root test results are given in Table 3.

Table 3. Ng and Perron (2001) Unit Root Test Results

		For Level Values of Series				For the First Differences of the Series			
		MZ_α	MZ_t	MSB	MPT	MZ_α	MZ_t	MSB	MPT
Japan	$LnSI$	-1.51	-0.64	0.42	12.02	-49.51[a]	-4.94[a]	0.09[a]	2:00[a]
	$LnER$	-0.94	-0.60	0.63	21.40	-83.31[a]	-6.44[a]	0.07[a]	1:11[a]
	$LnCF$	-0.40	-0.12	0.31	11:27	-101.21[a]	-7.02[a]	0.06[a]	1:24[a]
S. Korea	$LnSI$	-0.03	-0.03	0.84	41.61	-60.03[a]	-5.41[a]	0.09[a]	1.83[a]
	$LnER$	-4.00	-1.40	0.35	6.12	-74.52[a]	-6.10[a]	0.08[a]	1.22[a]
	$LnCF$	-0.45	-0.43	0.94	45.07	-40.74[a]	-4.46[a]	0.10[a]	2:48[a]
Turkey	$LnSI$	0.49	0.47	0.96	58.89	-40.32[a]	-4.48[a]	0.11[a]	2.26[a]
	$LnER$	2.94	2.28	0.77	61.34	-75.08[a]	-6.10[a]	0.08[a]	1.29[a]
	$LnCF$	-0.63	-0.25	0.39	13.32	-46.72[a]	-4.82[a]	0.10[a]	1.96[a]
Critical Values									
1%		-13.80	-2.58	0.17	1.78	-23.80	-3.42	0.14	4.03
5%		-8.10	-1.98	0.23	3.17	-17.30	-2.91	0.16	5.48
10%		-5.70	-1.62	0.27	4.45	-14.20	-2.62	0.18	6.67

Note: The lag length selection is made according to the Akaike criterion. a: It shows that the series is stationary at 1% significance level.

According to the findings presented in Table 3, all series are stationary at first differences, not at level values. In this case, according to Granger and Newbold (1974), spurious regression problems may be encountered in regression analysis. Therefore, according to Engle and Granger (1987), the existence of a cointegration between the series should be tested.

5.6 Cointegration Test

Cointegration tests find whether there is a long-term relationship between non-stationary series in level values. When the cointegration relationship between the series is detected, according to Engle and Granger (1987), in the analyzes to be made the spurious regression problem will not be encountered. In this study, the existence of a cointegration relationship between series is investigated by Phillips and Ouliaris (1990) cointegration test. The H_0 hypothesis of this test is "There is no cointegration between series". In the Phillips and Ouliaris (1990) test, which is a more advanced test compared to Engle and Granger (1987) and Johansen's (1988) cointegration tests, the existence of a cointegration relationship between the series is tested by two systems with simultaneous equation system. These criteria can be calculated as follows:

$$y_t = \beta_0 + \beta_1 X_t' + u_t \tag{11}$$

$$\Delta\hat{u}_t = (\rho - 1)\hat{u}_{t-1} + \sum_{j=1}^{p} \delta_j \Delta\,\hat{u}_{t-j} + v_t \tag{12}$$

$$\hat{\tau} = \frac{\hat{\rho} - 1}{se(\hat{\rho})} \tag{13}$$

$$\hat{z} = \frac{T(\hat{\rho} - 1)}{\left(1 - \sum_j \hat{\delta}_j\right)} \tag{14}$$

Here $se(\hat{\rho})$ is calculated as $se(\hat{\rho}) = \hat{s}_v(\sum_t \hat{u}_{t-1}^2)^{-1/2}$. The H_0 hypothesis is tested using the statistics τ and z (Hayashi, 2000). In this study, Phillips and Ouliaris (1990) cointegration test is performed, and the results obtained are presented in Table 4.

