

ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL

**THE IMPACT OF CHANGE IN FOREIGN OWNERSHIP ON STOCK PRICES:
EVIDENCE FROM BORSA ISTANBUL**



M.Sc. THESIS

Ömer Abdurrahman DEMİRCAN

Department of Management Engineering

Management Engineering Programme

FEBRUARY 2024

ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL

**THE IMPACT OF CHANGE IN FOREIGN OWNERSHIP ON STOCK PRICES:
EVIDENCE FROM BORSA ISTANBUL**

M.Sc. THESIS

**Ömer Abdurrahman DEMİRCAN
(507191024)**

Department of Management Engineering

Management Engineering Programme

Thesis Advisor: Prof. Dr. Kemal Burç ÜLENGİN

FEBRUARY 2024

İSTANBUL TEKNİK ÜNİVERSİTESİ ★ LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ

**YABANCI YATIRIMCI ORANINDAKİ DEĞİŞİMİN HİSSE FİYATLARI
ÜZERİNDEKİ ETKİSİ: BORSA İSTANBUL ÖRNEĞİ**

YÜKSEK LİSANS TEZİ

**Ömer Abdurrahman DEMİRCAN
(507191024)**

İşletme Mühendisliği Anabilim Dalı

İşletme Mühendisliği Programı

Tez Danışmanı: Prof. Dr. Kemal Burç ÜLENGİN

ŞUBAT 2024

Ömer Abdurrahman DEMİRCAN, a M.Sc. student of İTU Graduate School student ID 507191024, successfully defended the thesis/dissertation entitled “THE IMPACT OF CHANGE IN FOREIGN OWNERSHIP ON STOCK PRICES: EVIDENCE FROM BORSA ISTANBUL”, which he/she prepared after fulfilling the requirements specified in the associated legislations, before the jury whose signatures are below.

Thesis Advisor : **Prof. Dr. Kemal Burç ÜLENGİN**
İstanbul Technical University

Jury Members : **Prof. Dr. Oktay TAŞ**
İstanbul Technical University

Prof. Dr. Mehmet Fuat BEYAZIT
Bilgi University

Date of Submission : 5 January 2024

Date of Defense : 15 February 2024





To my beloved ones,



FOREWORD

I'm deeply indebted to my thesis advisor, Prof. Dr. Kemal Burç ÜLENGİN for his guidance, remarks and assisting with technical, practical and theoretical aspects throughout thesis.

I would like to express my deepest gratitude to my dear family for their endless support and always encouraging me throughout my life.

I gratefully acknowledge the ideas and motivations of my dear friends Alican ALAŞIK, Şule Nur UGUR and Rana Ezgi KÖSE.

February 2024

Ömer Abdurrahman DEMİRCAN
(Management Engineer)

TABLE OF CONTENTS

	<u>Page</u>
FOREWORD	ix
TABLE OF CONTENTS	xi
ABBREVIATIONS	xii
LIST OF TABLES	xiii
LIST OF FIGURES	xv
SUMMARY	xvii
ÖZET	xix
1. INTRODUCTION	1
2. LITERATURE REVIEW	3
2.1 Effect of Foreign Investment on Economies and Stock Markets.....	3
2.2 Determinants of Stock Prices	5
2.3 Impact of Interest Rate on Stock Prices	8
2.4 Impact of Exchange Rate on Stock Prices.....	9
3. METHODOLOGY	11
3.1 Data	11
3.2 Unit Root Tests.....	17
3.3 Theoretical Model	33
4. EMPIRICAL FINDINGS	37
5. CONCLUSION	41
REFERENCES	43
CURRICULUM VITAE	47

ABBREVIATIONS

ADF	: Augmented Dickey-Fuller Tets
AIC	: Akaike Information Criteria
BIST	: Borsa Istanbul Stock Exchange
FPI	: Foreign Portfolio Investment
FS	: Foreign Share
INTR	: Interest Rate
LPR	: Logarithmic Price
AKSEN	: Ticker of the stock Aksa Enerji Uretim AS
FROTO	: Ticker of the stock Ford Otomotiv Sanayi AS
GUBRF	: Ticker of the stock Gubre Fabrikalari T.A.S.
KCHOL	: Ticker of the stock Koc Holding AS
KRDMD	: Ticker of the stock Kardemir Karabuk Demir Celik Sanayi ve Ticaret AS Class D
TAVHL	: Ticker of the stock TAV Havalimanlari Holding AS
TCELL	: Ticker of the stock Turkcell Iletisim Hizmetleri AS
TKFEN	: Ticker of the stock Tekfen Holding AS
VESTL	: Ticker of the stock Vestel Elektronik Sanayi ve Ticaret AS
YKBNK	: Ticker of the Yapi ve Kredi Bankasi AS

LIST OF TABLES

	<u>Page</u>
Table 3.1 : Results of the Unit Root Tests.	33
Table 4.1 : Results of the Long-Term Equations.	38
Table 4.2 : Results of the Short-Term Equations	39





LIST OF FIGURES

	<u>Page</u>
Figure 3.1 : BIST Annual Net Foreign Inflow/Outflow (2013-2022)	12
Figure 3.2 : BIST Monthly Net Foreign Inflow/Outflow (Dec 2020-Dec 2022)	12
Figure 3.3 : Logarithmic Prices of Stocks (Dec 2020-Dec 2022).....	13
Figure 3.4 : BIST100 Index (Dec 2020-Dec 2022).	14
Figure 3.5 : Turkey CDS (Dec 2020-Dec 2022).....	14
Figure 3.6 : Interest Rates (Dec 2020-Dec 2022)	15
Figure 3.7 : Basket Currency (USD and EUR) (Dec 2020-Dec 2022).....	16
Figure 3.8 : Foreign Shares % of Selected Stocks (Dec 2020-Dec 2022).	16
Figure 3.9 : Logarithmic Price of AKSEN.	18
Figure 3.10 : Logarithmic Price of FROTO.....	18
Figure 3.11 : Logarithmic Price of GUBRF.	19
Figure 3.12 : Logarithmic Price of KCHOL.....	19
Figure 3.13 : Logarithmic Price of KRDMD.....	20
Figure 3.14 : Logarithmic Price of TAVHL.	21
Figure 3.15 : Logarithmic Price of TCELL.	21
Figure 3.16 : Logarithmic Price of TKFEN.....	22
Figure 3.17 : Logarithmic Price of VESTL.	22
Figure 3.18 : Logarithmic Price of YKBNK.	23
Figure 3.19 : Foreign Share of AKSEN.....	23
Figure 3.20 : Foreign Share of FROTO.	24
Figure 3.21 : Foreign Share of GUBRF.....	25
Figure 3.22 : Foreign Share of KCHOL.	25
Figure 3.23 : Foreign Share of KRDMD.	26
Figure 3.24 : Foreign Share of TAVHL.....	27
Figure 3.25 : Foreign Share of TCELL.....	28
Figure 3.26 : Foreign Share of TKFEN.	28
Figure 3.27 : Foreign Share of VESTL.....	29
Figure 3.28 : Foreign Share of YKBNK.	29
Figure 3.29 : Logarithm of BIST100 Index	30
Figure 3.30 : Logarithm of Turkey's CDS.....	31
Figure 3.31 : Logarithm of Basket Currency.	31
Figure 3.32 : Interest Rate.....	32
Figure 3.33 : Dummy Variable for YKBNK.	34



THE IMPACT OF CHANGE IN FOREIGN OWNERSHIP ON STOCK PRICES: EVIDENCE FROM BORSA ISTANBUL

SUMMARY

Financial markets are closely linked in an open economy on a global scale. Individuals and institutional investors seek to optimize their risk/return curves based on their risk appetite. Diversifying their portfolio and investing abroad is essential for optimising the risk and return curve. In addition to internal factors, stock markets are exposed to external factors such as macroeconomic conditions.

Foreign investments have increased in developing countries with the financial and economic liberalization. Numerous studies emphasize that emerging stock markets benefit from foreign investments, providing advantages such as higher market efficiency, increased liquidity, more stable stock prices, improved corporate governance, reduced cost of capital, and higher information disclosure.

Turkey has become an attraction point for foreign investors like other emerging markets. While foreign investor inflows and outflows were nearly equal from 2013 to 2017, in the last five years, foreign investors have inclined towards exiting the Turkish stock market due to worsening economic conditions, such as the depreciation of the Turkish Lira, inflation, and high-risk premiums.

Because the presence of foreign investors is significant for markets, the role and impact of foreign investment on the economy and financial markets have attracted the attention of policymakers and academia. Apart from research focused on assessing the influence of macroeconomic factors on stock prices, numerous studies have delved into the correlation between stock prices and foreign investment. These studies have taken into account various macroeconomic variables, employed diverse methodologies and concentrated on different timeframes and countries.

In this study, 10 stocks traded on the Borsa Istanbul Stock Exchange were selected to investigate whether changes in foreign ownership affect stock prices and, if so, to explore the direction of the relationship. In order to evaluate the impact more accurately, 5 stocks with lower initial foreign investor ownership (AKSEN, GUBRF, KRDM, TKFEN and VESTL) were selected. The remaining five stocks with higher foreign ownership were TCELL, YKBNK, TAVHL, KCHOL and FROTO. Daily data with 545 observations were included in the analysis. The data period covers more than two years from December 2020 to the end of December 2022 to encompass periods with net foreign inflows in addition to outflows.

Considering other variables that may impact stock prices, variables such as Turkey's CDS premium, basket exchange rate, BIST100 index and interest rate were incorporated into the equations as control variables. Two equations were formulated to depict the impact of alterations in foreign ownership on stock prices over the long term and short term.

Before estimating the equations, the Augmented Dickey-Fuller (ADF) test was employed to examine the stationarity of each variable, encompassing trend and

intercept. The unit root test versions of standard and breakpoint were both applied. The test results indicated that almost all time series, including daily prices of 10 stocks and foreign ownership data, basket exchange rate, BIST100 index, Turkey's CDS and interest rates were non-stationary. With the exception of one particular case, all time series demonstrated stationarity when subjected to first-order differences. The special case for one stock was resolved by including a dummy variable in its equation.

To depict the influence of alterations in foreign ownership on stock prices over the long term and short term, two equations were formulated. Ordinary Least Squares (OLS) was used for equation estimation. In the first model, representing the long-term relationship, all variables, including changes in foreign ownership (I_1), were taken at the I_0 level instead of their first-order differences. However, the error terms needed to be stationary for the long-term relationship equation results to be valid. Therefore, an ADF test was conducted for the error terms of each stock's equation. These tests confirmed the stationarity of the error terms for all stocks in the long-term equations. In the second model, representing the short-term relationship, the first-order differences of all I_1 variables were included in the equation. Additionally, the lagged value of the error terms from the long-term equations was included as a variable in the short-term equations after checking if the requirements have met.

As per the findings of this study, a notable long-term relationship between foreign ownership and stock prices was observed for 9 out of 10 stocks. All coefficients associated with foreign ownership were positive, suggesting that a rise in foreign ownership is correlated with an increase in stock prices in the long term. Other control variables such as the basket exchange rate, Turkey's CDS, BIST100 index and interest rate also showed significant relationships with stock prices in the long term. Conversely, foreign ownership did not exhibit a significant influence on stock prices in the short term across all ten stocks. The only explanatory variable with a significant impact on price in the short term was BIST100. Additionally, variables like Turkey's CDS, basket exchange rate, and interest rate did not manifest any impact on stock prices in the short term. In other words, the effect of changes in foreign ownership on stock prices will be observed one week or ten days later, not the day after the change.

YABANCI YATIRIMCI ORANINDAKİ DEĞİŞİMİN HİSSE FİYATLARI ÜZERİNDEKİ ETKİSİ: BORSA İSTANBUL ÖRNEĞİ

ÖZET

Finansal piyasalar, küresel ölçekte açık bir ekonomide sıkı bir şekilde bağlantılıdır. Bireysel ve kurumsal yatırımcılar, risk iştahlarına bağlı olarak risk/getiri eğrilerini optimize etmeye çalışırlar. Hisse senedi, yatırım fonu, emtia veya kripto para gibi her tür yatırımın kendi içinde bir risk primi bulunmaktadır. Örneğin, varlıklarına ve gelecekteki potansiyel nakit akışlarına kıyasla yüksek miktarda borca sahip bir şirketin hisse senedi, riskli bir varlık olarak kabul edilebilirken, bazı hisse senetleri daha düşük riskte algılanabilir. Risk, ayrıca aynı piyasada bulunan benzer iki varlığı karşılaştırarak açıklanabilen iç faktörlerden kaynaklanmaktadır. İçsel faktörlere ek olarak, hisse senedi piyasaları makroekonomik koşullar gibi dışsal faktörlere de maruz kalmaktadır.

Enflasyon, reel faiz oranı, ülke ekonomilerinin büyüme oranı, istihdam ve reel efektif döviz kuru gibi makroekonomik koşullardaki değişimler yatırımcıların kararlarında etkili olmaktadır. Birçok çalışma, yatırımcıların kararları ile makroekonomik koşullar arasındaki bağlantıyı incelemek için yapılmıştır. Bu çalışmalar, uyguladıkları metodolojiye, kullandıkları makroekonomik göstergelere, araştırdıkları ülkelere ve dikkate alınan zaman dilimine göre farklı sonuçlara ulaşmışlardır.