Table 4. Phillips and Ouliaris (1990) Cointegration Test Results

	Dependent Variable	2002-2020 Period		2002: M01-2007: M6		2007: M07-2009: M12		2010: M01-2020: M04	
		$\tau - ist.$	$z - ist.$	$\tau - ist.$	$z - ist.$	$\tau - ist.$	$z - ist.$	$\tau - ist.$	$z - ist.$
Japan	**LnCF**	-11.65[a] (0.00)	-207.74[a] (0.00)	-9.24[a] (0.00)	-70.02[a] (0.00)	-5.86[a] (0.00)	-28.31[a] (0.00)	-7.67[a] (0.00)	-84.89[a] (0.00)
	LnER	-29.6[a] (0.00)	-107.34[a] (0.00)	-3.13[b] (0.03)	-45.60[b] (0.04)	-4.78[a] (0.00)	-70.01[a] (0.00)	-3.51[c] (0.08)	-22.75[c] (0.09)
	LnSI	-21.7[a] (0.00)	-63.87[a] (0.00)	-3.78[b] (0.02)	-20.06[b] (0.04)	-9.46[a] (0.00)	-62.20[a] (0.00)	-3.90[c] (0.08)	-27.75[c] (0.09)
S. Korea	**LnCF**	-10.09[a] (0.00)	-149.87[a] (0.00)	-5.90[a] (0.00)	-44.03[a] (0.00)	-3.87[c] (0.09)	-20.02[c] (0.09)	-8.72[a] (0.00)	-117.96[a] (0.00)
	LnER	-3.65[c] (0.06)	-13.30[c] (0.07)	-2.82[c] (0.08)	-12.24[c] (0.09)	-4.87[c] (0.06)	-24.13[c] (0.06)	-3.99[c] (0.09)	-27.96[c] (0.08)
	LnSI	-14.26[a] (0.00)	-45.42[b] (0.02)	-2.46 (0.15)	-11.42[c] (0.09)	-4.61[c] (0.05)	-23.29[c] (0.07)	-3.14[c] (0.09)	-19.00[c] (0.09)
Turkey	**LnCF**	-12.50[a] (0.00)	-188.00[a] (0.00)	-6.96[a] (0.00)	-51.93[a] (0.00)	-5.41[a] (0.00)	-34.15[a] (0.00)	-10.90[a] (0.00)	-114.00[a] (0.00)
	LnER	-3.65[c] (0.06)	-21.17[c] (0.09)	-3.17[c] (0.09)	-16.18[c] (0.09)	-3.07[c] (0.09)	-32.86[b] (0.04)	-4.50[a] (0.00)	-34.70[a] (0.00)
	LnSI	-3.99[b] (0.02)	-28.55[b] (0.00)	-2.91[c] (0.09)	-12.89[c] (0.09)	-3.48[c] (0.09)	-18.26[b] (0.03)	-3.84[b] (0.04)	-25.61[b] (0.00)

Note: a, b and c respectively show that there is cointegration at the level of 1%, 5% and 10% significance.

According to the results in Table 4, with at least a 10% significance level in all models, H_0 hypothesis is rejected, and it is decided that there is a cointegration relationship between the series. In this case, there will be no spurious regression problems in the analyzes made using the series in question.

5.7 Long Term Analysis

In the study, long term analysis between the series is made, using the models below and the DOLS method[11] .

$$Model\ 1: LnCF_t = \theta_0 + \theta_1 LnSI_t + \theta_2 LnER_t + \varepsilon_t \quad (15)$$

$$Model\ 2: LnER_t = \varphi_0 + \varphi_1 LnCF_t + \varphi_2 LnSI_t + \epsilon_t \quad (16)$$

$$Model\ 3: LnSI_t = \delta_0 + \delta_1 LnCF_t + \delta_2 LnER_t + \omega_t \quad (17)$$

In the DOLS method developed by Stock and Watson (1993), by using the preliminary and lag values of the first-order differences of independent variables, results with high explanation power and resistant to econometric problems can be achieved (Kao and Chiang, 2000: 182). The following standard model is used to analyze the relationships between the two series with the DOLS method (Saikkonen, 1992):

$$y_t = X_t'\beta + D_{1t}'\gamma_1 + \sum_{j=-q}^{r} \Delta X_{t+j}'\delta + v_{1t} \quad (18)$$

Here y_t; is the dependent variable, X_t'; is the independent variables vector, D_{1t}'; are the external factors such as trend and constant term, q; is the precursor value and r; is the lag value. In this study, long-term analyzes are performed with the DOLS method and the results obtained are presented in Table 5.