Yabancı yatırımlar, finansal ve ülke ekonomilerindeki liberalleşmeyle birlikte gelişmekte olan ülkelerde artmıştır. Çok sayıda araştırma, gelişmekte olan hisse senedi piyasalarının yabancı yatırımlardan faydalandığını ve bu yatırımların daha yüksek piyasa verimliliği, daha yüksek likidite, daha istikrarlı hisse senedi fiyatları, daha iyi kurumsal yönetim, sermaye maliyetinde azalma ve daha yüksek bilgi sahipliği gibi avantajlar sağladığını vurgulamıştır.

Türkiye, diğer gelişmekte olan piyasalar gibi, yabancı yatırımcılar için çekim noktası olan bir pazar olmuştur. 2013-2017 yıllarında yabancı yatırımcı giriş ve çıkışları neredeyse eşit hale gelmişken, 2018'den bu yana Türk Lirası'nın yabancı para birimleri karşısında değer kaybetmesi, enflasyon ve yüksek risk primleri gibi kötüleşen ekonomik koşullar nedeniyle son 5 yılda Türkiye borsası piyasasında yabancı yatırımcılar çıkış eğilimindedir.

Hisse senedi fiyatları ile makroekonomik değişkenler arasındaki ilişkiyi incelemek için birçok çalışma yapılmıştır. Çalışmalar, araştırdıkları ülkelere, kullandıkları değişkenlere, uyguladıkları metodolojiye ve dikkate alınan tarih aralığına göre bazen farklı sonuçlara ulaştıkları görülmüştür.

Yabancı yatırımcının varlığı piyasalar için önemli olduğundan, yabancı yatırımın ekonomi ve finansal piyasalar üzerindeki rolü ve etkisi politikacıların ve akademisyenlerin dikkatini çekmiştir. Makroekonomik değişkenlerin hisse fiyatları üzerindeki etkisini araştıran çalışmalara ek olarak, farklı makroekonomik değişkenleri dikkate alan, farklı zaman dilimleri ve ülkeler için uygulanan farklı yöntemlerle birçok çalışma, hisse senedi fiyatları ile yabancı yatırım arasındaki ilişkiyi incelemiştir.

Bu tez çalışmasında, yabancı yatırımcı oranındaki değişimin hisse senedi fiyatlarını etkileyip etkilemediğini incelemek ve eğer etkisi varsa ilişkinin hangi yönde olduğunu araştırmak amacıyla Borsa İstanbul'da işlem gören 10 hisse senedi seçilmiştir. Etkiyi daha doğru değerlendirebilmek için başlangıç döneminde daha düşük yabancı yatırımcı payına sahip olan AKSEN, GUBRF, KRDM, TKFEN ve VESTL olarak 5 hisse seçilmiştir. Geriye kalan 5 hisse, daha yüksek yabancı yatırımcı oranına sahip olan TCELL, YKBNK, TAVHL, KCHOL ve FROTO'dur.

Analizde günlük veriler kullanılmıştır ve 545 gözlem bulunmaktadır. Veri dönemi, yabancı yatırımcı çıkışlarının yanı sıra net yabancı yatırımcı girişlerini içeren daha fazla dönemi dahil etmek amacıyla Aralık 2020'den başlayarak Aralık 2022 sonuna kadar iki yıldan fazla bir süreyi kapsamaktadır.

Hisse fiyatlarını etkileyebilecek diğer değişkenler olduğundan, Türkiye'nin CDS primi, Euro ve ABD Doları'nın ortalamasından hesaplanan sepet döviz kuru, BİST100 endeksi ve faiz oranı modelde kontrol değişkenleri olarak dahil edilmiştir. Bu sayede, yabancı yatırımcı oranı dışındaki diğer etkilerin kontrol değişkenleri tarafından sönmülmesi ve doğru ve daha açıklayıcı sonuca ulaşmak hedeflenmiştir.

Denklemin tahmini öncesinde her bir değişkenin durağan olup olmadığı trend ve kırılım noktasını içeren Augmented Dickey-Fuller (ADF) testi uygulanarak test edilmiştir. Bu birim kök testi hem standart hem de kırılımlı olarak tüm zaman serilerine uygulanmıştır. Test sonucunda 10 hisselerin günlük fiyatları ve yabancı yatırımcı oranı verisi ile sepet kur, BİST100 endeksi, Türkiye CDS'si ve faiz oranının neredeyse hepsi hem standard hem de kırılımlı birim kök testi yapıldığında durağan seriler olmadığı gözlemlenmiştir. Bir özel durum haricinde tüm zaman serilerinin ancak birinci dereceden farkları alındığında durağan seriler olduğu sonucuna varılmıştır. Bir hisse senedindeki özel durum ise kendi denkleminde kukla değişken dahil edilerek ortadan kaldırılmıştır.

Yabancı yatırımcı oranındaki değişimin hisse senedi fiyatları üzerindeki etkisini uzun vadeli ve kısa vadeli olarak modellemek için iki denklem oluşturulmuştur. Denklem tahmini için En Küçük Kareler Yönetimi kullanılmıştır. Uzun vadeli ilişkiyi gösteren ilk modelde, I_1 çıkan tüm değişkenlerin birinci dereceden farkları yerine kendileri yani I_0 seviyede alınmıştır. Ancak, uzun dönemli ilişkiyi gösteren denklemin verdiği sonucun geçerli olabilmesi için hata terimlerinin durağan olması gerektiğinden her bir hisse senedinin denkleminin hata terimleri için ADF testi yapılmıştır. Bu testler sonucunda tüm hisse senetleri için uzun dönemli denklemlerinin hata terimleri durağan çıktığından sonuçlar uzun dönemli denklemin geçerli olduğunu doğrulamıştır. Kısa dönemli ilişkiyi gösteren denklemde ise, I_1 olan değişkenlerin yani tüm değişkenlerin birinci dereceden farkları denkleme dahil edilmiştir. Buna ek olarak gerekli şartları sağlayan uzun vadeli denklemlerin hata terimlerinin bir dönem gecikmeli değeri kısa vadeli ilişkiyi gösterecek denklemlere değişken olarak dahil edilmiştir.

Bu çalışmanın sonuçlarına göre, 10 hisse senedinden 9'u için yabancı sahiplik ile hisse senedi fiyatları arasında uzun vadeli önemli bir ilişki bulunmaktadır. Yabancı yatırımcı payının tüm katsayıları pozitif çıkmıştır. Bu nedenle yabancı yatırımcı payının artması uzun vadede hisse senedi fiyatlarında bir artışa neden olacaktır. Sepet döviz kuru, Türkiye'nin CDS'si, BİST100 endeksi ve faiz oranı gibi diğer kontrol değişkenleri de uzun vadede hisse senedi fiyatlarıyla anlamlı ilişkiye sahiptir. BİST100'deki ve sepet kurundaki değişim hisse fiyatları üzerinde aynı yönde etkiye neden olurken, Türkiye CDS'sindeki ve faiz oranlarındaki değişim hisse fiyatları üzerinde ters yönde etki etmektedir.

Öte yandan, 10 hissenin tamamı için yabancı yatırımcı payındaki deęişimin kısa vadede hisse fiyatına anlamlı bir etkisi olmadığı gözlemlenmiştir. Kısa vadede fiyat üzerinde anlamlı bir etkiye sahip tek açıklayıcı deęişkenin BİST100 olduğu görülmüştür. Türkiye'nin CDS'si, sepet döviz kuru ve faiz oranı gibi denkleme dahil edilen dięer deęişkenler, hisse senetlerinin çoęunluğu için kısa vadede hisse senedi fiyatı üzerinde herhangi bir etki göstermemiştir.

Araştırmada elde edilen bulgulara göre iki modelin sonuçları incelendiğinde, yabancı yatırımcı oranındaki deęişiklięin hisse senedi fiyatları üzerindeki etkisi, deęişimden sonra bir veya iki gün içinde deęil, bir hafta veya on gün içinde gözlemlenecektir.





1. INTRODUCTION

Foreign investment in emerging countries has increased since the financial and economic liberalization. As in the other emerging markets, Turkey has been a market which is an attraction point for the foreign investors. Nevertheless, there has been an outflow trend of foreign investors in Turkey's stock market since 2018 because of macroeconomic conditions such as depreciated Turkish Lira, inflation and high risk premiums.

Numerous studies have been conducted to examine the relationship between equity prices and foreign investment. These studies incorporate various macroeconomic variables and apply diverse methodologies across different time periods and countries. Reviewing the literature, it is determined to examine whether the change in foreign ownership affect stock prices by selecting 10 shares in Turkey. If it has an effect, it is aimed to investigate the direction of the relation. Accordingly, 10 shares having higher market capitalization and higher traded value from Borsa Istanbul stock exchange are selected. In order to have homogenous data including difference in foreign ownership, 5 shares are selected from the sample having lower foreign investor share at the starting period which are AKSEN, GUBRF, KRDM, TKFEN and VESTL. The remaining 5 shares having higher foreign ownership are TCELL, YKBNK, TAVHL, KCHOL and FROTO. There are 545 observations which is on daily basis included in the model. The data period covers more than two years starting from Dec'20 to the end of Dec'22 to have more period that comprises net foreign inflows besides the outflows. Given the presence of other variables that might influence stock prices, Turkey's CDS, basket currency, BIST100 index, and interest rate have been included in the model as control variables. Two equations have been formulated to represent the impact of changes in foreign ownership on stock prices, encompassing both the long-term and short-term perspectives.



2. LITERATURE REVIEW

2.1 Effect of Foreign Investment on Economies and Stock Markets

As a result of financial and economic liberalization, foreign investment in emerging countries has escalated in the recent years. As neoclassical theory argues, capital should flow to countries which are capital scarce from countries having abundance of capital. Nonetheless, a growing number of developing market companies acquires assets in developed markets (Chari et al, 2009). Empirical evidence and theoretical models underscored the advantages of liberalization in fostering the development of stock markets. This process attracts foreign capital to bolster economic growth and mitigates capital costs by distributing risks between foreign and domestic investors (Li et al, 2011). Many studies conclude that local stock markets benefit from foreign investments that provide higher market efficiency, higher liquidity, more stable stock prices, better corporate governance, reduction in cost of capital and higher information disclosure (Thanatawee, 2020). Foreign investors have become a significant segment in many financial markets. As an example of 2002, 3189 firms had an average of 28% of their shares owned by foreigners in 40 markets (He et al., 2013). Because foreign investor's presence is significant for local markets, their role and effect have attracted policy makers' and academia's attention. The effect is viewed by different stream of researches. First stream is focusing on impact of foreign equity investments on productivity and growth on macro level. The second stream of studies examine liquidity, stock prices and cost of capital. Another stream of researches focuses on foreign ownership effect on the company at micro level with management and organisational development aspect. A company's performance influenced by its ownership structure. Because owners most probably have divergent goals to accomplish, performance of the firm will be influenced by their focus. Diversity in terms of owners' identity, endowments of resource and concentration have impact on determination of owners' incentives to managers, their relative power and monitoring process. (Douma et al, 2006).

According to traditional view, industry and national affiliations serve as proxies for the underlying factors that most influence international stock returns (Bartram et al., 2015). As the international finance theory points out, FPI (foreign portfolio investment) flows is substantial since investors aim to achieve higher returns and

diversifying risk of their portfolio. Diversifying the risk and achieving higher returns makes investing across countries inevitable fact. Foreign portfolio investment to developing countries has been a debated subject. Some researches argue that interest rates and economic slow down in developed countries which are called global factors push capital to developing countries. However, some other researches emphasize that credibility of country, equity index and having sufficient amount of reserves which are called domestic factors attract portfolio flows. The remaining studies have integrated view by combining external and domestic factors together. In their study, Gard and Dua (2014) examined determinants of portfolio flows on macroeconomic level in India and found out that greater risk diversification and lower exchange rate trigger the portfolio flows. Nonetheless, these flows are discouraged by higher equity returns. The performance of domestic equities, interest rate differentials, exchange rates and growth in domestic output are other conventional factors that influence portfolio movements (Gard and Dua, 2014).

India allowed FPI (foreign portfolio investment) after opening up its economy in 1992. Since then, India has attracted foreign investors through FPI rather than foreign direct investment. Higher than 50% foreign investment in India came from portfolio investment (Pal, 2006). FPI's have high volatility in nature due to informational asymmetry and herd behaviour. Portfolio flows may have negatively impact on growth of a developing country because of its instability. Higher volatility in stock markets may cause households to save less and hinder investments. In addition, foreign portfolio flows may impede exports by making pressure on exchange rates to move upward (Pal, 2006). Hao (2004) investigated effect of foreign ownership on equity returns in Japan in the period of 1991-2001. Confirming prior literature, the study found that foreign investors invested in stocks having low leverage high, large market capitalisation and high current ratio in 1991-2001. The study revealed that foreign investor share and future stock returns are positively correlated (Hao, 2004).

The research conducted by Froot et al. (2000), focusing on 44 countries from 1994 to 1998 found that foreign portfolio flows are stationary, and heavily impacted by previous returns. Additionally, portfolio inflows exhibit predictive power with a positive coefficient for equity returns in the forthcoming periods. There is also a positive and robust correlation between local stock prices and foreign inflows (Froot et al., 2000). Haider et al. (2017) investigated influence of inflation and performance of stock market on FPI (foreign portfolio investment) in 2007-2015 data period in

China by applying autoregressive distributed lag model. The results revealed that inflation is negatively related with foreign flow whereas stock performance is positively related with foreign flow (Haider et al., 2017).