[11] An important reason that the DOLS method is preferred in the study is that CF and ER responds to the changes in SI in a delayed manner in UEP Theory. Thanks to this method, the effects of independent variables not only in the current period but also in the lagged (past) period values on the dependent variable are included in the analysis.

Table 5. Long Term Analysis Results

	Variable	2002-2020 Period			2002: M01-2007: M6			2007: M07-2009: M12			2010: M01-2020: M04		
		Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Japan	***LnCF***	-	0.03[a] (0.00)	-0.005 (0.64)	-	0.005 (0.52)	0.11[b] (0.02)	-	-0.02[c, 2] (0.08)	0.22[a] (0.00)	-	-0.001 (0.67)	0.003 (0.58)
	LnER	6.66[b] (0.03)	-	1.34[a, 3] (0.00)	4.11 (0.33)	-	0.12 (0.89)	-21.31 (0.43)	-	4.45[a, 3] (0.00)	6.90 (0.45)	-	2.15[a, 3] (0.00)
	LnSI	-0.09 (0.93)	0.18[a, 3] (0.00)	-	2.32[b] (0.03)	-0.001 (0.98)	-	7.73 (0.28)	0.30[a, 3] (0.00)	-	-0.34 (0.92)	0.39[a, 3] (0.00)	-
	R^2	0.24	0.55	0.29	0.07	0.03	0.32	0.91	0.82	0.94	0.40	0.85	0.85
	$\bar{R}^2$	0.21	0.46	0.28	0.008	0.03	0.19	0.68	0.71	0.79	0.36	0.85	0.85
	LRV	23.95	0.04	0.35	3.97	0.01	0.14	1.17	0.003	0.005	28.28	0.01	0.07
	SSR	3207.87	1.70	16.05	321.09	0.21	2.17	23.71	0.02	0.06	2030.93	0.36	2.00
S. Korea	***LnCF***	-	0.002 (0.62)	0.07[a] (0.00)	-	-0.001 (0.66)	-0.006 (0.42)	-	0.003 (0.28)	0.003 (0.57)	-	0.0003 (0.89)	0.004 (0.32)
	LnER	6.45 (0.30)	-	-0.34 (0.66)	-13.16 (0.51)	-	-2.58[a] (0.00)	23.69 (0.47)	-	-1.42[a] (0.00)	-85.98[a, 2] (0.00)	-	-0.66[c] (0.09)
	LnSI	4:02[a] (0.00)	-0.02 (0.52)	-	-6.48 (0.37)	-0.32[a] (0.00)	-	6.47 (0.80)	-0.77[a] (0.00)	-	25.75[a] (0.00)	-0.15[c] (0.07)	-
	R^2	0.16	0.47	0.40	0.09	0.80	0.83	0.36	0.96	0.93	0.72	0.11	0.13
	$\bar{R}^2$	0.11	0.37	0.29	0.05	0.79	0.81	0.18	0.92	0.87	0.46	0.08	0.11
	LRV	50.20	0.02	0.51	47.90	0.007	0.04	76.06	0.002	0.007	13:01	0.006	0.03
	SSR	4831.67	0.82	18.73	1749.19	0.14	0.87	852.30	0.02	0.06	347.69	0.19	0.85
T	***LnCF***	-	0.11[a] (0.00)	-0.15[a] (0.00)	-	-0.003 (0.57)	-0.15[a] (0.00)	-	0.01 (0.10)	-0.06[a] (0.00)	-	0.07[a] (0.00)	-0.005 (0.66)

	LnER	6.63[a] (0.00)	-	0.79[a, 3] (0.00)	6.60 (0.49)	-	-1.52 (0.22)	14.76 (0.15)	-	1.65[b, 3] (0.01)	8.26[a] (0.00)	-	0.40[a, 3] (0.00)
	LnSI	-4.35[a, 1] (0.00)	0.66[a, 3] (0.00)	-	-4.57[a, 1] (0.00)	-0.09[b] (0.02)	-	-16.64[a, 1] (0.00)	-0.01 (0.92)	-	-7.78[b, 1] (0.02)	1.32[a, 3] (0.00)	-
	R^2	0.36	0.88	0.86	0.32	0.54	0.87	0.73	0.86	0.97	0.42	0.96	0.89
	$\bar{R}^2$	0.33	0.85	0.81	0.27	0.46	0.82	0.69	0.77	0.92	0.38	0.95	0.86
	LRV	31.05	0.13	0.26	21.74	0.008	0.14	20.78	0.006	0.004	14.50	0.03	0.01
	SSR	5115.07	4.26	8.35	1233.40	0.15	2.11	345.88	0.06	0.02	2849.50	0.61	0.46