The impact of foreign ownership on Borsa Istanbul have analysed in various studies. Using three-factor asset pricing model, Ceylan et al. (2015) shows that big and liquid companys' stocks having high foreign ownership and low returns don't lead to high profits. Adabag and Ornelas (2005) examine the relation between Borsa Istanbul's US dollar returns and its net foreign portfolio flow and claim strong positive correlation between them by using a VAR model. They show that Borsa Istanbul index increase when there is foreign investment inflow. Nevertheless, because net foreign portfolio flow and first difference foreign investor share is stationary, the relation is inefficient to be considered as long-run process (Adabag and Ornelas, 2005). Ulku and Ikizlerli (2015) investigate interaction between emerging stock returns and trading of foreigners by employing structural VAR model and using monthly foreign flow of Borsa Istanbul index. They find that future market returns are able to be forecasted by net foreign flows but individual stock returns are not (Ulku and Ikizlerli, 2015). Ünal (2021) investigated the connection between foreign ownership and stock returns by utilizing monthly panel data spanning the period 2015-2019 for companies listed on the BIST100 index. Based on the results, the study shows that there is not unusual return of stocks after a quarter which include change in foreign share. Change in foreign investor share affect stock prices during the change period (Ünal, 2021). Furthermore, there is no proof that informational asymmetry causes international investors to get higher earnings than local investors (Ünal, 2021).

2.2 Determinants of Stock Prices

Financial markets are closely linked in an open economy on global scale. Individuals and institutions seek for optimising their risk/return curve depending on their risk appetite. Each type of investment whether it is stock, mutual fund, commodity or cryptocurrency has a risk premium in itself. To exemplify, a stock of a company having high amount of debt compared to its assets and future potential cash flows can be assumed a risky asset while some stocks might be perceived with lower risk. The risk is sourced by internal factors which can be explained by the analysis by comparing

two similar assets in the same market. In addition to indigenous factors, stock markets are exposed to exogenous factors such as macroeconomic conditions.

Numerous studies have been conducted to investigate the relationship between equity prices and macroeconomic variables. The studies are concluded different results according to the methodology they applied, macroeconomic indicators they used, countries investigated and period of time considered. Kandir (2008) created a macroeconomic model to examine impact of macroeconomic factors on return of stocks for almost 8 years starting from 1997 to 2005. Kandir (2008) designed a multiple regression model incorporating seven macroeconomic variables as independent variables and stock portfolio returns as the dependent variable. The macroeconomic variables employed in his study include the growth rate of money supply, change in exchange rate, growth rate of crude oil prices, industrial production growth rate, change in consumer price index, interest rate, and the return on MSCI World Index as a representation of the global stock market. Kandir's (2008) study revealed that exchange rate, world equity market and interest rate seem to have impact on returns of the all portfolios while inflation rate seem to affect only three out of twelve portfolios. Money supply, industrial production, and oil prices did not demonstrate a significant impact on the returns of the stocks (Kandir, 2008).

It has been extensively studied that ability of stock prices whether they keep their purchasing power stable in the long term against inflation. Fisher (1930) stated that existing information about the potential future inflation rate is entirely reflected in the nominal interest rate. In other words, Fisher effect claims that financial assets' projected nominal interest rate should increase in step with inflation expectation. Firth (1979) investigated the relationship between inflation and returns of the UK stock market supporting Fisher effect. His study concluded there was some inflation hedging provided by the stock market. However, the results presented a contrast to a study in the U.S. that posits a significant and negative relationship between expected inflation and the stock market (Firth, 1979). Anari and Kolari (2001) examined short-term and long-run effects of inflation on stock returns by considering Consumer Price Indices (CPIs) and stock prices of six countries. The sample included Canada, UK, Germany, Japan, France and US starting from 1953 to 1998. They employed an alternative approach to measure long term Fisher effect which is using stock prices instead of stock returns and goods prices instead of inflation rate (Anari and Kolari, 2001). As stock returns and inflation rates are essentially first differences of stock and goods

prices, they eliminate information in the long run in time series analysis. Anari and Kolari (2001) found out consistent results with prior researches that inflation negatively affects stock prices in the short term while relationship between goods prices and stock prices is positive in the long-run. Gultekin (1983) investigated the relationship between inflation and stock returns for postwar period from 1947 to 1979 in twenty six countries. He employed time series regressions and discovered that there is no positive and significant relation between inflation rates and stock returns for the period. The relation of stock return and inflation differs among countries and not stable over time. Countries having higher inflation rate usually have higher return of stocks in nominal but declining real rates (Gultekin, 1983). A study investigated the relationship between the current stock market and current inflation in four high-inflation countries: Argentina, Chile, Mexico, and Venezuela, spanning the period from 1981 to 1998 (Choudhry, 2001). As a unit root test KPSS test was applied and GPH test implemented. Choudhry (2001) claimed that there is one-to-one and direct relation between nominal returns and current rate of inflation which indicates stocks can be seen as a hedge instrument against inflation. Under conditions of high inflation, it is plausible that there may be a positive relationship between inflation and stock returns (Choudhry, 2001). In contrast to Fisher's theory, negative impact of current and expected inflation on real returns is possible (Choudhry, 2001).

Hooker (2004) investigated what extent predict emerging market returns with several macroeconomic indicators by applying Bayesian model approach. Several macroeconomic factors added into model were; GDP forecast change, two-month lagged inflation rate, change in exchange rate, local interest rate, real interest rate, price/earnings ratio and price/book ratio. Aside from exchange rate fluctuations, the data offered compelling evidence against all of the macro indicators taken into account. Consistent with prior research, the findings provided strong support for multiple financial variables, but not beta, as significant indicators of excess returns (Hooker, 2004). Ben Naceur et al., (2007) conducted a study to see the influence of macroeconomic determinants on stock markets of twelve countries in the North African and Middle-Eastern region. The study employed GDP, saving rate, investment rate, money supply, financial intermediary (credit to the private sector), stock market liquidity, and inflation change as explanatory variables. Rather than the substitutes, stock markets and financial intermediaries are complements in the process of growth. The research also identified that the investment rate and GDP are not significant for

stock market development, whereas the saving rate, financial intermediary, stock market liquidity, and inflation were proven to be significant determinants (Ben Naceur et al., 2007).

Bernoth and Colavecchio (2014) examined macroeconomic determinants of stock investment covering 16 countries from Central Eastern Europe (CEE) and West Europe (WE) for ten years starting from 2001 to 2011. They incorporated numerous indicators under four subgroups, namely economic environment, financial environment, labor market environment, and political, legal, and social environment. In detail, their analysis involved growth rate of GDP, GDP per capita, inflation rate, unemployment, short-term interest rate, corporate tax rate, growth rate of MSCI, trade union density, employee protection, productivity, labour cost, government effectiveness, political stability etc. (Bernoth and Colavecchio, 2014).

2.3 Impact of Interest Rate on Stock Prices

Interest rates are fundamental indicators for individuals and corporations while calculating risk and opportunity cost before making an investment decision. Choi and Jen (1991) investigated all stocks listed on the AMEX and NYSE to see what extent the expected returns of stocks are related to risk depending on short-term interest rates. While not adequately represented in the single-factor market risk, interest rate risk for small businesses emerges as a significant source of portfolio risk for investors. Large enterprises are exposed to negative interest-rate risk since their actual risk is underestimated based on the market risk calculated using the single-factor approach (Choi and Jen, 1991). Choi and Jen (2001) also claimed that the difference in AMEX and NYSE's expected returns are largely explained by the interest rate risk premium. Hussainey and Khanh (2009) examined the effects of domestic and international macroeconomic indicators as industrial production and interest rate on Vietnamese stock prices. The research provided that there are significant relations among money markets, domestic production and Vietnamese stock prices. Additionally, US macroeconomic indicators has noteworthy impact on stock prices in Vietnam. The study concluded that short-term interest rates have a positive effect on Vietnamese stock prices, whereas the effect of long-term interest rates is in the opposite direction (Hussainey and Khanh, 2009).

2.4 Impact of Exchange Rate on Stock Prices

Changes in exchange rates may have an impact on stock prices, as continuous depreciation or appreciation of the local currency has the potential to induce inflation or disinflation over time. Besides inflation or disinflation effect, foreign investors' demand may vary due to change in stock prices in terms of their currencies in nominal term in the short run. To exemplify, a depreciation in local currency may lead to higher foreign demand and sales. A decline in local currency against foreign currencies would increase the worth of an exporting company. In contrast, the sensitivity to change in exchange rate of a firm value for importing firm is the opposite. Even the domestic firms having low international activities can be exposed by exchange rate if their output and input prices or demand of products are impacted by fluctuations of exchange rates (Adler and Dumas, 1984). On the other hand, fluctuations on stock prices can affect the exchange rates. A country's demand for its currency rises in response to a thriving stock market, which also draws capital inflows from overseas investors (Pan et al., 2007). Consequently, declining stock prices are associated with depreciation in exchange rates and vice versa. In addition, due to the gain foreign investors trying to benefit from international diversification, foreign investments in a country on stocks may rise over time (Pan et al., 2007). Currency appreciation has a positive impact on the local stock market of an import-dominant country, while it has a negative effect on the local stock market of an export-dominant country (Ma and Kao, 1990). Pan et al. (2007) studied relation between stock markets and foreign exchanges in Japan, Korea, Malaysia, Taiwan, Singapore, Hong Kong and Thailand. In terms of their economy they are different in size, rate of growth and degree of development. Furthermore, the group of countries also differ in terms of capital control and market liberalizations (Pan et al., 2007). Singapore, Japan and Hong Kong have less or no restrictions in their equity markets for foreign investments while Taiwan, Thailand, Korea and Malaysia don't have a entirely accessible stock market to foreign investors. Pan et al. (2007) asserted that there is a significant causal relationship from stock prices to exchange rates for every country, except Malaysia. They also noted that relation may differs across countries depending on trade size, size of stock market, regime of exchange rate and degree of capital control. Furthermore, a study examined the linkage between exchange rates and stock market prices of six developed countries or economies Japan, Eurozone, Switzerland, Canada, UK and the US in the time period

of banking crisis from 2007 to 2010 (Caporale et al., 2014). The UEDCC-GARCH model they applied indicated that there is short-term unidirectional Granger causality from stock returns to changes in exchange rates in the UK and the US, while it is the opposite in Canada and bidirectional in Switzerland and the Eurozone (Caporale et al., 2014). Given the fact that currencies of investigated countries are the most actively traded, their power during the banking crisis might have been a significant factor in generating capital outflows and inflows. Caporale et al., (2014) explained the trade amount of currencies might be one of the reasons for disparate findings when examining how stock returns and fluctuations in exchange rates interact in various economies. Investors cannot effectively use stock prices and exchange rates as tools for diversification and portfolio hedging strategies, as research has shown a substantial correlation between them within national economies (Caporale et al., (2014).

3. METHODOLOGY

3.1 Data

Foreign investment in developing countries has prompted extensive research investigating the effects of foreign investment on both the stock market and the overall economy of the country in recent years. Among the developing countries, Turkey has a special case in terms of attracting foreign investors because of volatile local currency and worsening various macroeconomic variables in the last few years. As a result, the scope of the study is confined to Turkey's stock market.

10 stocks selected among 30 companies which were on the BIST30 list effective from 2022 October 1st to December 31st 2022. Since, they had higher traded volume and market capitalization with lower volatility, they were on the BIST30 index list. The selection is made between two groups based on foreign ownership value at the starting of the period. 5 stocks having highest foreign ownership in BIST30 list selected which are FROTO, KCHOL, TAVHL, TCELL and YKBNK. In contrast, 5 stocks having lowest foreign ownership in BIST30 list selected which are AKSEN, GUBRF, KRDMMD, TKFEN and VESTL.

Data covers almost a period of more than 2 years starting from beginning of Dec'20 to the end of Dec'22. Dec'20 is included to balance the sample with net foreign inflows because the data include outflows more than the inflows. Therefore, it is aimed to have more accurate results with two trends involved.

Reference interest rate in Turkey, Turkey's CDS, basket currency against local currency TL and BIST100 index are selected as control variables which may have impact on stock prices discussed in previous section to absorb other effects and have clear understanding.

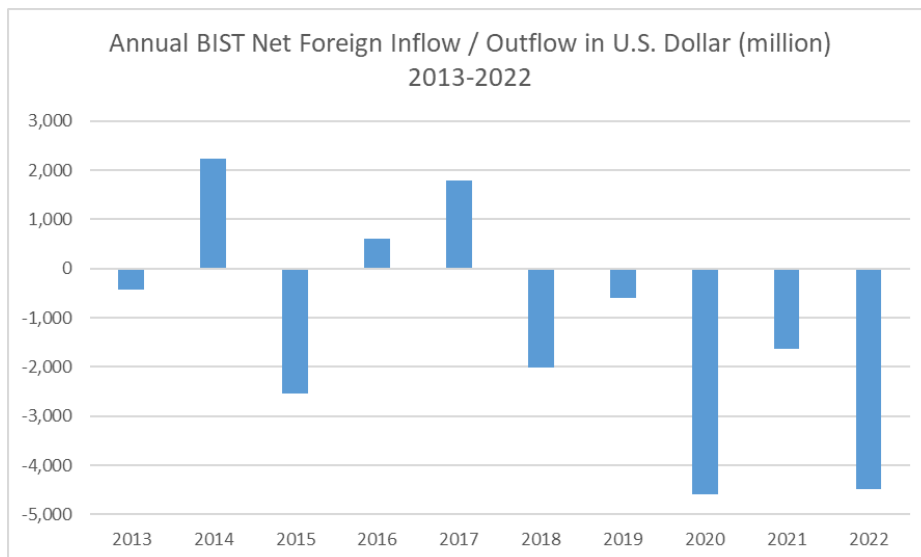


Figure 3.1: BIST Annual Net Foreign Inflow/Outflow (2013-2022)

Figure 3.1 exhibits Borsa Istanbul had net foreign inflow only in 2014, 2016 and 2017 over the last ten years (Url-1, 09.08.2023). Since 2018, there was no net foreign inflow for 5 years. In the first six-year period which is between 2013 and 2018, foreign investment is almost neutral with similar amount of inflow and outflows without any trend. Thereafter foreign investors continued to sell with higher amount of stocks in the upcoming years.