Note: a, b and c respectively show that the coefficients are statistically significant at the level of 1%, 5% and 10%. LRV refers to long-term variance and SSR shows sum of squared residuals, low values are indicators of the success of the model. 1, 2 and 3 show that the 1st, 2nd and 3rd stages of the UEP Theory are valid.

According to the findings in Table 5, although it is seen that in Japan the second stage of the UEP Theory is valid during the 2008 global economic crisis and the third stage of the UEP Theory is valid during the period of 2002-2020, it has been determined that this effect is mainly in the period of 2008 global economic crisis and after. In this case, portfolio holders to trade in the Japanese market should take into account that there is a negative relationship between capital flows for this country exchange and USD / YEN in times of crisis, and positive relationships between the Nikkei Stock Exchange index and USD / YEN during and after crisis.

Only the second phase of the UEP Theory was valid in the post-2008 crisis in S. Korea. In this case, portfolio holders trading in the S. Korea market should be aware that there is a negative relationship between the foreign purchases for this country exchange (KOSPI) and the USD / WON in the post-crisis periods.

In Turkey, it is valid for the entire 2002-2020 period of the 1st phase of the UEP theory. When BIST 100 index in Turkey increases, it would be beneficial for foreign investors to consider selling some of their shares they have in order to rebalance their portfolios and do profit realization. UEP Theory is not valid in Turkey in the 2nd stage, namely the exchange with foreign purchases for the stock dry in the long run in the opposite direction and statistically as there is no significant relationship, therefore, has been found to be an important determinant of exchange rates in Turkey of foreign portfolio investment. The third stage of the UEP Theory, which was found to be valid in the period of 2002-2020, is determined to occur mainly during the 2008 global economic crisis and the post-crisis period. At this point, domestic and foreign investors in the stock exchange index in Turkey would be simultaneous, and in the same way it is useful to keep in mind movements. Model verification tests of estimates show that the analyzes are generally reliable.

5.8 Short Term Analysis

Short term analysis are made using the first difference of the series' fixed state and error correction terms obtained from long term analysis (Error Correction Term: ECT) (Gujarati and Porter, 2012: 764). In this study, short term analyzes were carried out with the help of the following models:

$$Model\ 1: \Delta LnYA_t = \theta_0 + \theta_1 \Delta LnBE_t + \theta_2 \Delta LnKUR_t + \theta_3 ECT_{1,t-1} + \varepsilon_t \quad (18)$$

$$Model\ 2: \Delta LnKUR_t = \varphi_0 + \varphi_1 \Delta LnYA_t + \varphi_2 \Delta LnBE_t + \varphi_3 ECT_{2,t-1} + \epsilon_t \quad (19)$$

$$Model\ 3: \Delta LnBE_t = \delta_0 + \delta_1 \Delta LnYA_t + \delta_2 \Delta LnKUR_t + \delta_3 ECT_{3,t-1} + \omega_t \quad (20)$$

In the short term analysis, when the coefficient of error correction term is statistically significant, it is determined that the deviations occurring in the short term between the series acting in cointegration disappear in the long term, and the error correction mechanism of the model is working and the analyzes made are reliable (Tarı, 2012: 433). In the study, short term analyzes were also performed with the DOLS method and the results obtained are presented in Table 6.

Table 6. Short Term Analysis Results

	Variable	2002-2020 Period			2002: M01-2007: M6			2007: M07-2009: M12			2010: M01-2020: M04		
		Model 1	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**	**Model 1**	**Model 2**	**Model 3**
Japan	$\Delta LnYA$	-	-0005[a, 2] (0.00)	0.002 (0.13)	-	0.009 (0.14)	-0.003 (0.62)	-	-0.03 (0.12)	0.08[c] (0.09)	-	-0.003[b, 2] (0.04)	0.003[b] (0.02)
	$\Delta LnKUR$	-9.17 (0.70)	-	1.33[a, 3] (0.00)	8.83 (0.62)	-	1.22[b, 3] (0.02)	88.40[c] (0.05)	-	8.21[b, 3] (0.03)	-11.90 (0.78)	-	1.67[a, 3] (0.00)
	$\Delta LnBE$	5.90 (0.59)	0.31[a, 3] (0.00)	-	6.10 (0.45)	-0.04 (0.70)	-	-7.81 (0.29)	0.006 (0.98)	-	7.36 (0.76)	0.47[a, 3] (0.00)	-
	ECT_{t-1}	-0.81[a] (0.00)	-0.02[c] (0.09)	-0.02[c] (0.06)	-1.12[a] (0.00)	-0.09[c] (0.07)	-0.006[c] (0.07)	-1.88[a] (0.00)	-0.01[c] (0.07)	-0.46[b] (0.02)	-0.83[a] (0.00)	-0.04[c] (0.07)	-0.05[b] (0.03)
	R^2	0.46	0.35	0.26	0.57	0.38	0.14	0.98	0.93	0.75	0.55	0.56	0.44
	$\bar{R}^2$	0.43	0.31	0.24	0.53	0.20	0.13	0.96	0.65	0.35	0.51	0.50	0.40
	LRV	17.04	0.0005	0.002	4.66	0.0004	0.002	0.89	0.0006	0.006	20.96	0.0003	0.001
	SSR	3071.89	0.09	0.47	311.34	0.01	0.10	6.59	0.001	0.04	1949.07	0.03	0.17
S. Korea	$\Delta LnYA$	-	0.001 (0.27)	-0.0007 (0.87)	-	0.0004 (0.45)	-0.001 (0.78)	-	-0.008 (0.45)	0.01 (0.37)	-	-0.001 (0.15)	-0.002 (0.32)
	$\Delta LnKUR$	50.63[c] (0.06)	-	-1.34[a] (0.00)	45.18 (0.40)	-	-1.13 (0.15)	25.89 (0.62)	-	-2.91[b] (0.02)	13.47 (0.84)	-	-0.77[a] (0.00)
	$\Delta LnBE$	15.07 (0.28)	-0.42[a] (0.00)	-	8.35 (0.64)	-0.06 (0.24)	-	3.66 (0.91)	-1.38[b] (0.02)	-	-31.38 (0.43)	-0.44[a] (0.00)	-
	ECT_{t-1}	-0.57[a] (0.00)	-0.08[a] (0.00)	-0.006[c] (0.05)	-0.63[a] (0.00)	-0.16[a] (0.00)	-0.14[b] (0.03)	-0.57[a] (0.00)	-0.08[c] (0.06)	-1.06[c] (0.08)	-0.74[a] (0.00)	-0.14[a] (0.00)	0.09[a] (0.00)
	R^2	0.35	0.36	0.29	0.42	0.18	0.24	0.58	0.94	0.88	0.65	0.37	0.47
	$\bar{R}^2$	0.32	0.33	0.22	0.34	0.11	0.11	0.43	0.70	0.40	0.51	0.34	0.43