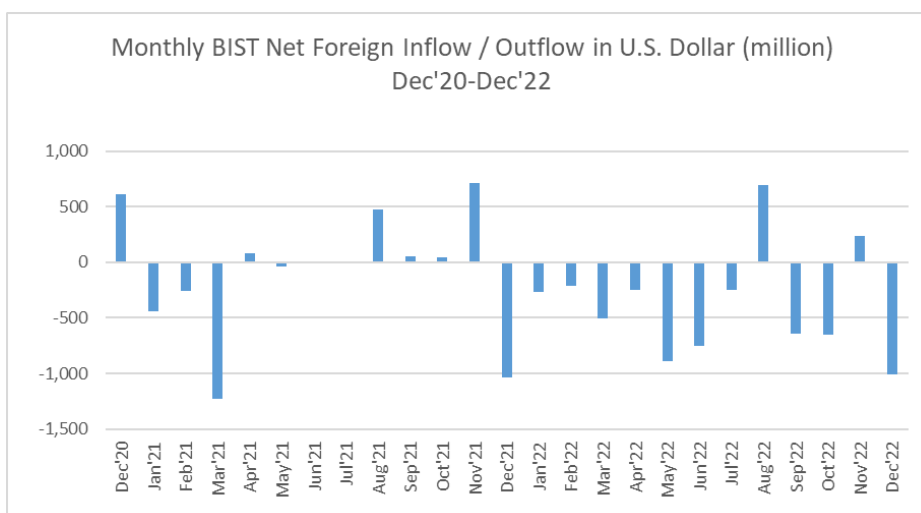


Figure 3.2: BIST Monthly Net Foreign Inflow/Outflow (Dec 2020-Dec 2022)

Figure 3.2 shows monthly net foreign inflow or outflows in terms of US Dollar (Url-1, 09.08.2023). The trend is similar to the Figure 3.1 showing annual net foreign flows with many net outflows and a few net inflows. The data of the model is decided to be started from the beginning of Dec'20 to the end of 2022 in order to have more

homogenous data thus more accurate results with two scenarios which are net inflows and outflows included.

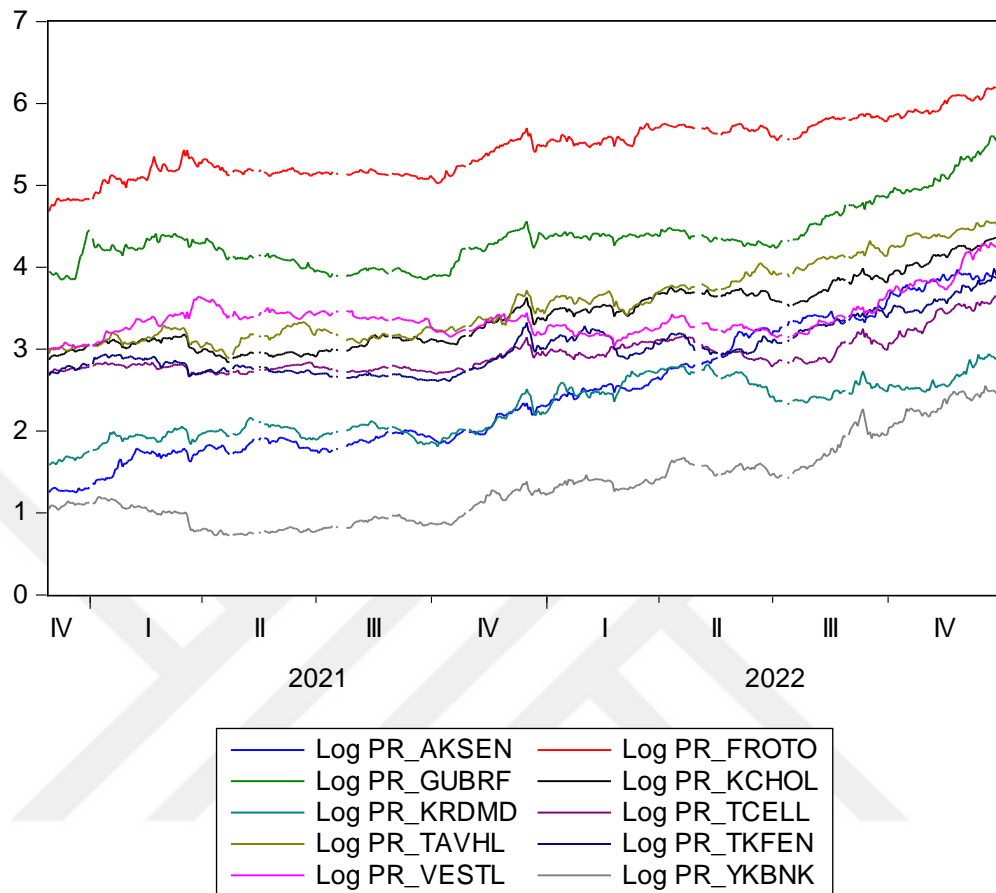


Figure 3.3: Logarithmic Prices of Stocks (Dec 2020-Dec 2022)

Figure 3.3 reveals that none of the stock prices has sharp break within the period (Bloomberg L.P., 2023). Although there are slight decreases or different increase or decrease rates for a short period, the overall trend is upward. Logarithm of price data is taken into consideration in the model to provide more precise representation of data in the same scale and it is more applicable in volatile markets for interpretation and comparability.



Figure 3.4: BIST100 Index (Dec 2001-Dec 2022)

As the Figure 3.4 displays, BIST100 index had a relatively stable period in the first three quarters of 2021. Since then, the index started to climb up and reached new peaks in almost every quarter. Following some sharp rises, index dropped but continued to rise after a while and compensated its loss.

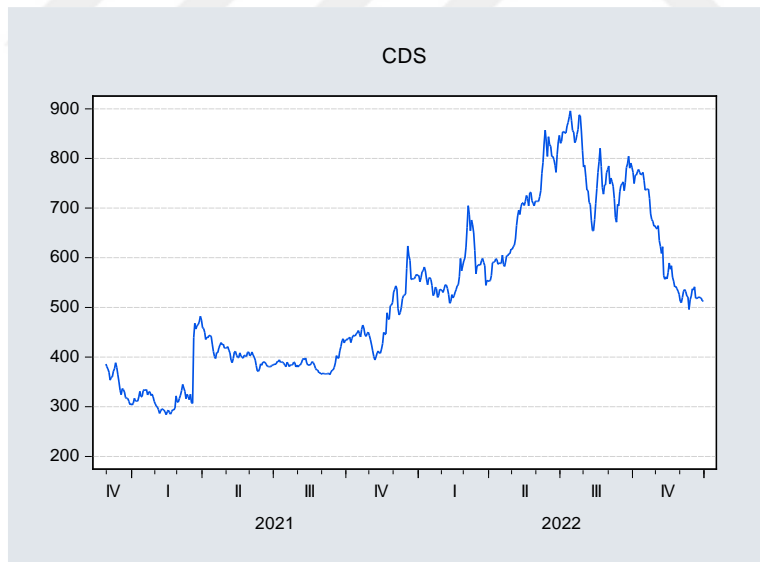


Figure 3.5: Turkey CDS (Dec 2020-Dec 2022)

Figure 3.5 suggests that Turkey's CDS value was at the lowest level of 300 in the specified period. However, there was a sharp increase through the end of Q2'21. Then the CDS level remained stable by deviating around 400. Then it started to rise and reached a peak of 900 in the midyear of 2022. After the peak, Turkey's CDS dropped 500 levels in the last quarter of 2022.

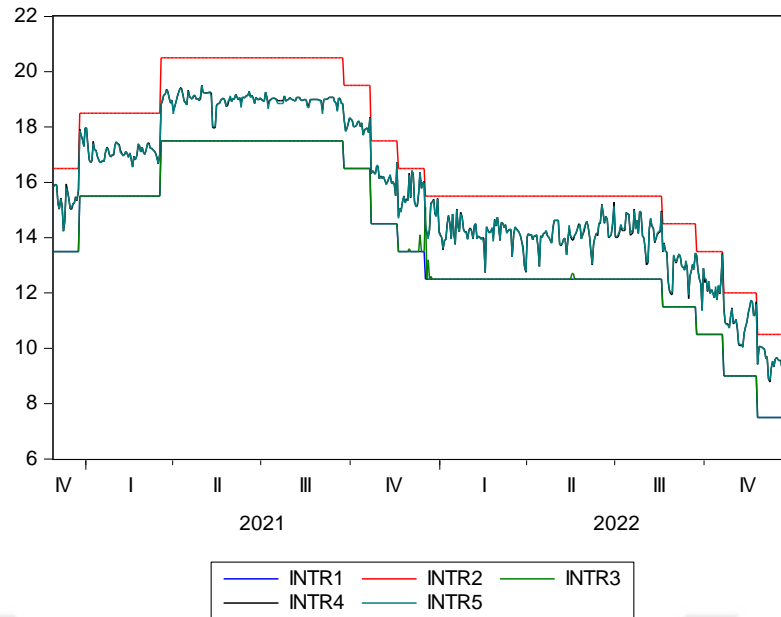


Figure 3.6: Interest Rates (Dec 2020-Dec 2022)

The Figure 3.6 includes five different interest rates (Bloomberg L.P., 2023). Intr1 int2 and int3 are CBT's different rate of interests. Intr1 is CBRT Turkish Interbank Rates Lira Overnight whereas Intr2 is the lending overnight rate. Intr3 is CBRT simple interest rate weighted average (overnight). Intr1 int2 and int3 is constant over some period of time. Intr4 and intr5 are retrieved from Borsa Istanbul's database (url-4, 22.03.2023). Intr4 and intr5 are Turkish Lira Overnight Reference Rate which is daily and not constant over some period of time unlike first three interest rates. Trend of Int4 and int5 are almost the same. Int4 is called TLREF rate and calculated with the methodology determined by the committee involving Borsa İstanbul, CBRT, İstanbul Settlement and Custody Bank, Turkish Capital Markets Association and The Banks Association of Türkiye. Therefore, intr4 is selected as the interest rate explanatory variable.

The Figure 3.6 represents five different interest rates in percentage which all have similar trend with different data intervals. The rates started the period around 14-16% and rapidly increased almost 400 bps, and remained stable for 2 quarters in 2021. After that the line transformed into downward trend and remained constant for longer than 2 quarters in 2022. The interest rates started its decline period and continued almost 2 quarters with almost 500 bps decrease on average.



Figure 3.7: Basket Currency (USD and EUR) (Dec 2020-Dec 2022)

Figure 3.7 shows the basket currency, which is simple average of USD/TL and EUR/TL, published by CBRT (Url-3, 09.03.2023). The basket currency had upward trend with a sharp increase through the end of 2021. Following the currency shock was in Dec'21 currency protected time deposits launched and TL was appreciated.

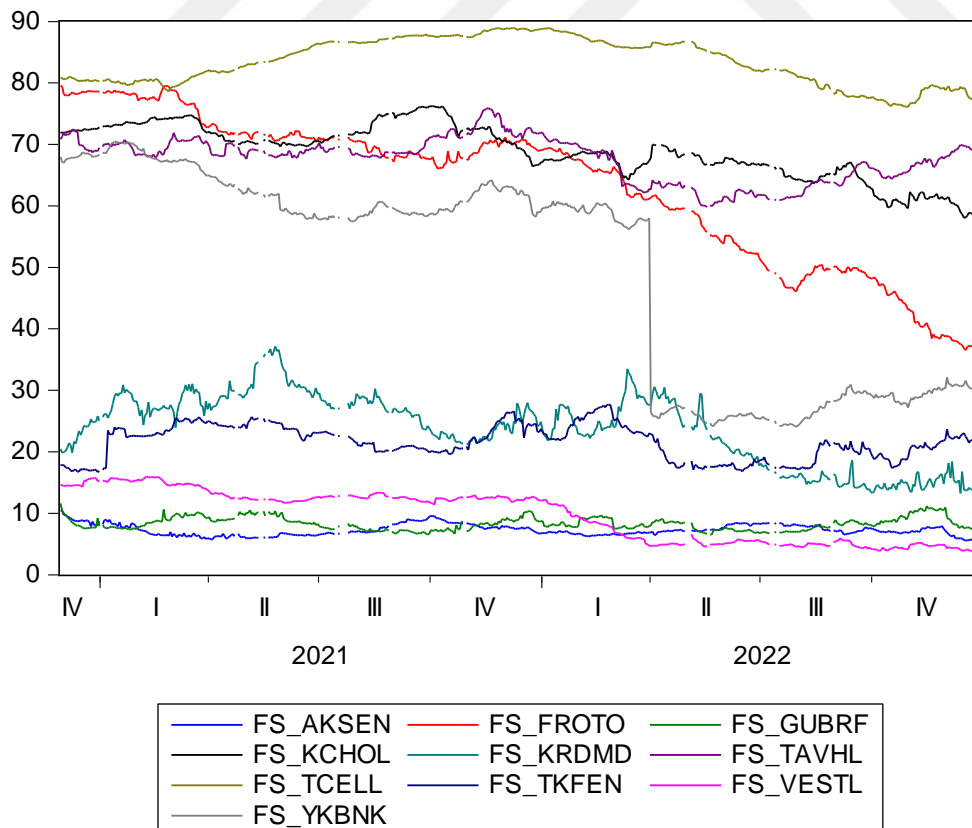


Figure 3.8: Foreign Shares % of Selected Stocks (Dec 2020-Dec 2022)

Figure 3.8 points foreign share of 10 stocks in percentage (Url-2, 01.02.2023). The foreign share refers to the ratio of shares held by foreign owners to the floating shares of the firms. TCELL had the highest foreign share among 10 stocks while VESTL, AKSEN and KRDMMD was the stocks having three lowest foreign investor share. TCELL's foreign ownership was 89% in the beginning of the period and decreased to 76% in 2022. Foreign share of YKBNK dropped in April 2022 due to the selling off shares. On 31.03.2022, the share decreased to 26.45% from 57.99%.