	LRV	22.35	0.0004	0.002	23.10	0.0003	0.003	31.14	0.001	0.003	5.50	0.0004	0.0006
	SSR	4288.13	0.13	0.43	1352.60	0.02	0.17	647.52	0.006	0.02	451.97	0.05	0.09
Turkey	$\Delta LnYA$	-	-0.006[c, 2] (0.05)	-0.0001 (0.88)	-	0.002 (0.18)	-0.01[b] (0.03)	-	0.009 (0.14)	-0.10[a] (0.00)	-	-0.003 (0.49)	-0.001 (0.44)
	$\Delta LnKUR$	-7.60 (0.80)	-	0.002 (0.82)	23.35 (0.22)	-	-0.58 (0.30)	69.24 (0.18)	-	5.64[a, 3] (0.00)	52.66[a] (0.00)	-	-0.66[a] (0.00)
	$\Delta LnBE$	-34.60[b, 1] (0.03)	-0.40[a] (0.00)	-	6.08 (0.54)	-0.30[a, 1] (0.00)	-	-6.49 (0.69)	-0.16 (0.37)	-	-6.30 (0.55)	-0.25 (0.22)	-
	ECT_{t-1}	-0.87[a] (0.00)	-0.02[c] (0.06)	-0.05[a] (0.00)	-0.81[a] (0.00)	-0.29[a] (0.00)	-0.03 (0.47)	-0.92[a] (0.00)	-0.03[c] (0.08)	-0.85[b] (0.04)	-1.11[a] (0.00)	-0.07[c] (0.08)	-0.25 a (0.00)
	R^2	0.56	0.44	0.26	0.48	0.44	0.43	0.97	0.60	0.88	0.58	0.47	0.27
	$\bar{R}^2$	0.51	0.39	0.24	0.44	0.39	0.30	0.85	0.45	0.72	0.56	0.34	0.22
	LRV	21.63	0.001	0.004	16.72	0.001	0.006	5.17	0.001	0.003	19.93	0.0009	0.002
	SSR	4215.51	0.21	0.86	1109.03	0.06	0.32	24.73	0.03	0.03	3066.76	0.10	0.30

Note: a, b and c respectively show that the coefficients are statistically significant at the level of 1%, 5% and 10%. 1, 2 and 3 show that the 1st, 2nd and 3rd stages of the UEP Theory are valid.

According to the short-term analysis findings in Table 6, in Japan, it is seen that the second stage of the UEP Theory is valid in the period after the 2008 global economic crisis and the third stage of the UEP Theory is valid throughout the 2002-2020 period. In this case, portfolio holders to trade in the Japanese market should not forget that there is a negative relationship between the foreign purchases for this country exchange (Nikkei) and the USD / YEN in the post-crisis periods. On the other hand, it should be taken into consideration that there is a positive relationship between Nikkei Stock Exchange index and USD / YEN in all periods.

It is found that no stage of the UEP Theory is valid in S. Korea. In Turkey, it is seen that the first phase of the UEP Theory is valid only in the 2002-2007 (pre-crisis) period in the short term. It is determined that the second stage of the UEP Theory is valid in the weak form (10% significance level) in the period 2002-2020. In other words, it will be beneficial for domestic and foreign investors to invest in Borsa Istanbul to consider the opposite relationship between their foreign purchases and exchange rates. The results obtained in this phase of the study, provides empirical evidence for cause-and-effect relationship between disposal strategy of the foreign investors from the stock market and exchange rates increases in Turkey.

The third phase of the UEP Theory is valid only during the crisis period. This situation, as observed in the COVID-19 period, is experienced in the form of an increase in exchange rates along with uncertainties in the economy with the support provided by the government to the firms during periods of slowdown in the economy. For this reason, it can be stated that it would be beneficial for investors to have foreign exchange in their portfolios with BIST assets.

Since the coefficients of error correction terms of all models are negative and statistically significant, error correction mechanisms of models work. Thus, it is decided that the analyzes made are reliable. The model verification tests of these estimates reveal that the analyzes are generally reliable.

6 Conclusion and Investment Decision Recommendations

Stock markets and exchange rates are the most important financial / economic indicators of the countries, and foreign investments in stock exchanges have the potential to affect these sizes closely. In this study, the validity of the fairly new UEP Theory in the literature has been tested through time series analysis. Exactly reachable data used in the analysis covers stock index, capital flows, and foreign exchange rates obtained from Japan, South Korea and Turkey belonging to 2002: M01-2020: M04 period. The analysis is carried out in four periods, as the 2008 global economic crisis is also taking place during the analyzed period, and this crisis deeply affected the financial markets of the given countries. Firstly, in order to reveal in which periods the UEP Theory is more valid, the analyzes are made for the whole period. After that for the 2002-2007, 2007-2009 and 2010-2020 periods are repeated separately.

Stationarity degrees of the series are examined by Ng and Perron (2001) unit root test, and it is seen that all series became stationary (I (1)) when the first differences are taken. The cointegration between the series in the models are examined by Phillips and Ouliaris (1990) cointegration test and the series in all models are found to be cointegrated.