In accordance with Figure 3.8, overall trend for foreign ownership is mixed with downward or stable. Among 10, TKFEN is the only stock that increased its foreign share from 15% to 20% within two years.

3.2. Unit Root Tests

Financial time series and economic indicators may exhibit non-stationarity in the mean or trending behaviour. Time series of each variable needs to be tested whether they have constant variance and mean over time. A time series having a unit root implies that it is non-stationary and exhibits a pattern that is unpredictable. If a time series has a trend, trend removal is required which will be first differencing in this case. Therefore, unit root tests are essential for model estimation to get reliable test statistics (Tsay, 2005).

Augmented Dickey-Fuller Test (ADF) which is valid in large samples and more common is selected. The ADF test is applied with the version including intercept and trend in test equation. Since the sample is large with more than 500 observation and comprehensive method is required, AIC (Akaike Information Criteria) is selected for the lag length.

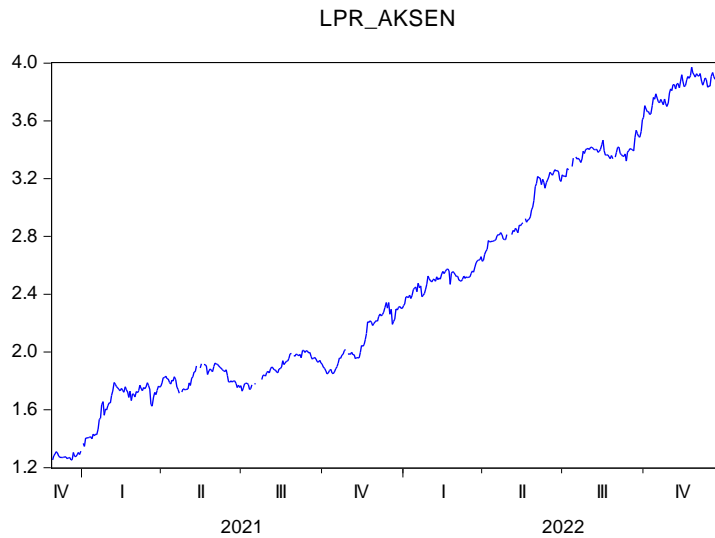


Figure 3.9: Logarithmic Price of AKSEN

As the Figure 3.9 suggests, logarithm of the AKSEN price has an increasing trend overall in the period starting from end of 2020 for 2 years.

As a standard unit root test, the Augmented Dickey-Fuller Test is applied, and it is found that the first difference of the LPR_AKSEN is stationary, as suggested by the graph. There are slight increase and decreases over the time but resulted in I_1 in the breakpoint unit root test as well.

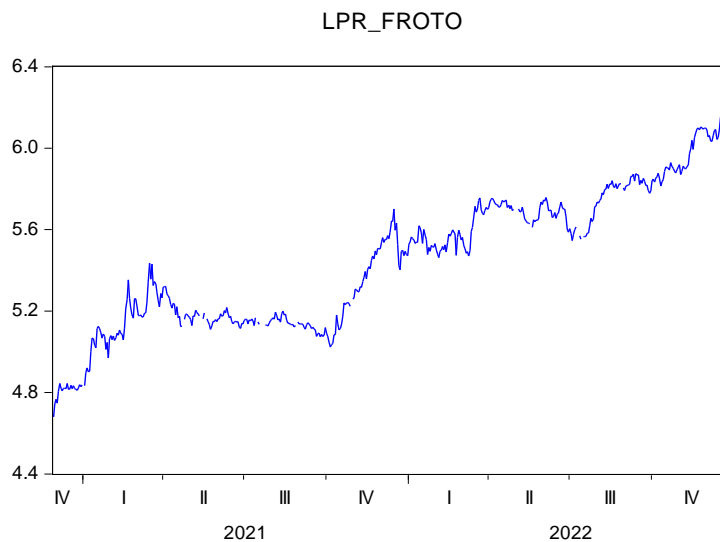


Figure 3.10: Logarithmic Price of FROTO

In accordance with Figure 3.10, logarithm of the FROTO price has an upward trend with different behavior during specific periods such being steady in second and third quarters of 2021. Thereafter, there is a sharp increase through the end of 2021 which may be signal of breakpoint. According to the applied standard unit root and

breakpoint unit root tests, LPR_FROTO is the I_1 , that is, time series itself is not stationary, but its first difference is stationary. Consequently, even there is a sharp decrease which resembles breakpoint, breakpoint unit root test printed the same result.

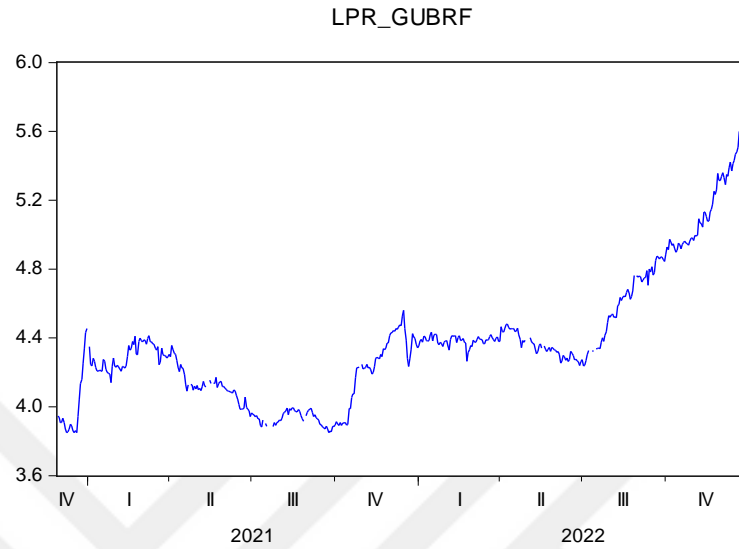


Figure 3.11: Logarithmic Price of GUBRF

Figure 3.11 shows that logarithm of GUBRF price has different trending behaviours over the period. It has an increasing trend in second and fourth quarter of 2022 but fluctuating in first and second quarter of 2021 and 2022 years. Nevertheless, both standard unit root and breakpoint unit root tests concluded that LPR_GUBRF is not stationary but its first difference is stationary.

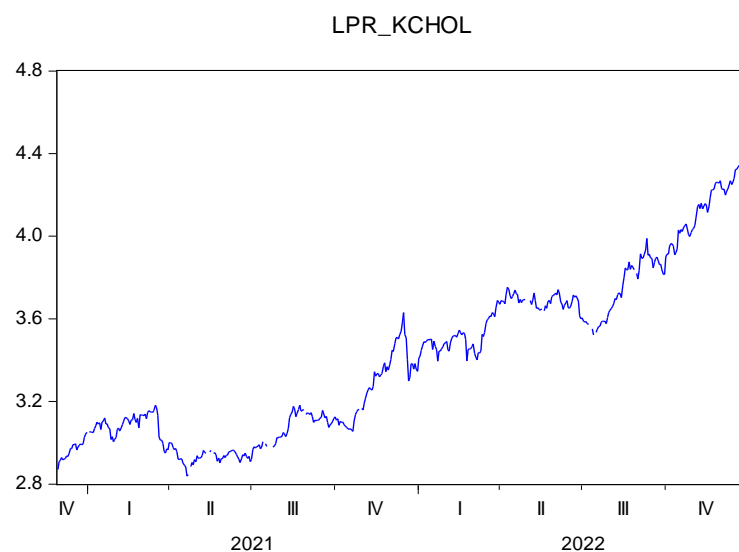


Figure 3.12: Logarithmic Price of KCHOL

As Figure 3.12 demonstrates, logarithm of KCHOL price has an upward trend in general. LPR_KCHOL is a non-stationary time series according to ADF standard unit root test yet its first difference is stationary. Although there are sharp decreases in the first and fourth quarter of 2021, LPR_KCHOL is I_1 based on breakpoint unit root test results.

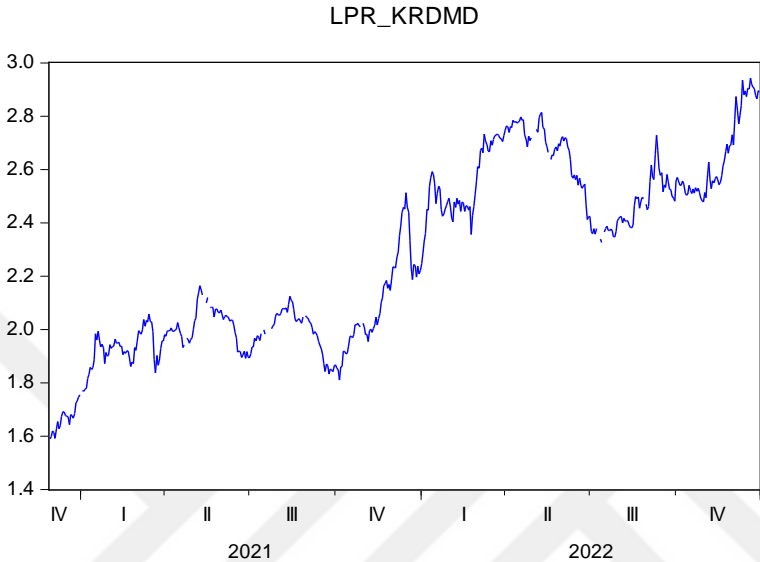


Figure 3.13: Logarithmic Price of KRDMD

Figure 3.13 indicates that logarithm of KRDMD price has distinct behaviour compared to previous time series. The trend is upward like others but more fluctuated. Standard unit root tests and breakpoint unit root tests proved that LPR_KRDMD is I_1 series despite sharp decrease and increases during the period.

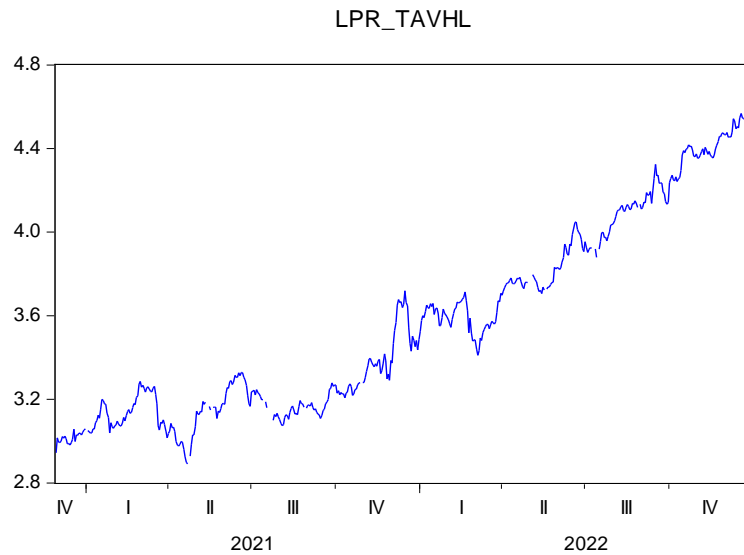


Figure 3.14: Logarithmic Price of TAVHL

According to Figure 3.14, logarithm of TAVHL price moved upward except several cutbacks in 2 years. In line with expectations, standard and breakpoint unit root tests concluded that LPR_TAVHL is I_1 which means its first difference is stationary.

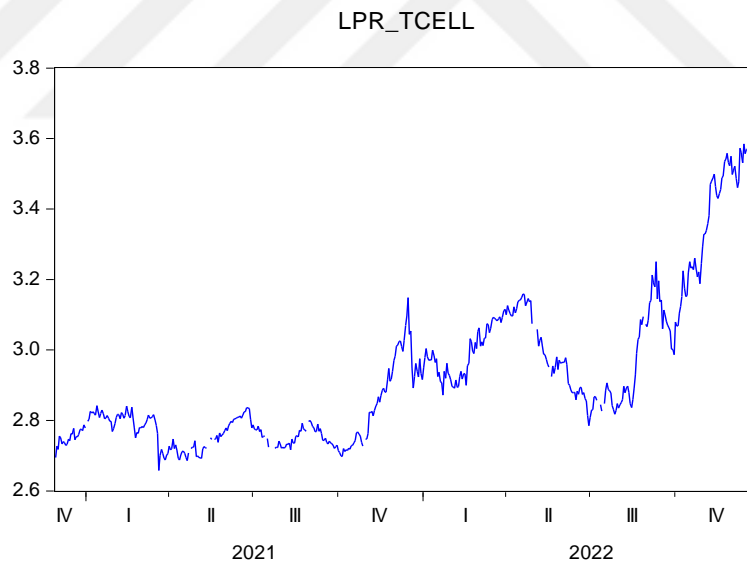


Figure 3.15: Logarithmic Price of TCELL

The Figure 3.15 exhibits logarithm of TCELL price remained steady in the first three quarters of 2021 then started growing. In the second quarter of 2022, it decreased thereafter started its upswing. Even though there is steady period and some breaks within two years, both standard and breakpoint unit root tests indicated that LPR_TCELL is I_1 .

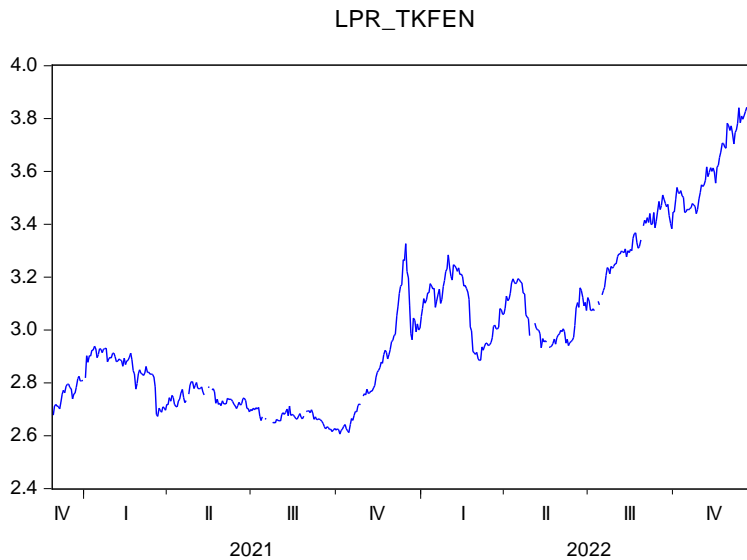


Figure 3.16: Logarithmic Price of TKFEN

The Figure 3.16 displays that logarithm of TKFEN price has increasing trend after fourth quarter of 2021 but remains steady in the first three quarters of 2022. There is sharp decrease and increases in the fourth quarter of 2021 and first quarter of 2022. Despite the breakdowns and stability in the beginning, the first difference is deemed stationary based on the results of both standard and breakpoint unit root tests.

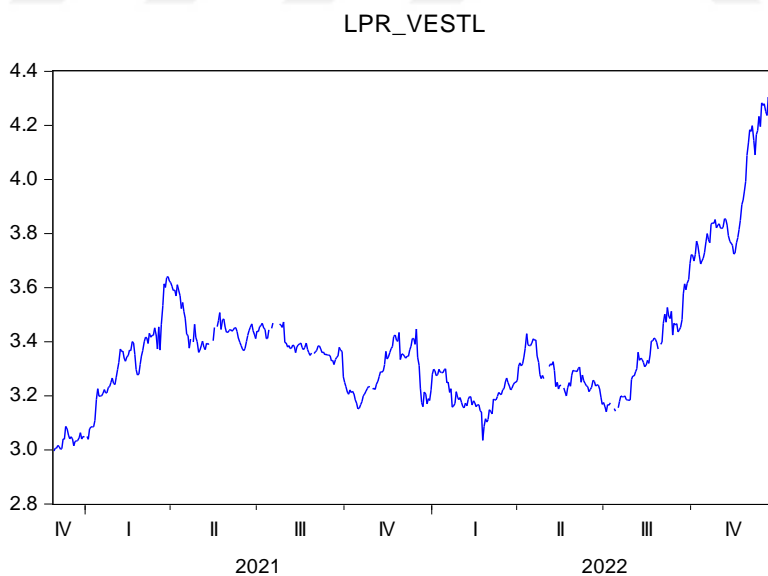


Figure 3.17: Logarithmic Price of VESTL

Figure 3.17 shows that logarithm of VESTL price deviated around 3.0 and 3.4 in the first six quarters of the period. After that started to grow rapidly. The graph may resemble stationary because of the long and steady period except the last two quarters.

However, LPR_VESTL itself is non-stationary and its first difference is stationary according to standard and breakpoint unit root tests.

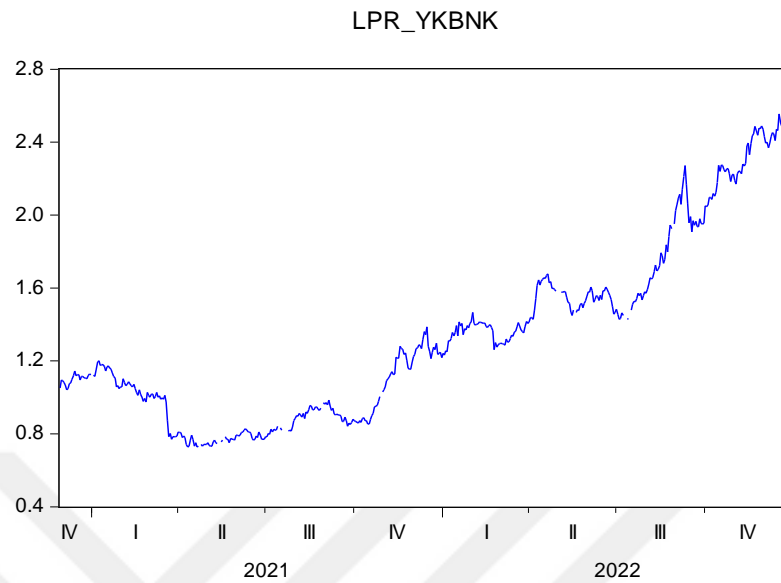


Figure 3.18: Logarithmic Price of YKBNK

Figure 3.18 suggests that logarithm of YKBNK price has an upward trend started in fourth quarter of 2021. LPR_YKBNK has a sharp decline through the end of 2021's first quarter. Nevertheless, LPR_YKBNK is stationary at I_1 level according to both standard and breakpoint unit root tests.

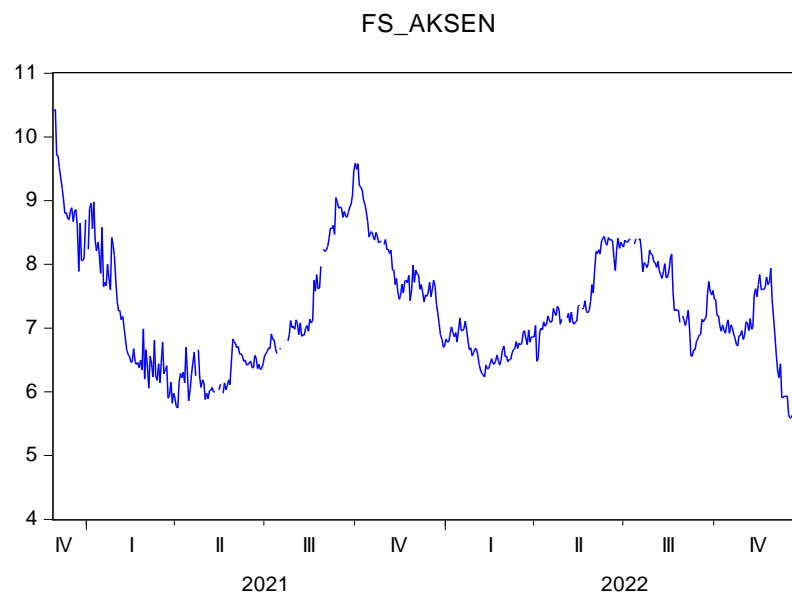


Figure 3.19: Foreign Share of AKSEN

In accordance with Figure 3.19, AKSEN’s foreign share decreased over time. In the first two quarters the share decreased, then remained steady. After that, it started to increase and reached a peak of the last few quarters. The foreign share ratio deep into incline phase after the second quarter of 2022. Standard unit root and breakpoint unit root test applied and found that FS_AKSEN is stationary at I_1 level.



Figure 3.20: Foreign Share of FROTO

Figure 3.20 demonstrates that FROTO’s foreign share has obvious downward trend without any sharp up and downs in the period. FS_FROTO is stationary at I_1 level based on the results of standard and breakpoint unit root tests.

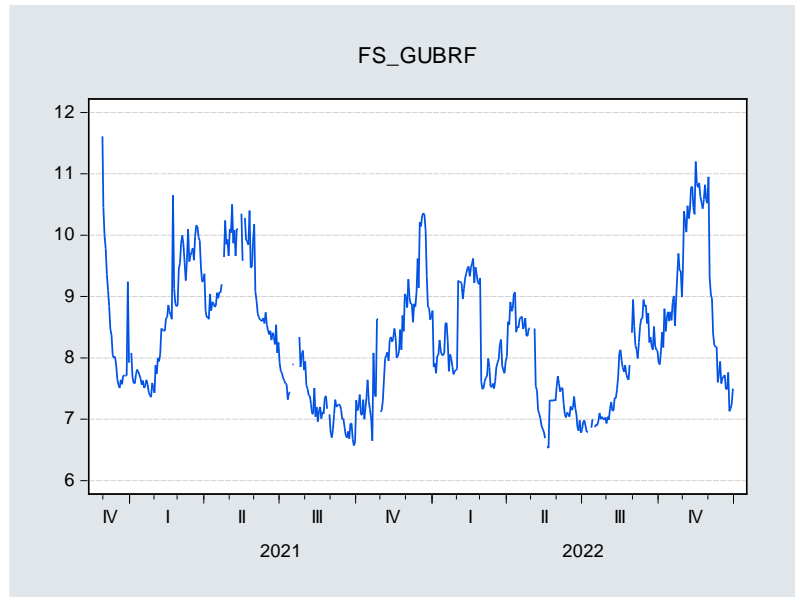


Figure 3.21: Foreign Share of GUBRF

As Figure 3.21 indicates, GUBRF’s foreign share has dissimilar trend deviating around 7 and 11. It may resemble a non-stationary time series in the first look. Standard unit root test is performed at level I_0 and resulted a t-statistic in between test critical values of 5% and 1% levels. Since the t-statistic value is on the boundary and breakpoint unit root test resulted in I_1 , it is accepted that FS_GUBRF is stationary at I_1 level.



Figure 3.22: Foreign Share of KCHOL

According to Figure 3.22, KCHOL’s foreign share has downward trend started 72 to below 60 level. After a decline period in the first quarter of 2021, it increased to a peak

within the data period. After that, it is started to decrease from 76 to 58. FS_KCHOL's first difference is stationary while the time series itself is non-stationary according to applied standard and breakpoint unit root tests.

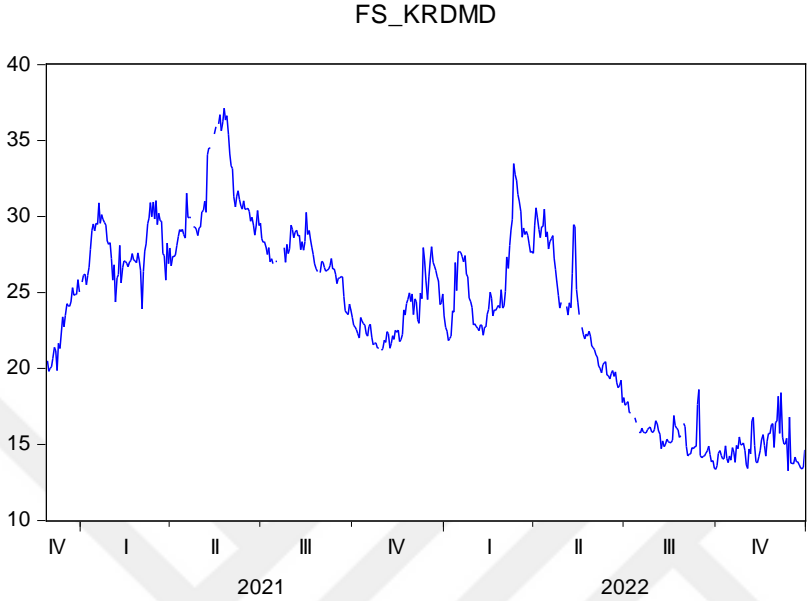


Figure 3.23: Foreign Share of KRDMD

As Figure 3.23 exhibits, KRDMD's foreign share has growing trend and reached the peak in the first two quarters of 2021, then has decline phase till end of the period. There are sharp incline and declines through the period which may indicate breakpoints. However according to both tests which are standard and breakpoint unit root, FS_KRDMD is stationary at I1 level.