Long and short term analyzes are carried out with the DOLS method, and it is observed that the first stage of the UEP Theory in Japan is valid during the 2008 global economic crisis period, and the third stage is valid during and after the 2008 global economic crisis. Only the second phase of the UEP Theory is valid in the post-2008 crisis in S. Korea. The first stage of the UEP Theory is found to be valid for the entire 2002-2020 period in Turkey, and the second stage is found to be invalid. It has been determined that the third stage of the UEP Theory is experienced in the 2008 global economic crisis and after. The results obtained from these analyzes are compatible with the works of Hau and Rey (2004, 2006, 2008), Cappiello and De Santis (2005, 2007), Dunne, Hau and Moore (2010), and Curcuru et al. (2014).

Short term analyzes are also conducted with the DOLS method, and it is observed that, in Japan, the second stage of the UEP Theory is valid in the period after the 2008 global economic crisis and the third stage of the UEP Theory is valid throughout the 2002-2020 period. It has been found that no stage of the UEP Theory is valid in S. Korea. The first stage of the UEP Theory in Turkey is only observed in the short term that applies to the pre-crisis period. Also during the 2002-2020 period, the second stage of the UEP theory is valid in Turkey, while the third stage is found to be valid in the short term.

According to the findings obtained from this study, while making long-term investment decisions, it will be useful to consider that there is a negative relationship between capital flows for the stock market and USD / YEN in the Japanese market and positive relations between the Nikkei Stock Exchange index and USD / YEN during and after the crisis. In this case, portfolio holders trading in the S. Korea market should be aware that there is a negative relationship between the foreign purchases for this country's exchange (KOSPI) and the USD / WON rate in the post-crisis periods. When BIST 100 index in Turkey increases, it will be beneficial for foreign investors to consider selling some of their shares they have in order to rebalance their

portfolios and perform profit realization. It should also be noted that the simultaneous movements in the same direction may be formed with Turkey's stock exchange.

While making short-term investment decisions, it should be borne in mind that there is a negative relationship between foreign purchases towards the stock market (Nikkei) in the Japanese market and the USD / YEN in the post-crisis periods, and it should be known that there are positive relations in general between the Nikkei Stock Exchange index and USD / YEN. In South Korea, it should be known that no stage of the UEP Theory is valid in the short term and different dynamics should be taken into consideration in this country. For Turkey, it must be known that the first stage of the UEP Theory (negative relationship between SI by CF) is valid only in the short term from 2002 to 2007 (pre-crisis) period and the second stage of the UEP Theory (negative relation between CF and the Exchange Rate) which is valid for the entire 2002-2020 period. In other words, it will be beneficial for domestic and foreign investors to invest in Borsa Istanbul to consider the opposite relationship between their foreign purchases and exchange rates. It can be said that the third stage of the UEP Theory (the positive relationship between SI and Exchange Rate) is valid only during the crisis period, so it will be beneficial to pay attention to this relationship in similar situations as well as the current COVID-19 period.