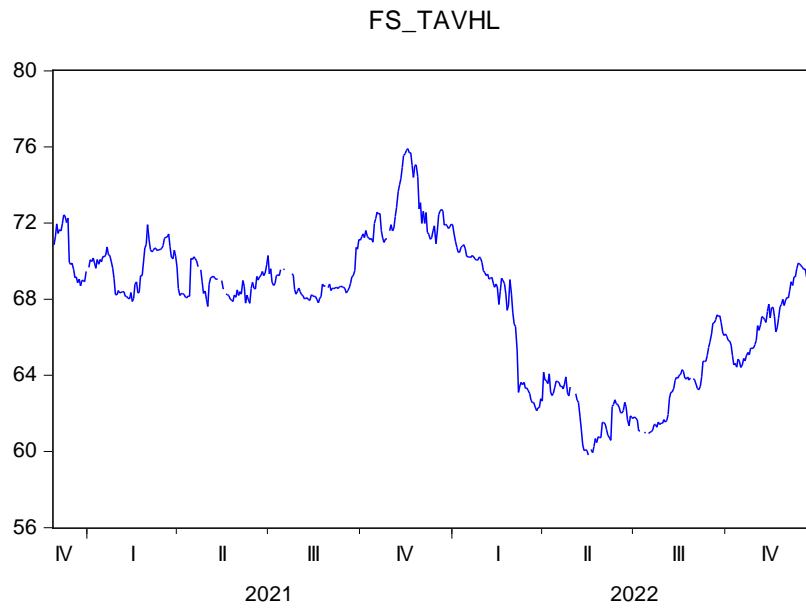


Figure 3.24: Foreign Share of TAVHL

Figure 3.24 displays that TAVHL's foreign share remained stable during the first three quarters of 2021. Thereafter, there is a sharp increase during short period of time then it is decreased to around 60 levels. After the period of decline, it started to grow and reached a level almost at the starting period which is around 68 levels. FS_TAVHL is non-stationary time series but its first difference is stationary based on standard and breakpoint unit root tests.

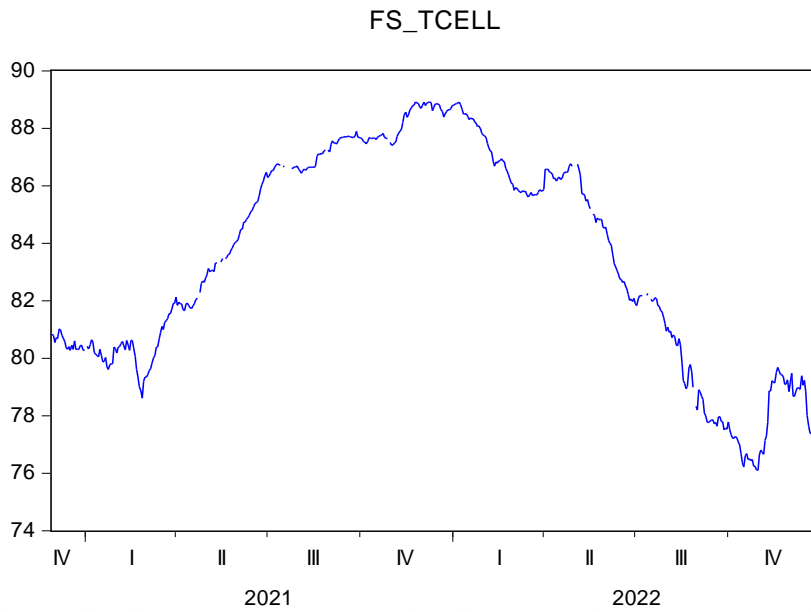


Figure 3.25: Foreign Share of TCELL

Figure 3.25 shows that TCELL’s foreign share has two phases in the data period. In the first half the period which is until the end of 2021, FS_TCELL has upward trend and reached a peak at 88 level. After that, started its decline to 76 levels. According to the standard and breakpoint unit root tests applied, FS_TCELL is stationary at I_1 level.

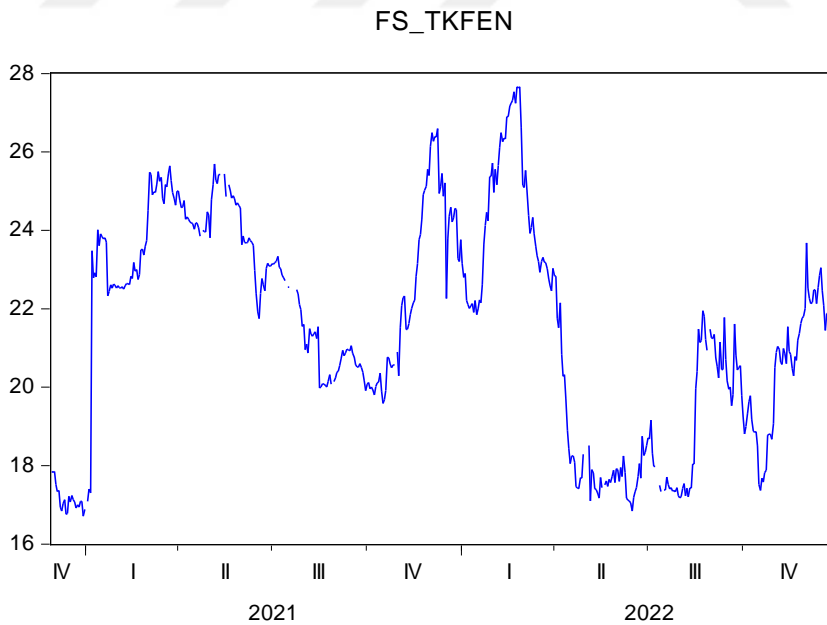


Figure 3.26: Foreign Share of TKFEN

Figure 3.26 suggests that TKFEN’s foreign share fluctuated with sharp up and downs. It may include many breakpoints especially in the first quarter of 2021 and 2022.

Nevertheless, FS_TKFEN itself is non-stationary time series while its first difference is stationary according to both standard and breakpoint unit root tests.

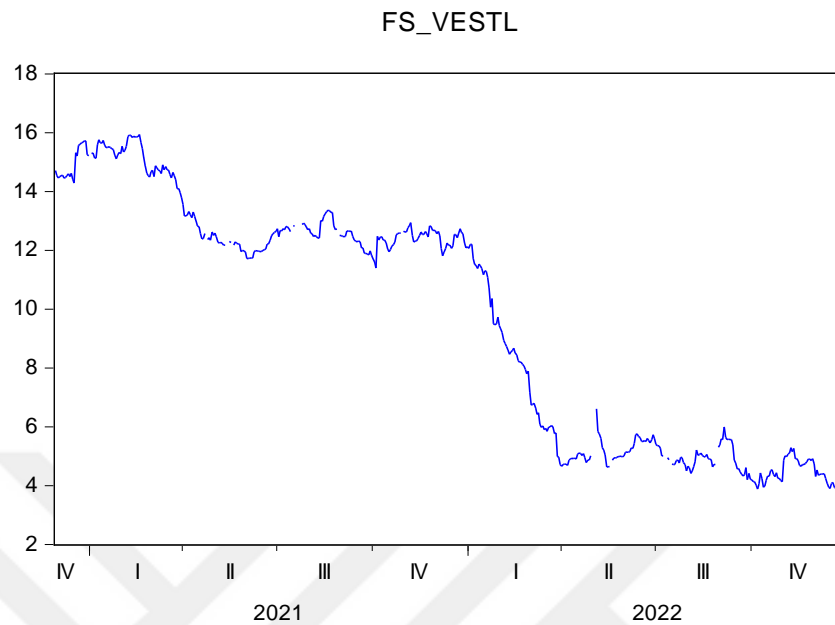


Figure 3.27: Foreign Share of VESTL

As Figure 3.27 reveals, VESTL's foreign share has downward trend during the period. The foreign share remains steady in the second, third and fourth quarter of 2021. Thereafter, it drops to 4 levels and deviates around 4. Standard and breakpoint unit root tests applied and both printed that FS_VESTL is stationary at I_1 level.



Figure 3.28: Foreign Share of YKBNK

As Figure 3.28 unveils YKBNK’s foreign share has structural break in the beginning of Q2’22 because of change in ownership. Excluding the break, FS_YKBNK is stable. The standard unit root test suggests that the series is stationary at the I_1 level. However, breakpoint unit root test concludes that FS_YKBNK is stationary. Since standard and breakpoint tests printed different results, FS_YKBNK is assumed as I_1 level considering a special case in equation estimation by creating and including a dummy variable for YKBNK share.

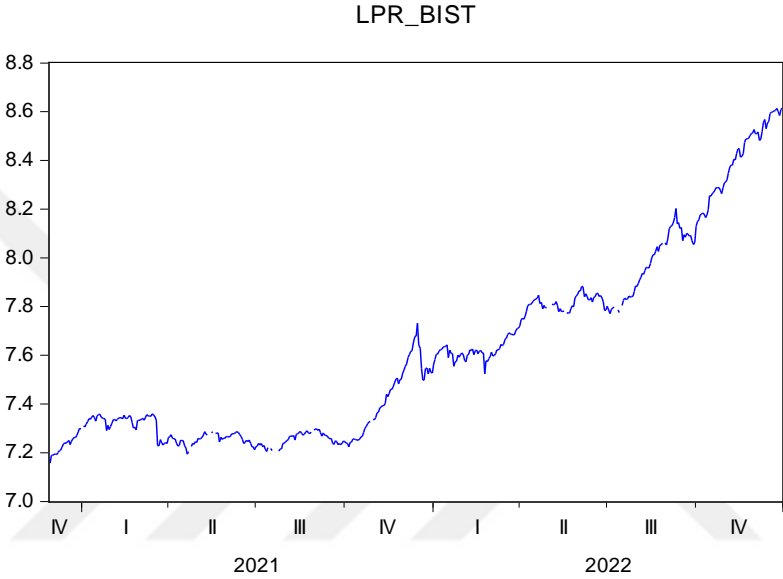


Figure 3.29: Logarithm of BIST100 Index

Figure 3.29 demonstrates that logarithmic BIST100 Index has indisputable increasing trend after a steady trend in the first three quarters of 2021. LPR_BIST is non-stationary while its first difference is stationary as both standard and breakpoint unit root validates.

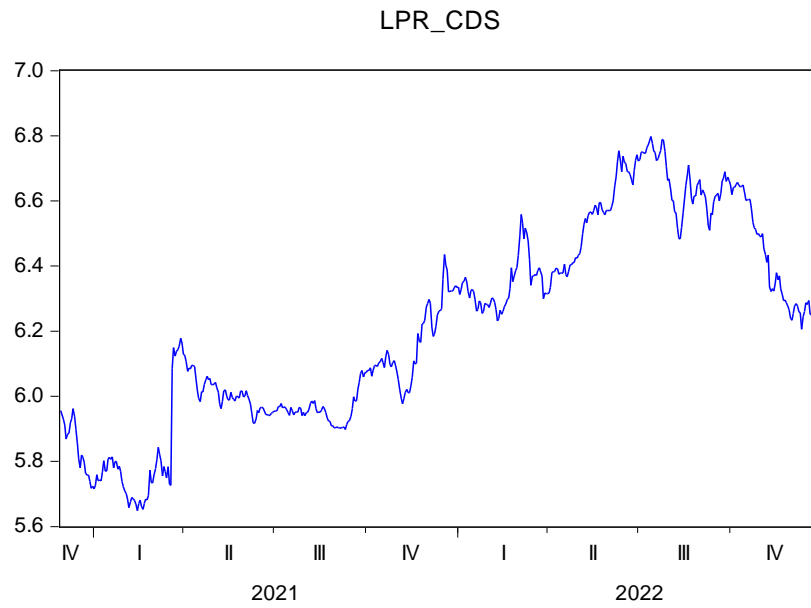


Figure 3.30: Logarithm of Turkey's CDS

Figure 3.30 indicates that logarithmic CDS of Turkey has growing trend with sharp incline in the end of 2021's first quarter. After the sharp increase, it remains stable for 2 quarters and then started to its growth period. Based on the standard and breakpoint unit root test results, it is found out that LPR_CDS is stationary at I_1 level.

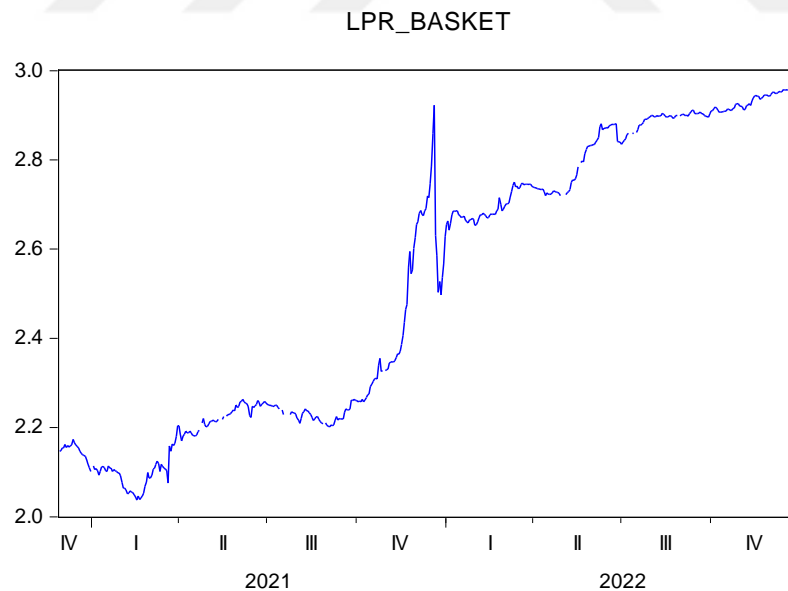


Figure 3.31: Logarithm of Basket Currency

In accordance with Figure 3.31, logarithm of basket currency represents an obvious growing trend overall. It rises sharply in the end of 2021's last quarter. Thereafter a sharp rise, it follows a sharp drop and starts its growth period. LPR_BASKET is non-

stationary while its first difference is stationary time series as the standard and unit root tests verifies.