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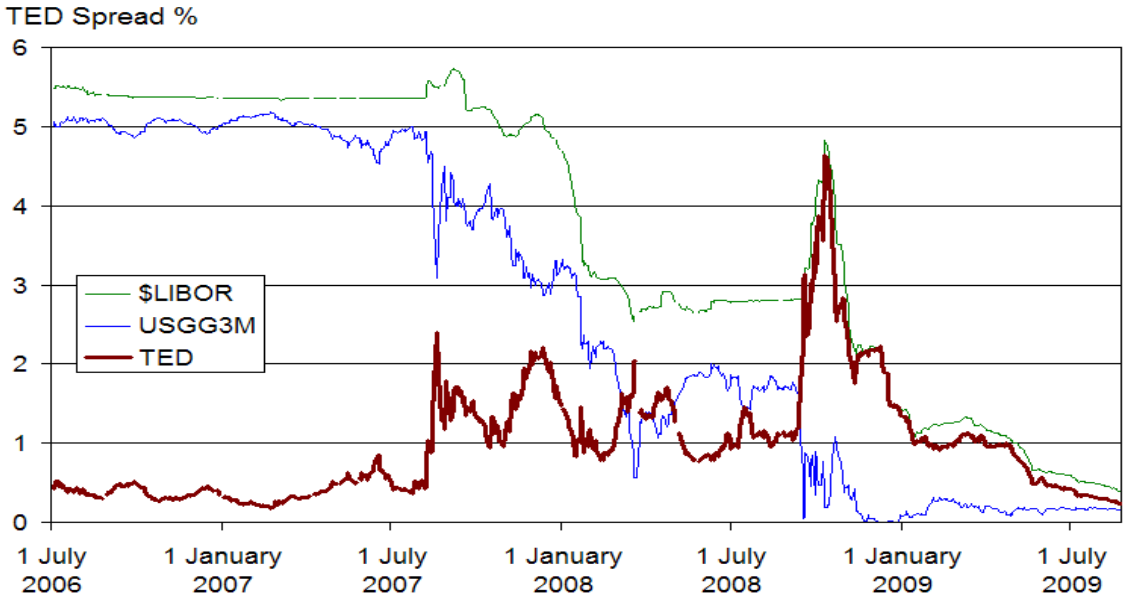
Appendix

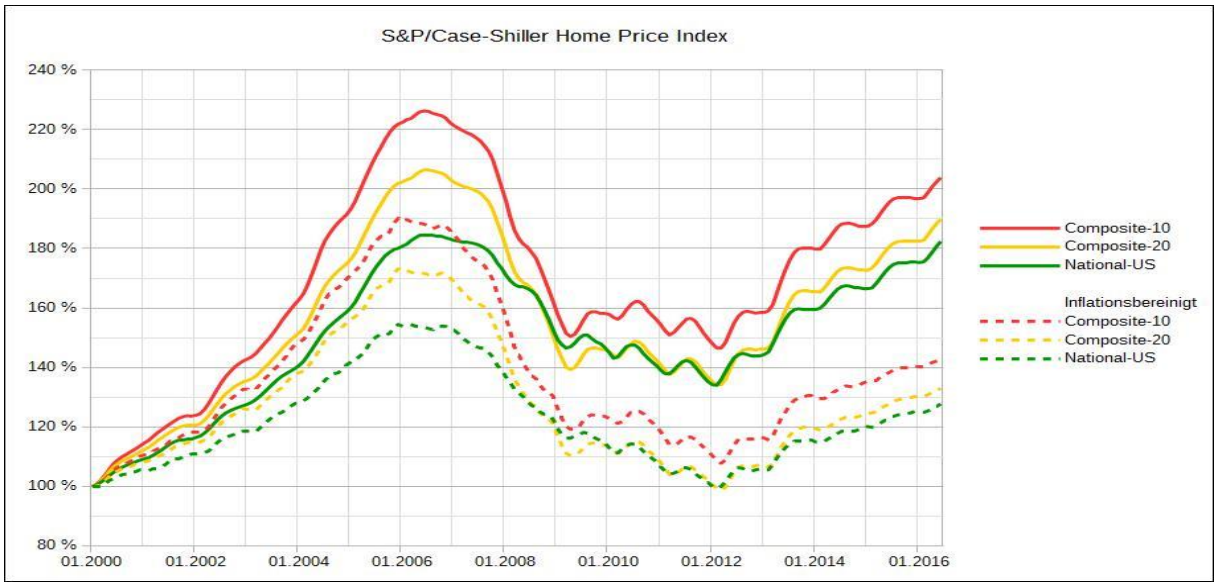
Annex 1: Graph Indicates Period that 2008 Global Economic Crisis Emerged



Source:https://en.wikipedia.org/wiki/Financial_crisis_of_2007%E2%80%932008#/media/File:TED_Spread.png.

As can be seen from this graphic, TED Spread (risk premium of US Treasury bills) has started to increase significantly since July 2007 and the first signs of the 2008 crisis have been taken. It is possible to see a similar relationship in the graph of S&P Case-Shiller index, which is used in the measurement of second-hand housing prices in the USA, included in Annex 2.

Annex 2: Case-Shiller Housing Price Index



Source: https://en.wikipedia.org/wiki/Case%E2%80%93Shiller_index