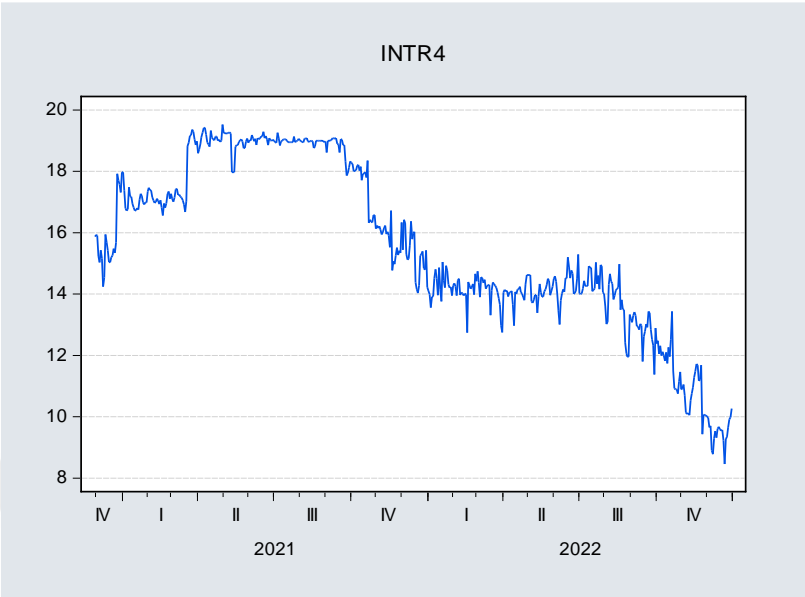


Figure 3.32: Interest Rate

As Figure 3.32 exhibits, interest rate declines gradually after remaining sometime steady over the period of time. It remains stable in the second and third quarter of 2021 then drops to 14 levels. It deviates around 14 levels approximately for three quarters and decreases to 9 levels until the end of the period. First difference of INTR4 stationary whereas the time series itself is non-stationary according to standard and breakpoint unit root tests.

In summary, Augmented Dickey-Fuller Test (ADF) test is applied with trend and intercept for testing the unit root of time series. Since time series involves breaks, breakpoint unit root tests also performed in addition to standard test.

The table 3.1 indicates the summary of unit root test results. In accordance with the table 3.1, 23 out of 24 time series are stationary at I_1 level in both standard and breakpoint unit root tests. FS_YKBNK is observed I_1 in standard unit root test but I_0 in breakpoint unit root test. Since it has structural break, it is assumed as I_1 by handling it as a special case and apply different method in upcoming equation estimation phase.

Table 3.1: Results of the Unit Root Tests

	Variables	Standard Unit Root Test	Breakpoint Unit Root Test
Other Explanatory Variables	lpr_basket	I ₁	I ₁
	lpr_bist	I ₁	I ₁
	lpr_cds	I ₁	I ₁
	intr_4	I ₁	I ₁
Foreign Shares	fs_aksen	I ₁	I ₁
	fs_froto	I ₁	I ₁
	fs_gubrf	I ₁	I ₁
	fs_kchol	I ₁	I ₁
	fs_krdmd	I ₁	I ₁
	fs_tavhl	I ₁	I ₁
	fs_tcell	I ₁	I ₁
	fs_tkfen	I ₁	I ₁
	fs_vestl	I ₁	I ₁
fs_ykbnk*	I ₁	I ₀ *	
Logarithm of Stock Prices	lpr_aksen	I ₁	I ₁
	lpr_froto	I ₁	I ₁
	lpr_gubrf	I ₁	I ₁
	lpr_kchol	I ₁	I ₁
	lpr_krdmd	I ₁	I ₁
	lpr_tavhl	I ₁	I ₁
	lpr_tcell	I ₁	I ₁
	lpr_tkfen	I ₁	I ₁
	lpr_vestl	I ₁	I ₁
lpr_ykbnk	I ₁	I ₁	

3.3 Theoretical Model

Two equations are formulated to investigate the impact of changes in foreign ownership on share prices. Least Squares method is selected for equation estimation to analyse the impact. Since heteroskedasticity might be presented, Huber White covariance method applied.

Share price is the dependent variable which depends on the explanatory variables; constant term, logarithm of BIST100 index, foreign share of the firm, logarithm of CDS, logarithm of basket currency and interest rate. Unlike the general equation, a dummy variable is added for the YKBNK share due to its special case with structural break as it can be analysed in the Figure 3.33. The dummy variable is 0 till the breakpoint, then gets the value 1.

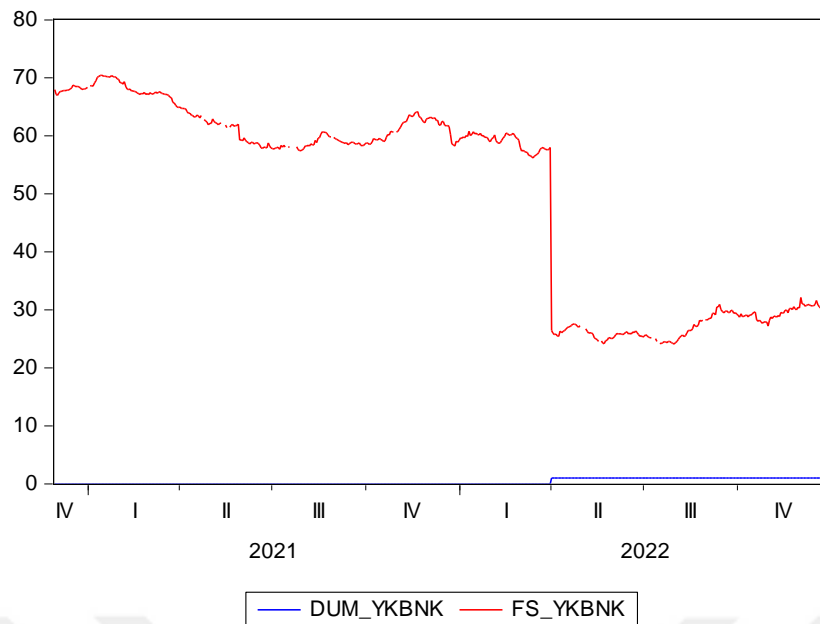


Figure 3.33: Dummy Variable for YKBNK

The first general equation is the long-run equation with considering variables itself in other words, variables at I_0 level although they are stationary at I_1 level. Taking difference of time series absorb the trend thus eliminating the long-term relation. The equation with only I_0 shows the cointegration between variables in the long-term. However, the error terms of the long-run equations must be stationary to test whether the equation result is valid. If the equation is estimated with non-stationary time series, result may be misleading because of the existence of spurious regression. Error term of each equation is tested with ADF standard unit root test without trend and intercept since mean of error terms is accepted 0 in the long run. All of the error terms of 10 equations are tested and they are all stationary which proves that the estimated equations are long-term equations.

Long-Term Equation

$$\text{Log}(\text{Price}_i) = \beta_0 + \beta_1 \text{Log}(\text{bist100}) + \beta_2 \text{Foreign share}_i + \beta_3 \text{Log}(\text{cbs}) + \beta_4 (\text{basket}) + \beta_5 \text{intr4} + e_i$$

The short-term equation is estimated by applying Least Squares with Huber White covariance method as well. All variables are stationary at I_1 level so that their first differences are included in the equation. Short-term equation results indicate the effect of daily changes on stock price because the data frequency is daily in the study. Error terms of previous period is included in the short-term equation since it should be written in the form of Error-Correction if the error terms in the first equation estimation

is stationary. Coefficient of $e_i(-1)$ is expected to get value in between 0 and -1. If the error terms in the long-term equations were found they are not stationary, error terms of previous period would not be included in the equation.

Short-Term Equation

$$\Delta\text{Log}(\text{Price}_i) = \alpha_0 + \alpha_1\Delta\text{Log}(\text{bist100}) + \alpha_2\Delta(\text{Foreign share}_i) + \alpha_3\Delta\text{Log}(\text{cds}) + \alpha_4\Delta\text{Log}(\text{basket}) + \alpha_5\Delta(\text{intr4}) + e_i(-1)$$





4. EMPIRICAL FINDINGS

The study examines the impact of changes in foreign ownership on stock prices for 10 selected Borsa Istanbul stocks. As Table 4.1 shows, the result provide a significant relation between foreign share and stock price in the long run for all equations except VESTL. The positive coefficients across all variables suggest that a rise in foreign ownership is associated with a corresponding increase in long-term stock prices. On the other hand, other explanatory variables such as Borsa Istanbul index, Turkey's CDS, basket currency and interest rate have significant linkages in general. The independent variables are involved to absorb possible effects to have clear view on impact of foreign share and proved that including them is right decision.

Conversely, foreign ownership does not exert a significant influence on stock prices in the short term across all 10 equations according to Table 4.2. None of the shares represent a significant relation between foreign share and stock price among 10 equations. The only regressor having significant impact on price was BIST100 in this case. Remaining variables such as CDS of Turkey, basket currency and interest rate does not point out linkage between stock price.

To summarize, there is a meaningful and positive relation between foreign investor share and stock prices over the long term, whereas there is no identifiable connection between them in the short term. In other words, in the case of foreign investor share change, its effect on stock price will not be observed the day after, yet it will be one week or ten days later.

Table 4.1: Results of the Long-Term Equations

Variables	β_0	LOG (BIST100)	FS _i	LOG (CDS)	LOG (BASKET)	INTR4	Dummy YKBNK	Error I(0)
LOG(PR_AKSEN)	-18.00***	1.90***	0.01**	0.65***	0.25***	0.08***	-	Yes
LOG(PR_FROTO)	-3.70***	0.85***	0.01***	-0.08**	0.76***	0.05***	-	Yes
LOG(PR_GUBRF)	-2.58***	1.11***	0.05***	-0.19***	-0.24***	-0.01	-	Yes
LOG(PR_KCHOL)	-4.95***	0.85***	0.02***	-0.15***	0.56***	-0.01***	-	Yes
LOG(PR_KRDMD)	-4.02***	0.44***	0.03***	0.09**	0.72***	-0.01***	-	Yes
LOG(PR_TAVHL)	-6.32***	1.02***	0.00***	0.14***	0.30***	0.02***	-	Yes
LOG(PR_TCELL)	-1.21***	0.68***	0.01***	-0.32***	0.01	-0.01***	-	Yes
LOG(PR_TKFEN)	-1.61***	0.71***	0.01***	-0.13***	0.04	-0.02***	-	Yes
LOG(PR_VESTL)	-5.59***	1.35***	0.01	-0.32***	-0.26***	0.08***	-	Yes
LOG(PR_YKBNK)	-5.59***	0.98***	0.01***	-0.05	-0.03	-0.04***	0.35***	Yes

*** significant at 1% level

** significant at 5% level

* significant at 10% level

Table 4.2: Results of the Short-Term Equations

Variable	α_0	ΔLOG (BIST100)	$\Delta(\text{FS}_i)$	ΔLOG (CDS)	ΔLOG (BASKET)	$\Delta(\text{INTR4})$	Dummy_ YKBNK	$E_i(-1)$
$\Delta\text{LOG}(\text{PR_AKSEN})$	0.003***	0.827***	-0.005	0.033	-0.144***	-0.001	-	-0.027***
$\Delta\text{LOG}(\text{PR_FROTO})$	0.000	1.118***	0.000	0.045	0.154***	0.002	-	-0.042**
$\Delta\text{LOG}(\text{PR_GUBRF})$	0.001	1.005***	0.005	-0.057	-0.031	0.004*	-	-0.026**
$\Delta\text{LOG}(\text{PR_KCHOL})$	0.000	1.183***	0.001	-0.009	0.067	-0.003**	-	-0.025*
$\Delta\text{LOG}(\text{PR_KRDMD})$	-0.001	1.274***	0.002	0.096***	0.097*	-0.003	-	-0.014
$\Delta\text{LOG}(\text{PR_TAVHL})$	0.000	0.998***	-0.001	-0.040	0.087*	-0.002	-	-0.041***
$\Delta\text{LOG}(\text{PR_TCELL})$	-0.001	0.941***	0.002	-0.010	0.052	0.001	-	0.007
$\Delta\text{LOG}(\text{PR_TKFEN})$	-0.001	0.946***	0.001	-0.033	0.081	-0.003	-	-0.026**
$\Delta\text{LOG}(\text{PR_VESTL})$	0.000	0.937***	-0.005	0.040	0.049	0.002	-	0.018
$\Delta\text{LOG}(\text{PR_YKBNK})$	-0.001	1.211***	0.001*	-0.034	-0.197**	0.002	0.001	-0.046***

*** significant at 1% level

** significant at 5% level

* significant at 10% level



6. CONCLUSIONS

Turkey has been a market which is an attraction point for the foreign investors as in the other emerging markets. However, there has been foreign outflow annually from stock market in Turkey since 2018 because of macroeconomic conditions, depreciated Turkish Lira, inflation and high risk premiums.

This study investigates the influence of changes in foreign ownership on daily stock prices in Turkey. 10 stocks listed in BIST30 having higher average traded value and market capitalization from Borsa Istanbul stock exchange market were selected as a sample. The data period started from Dec'20 to the end of Dec'22 to include the month when there were net foreign inflows to the stock market. The effect of change in foreign investor share was investigated in long and short terms.

As per the findings, there is a notable relationship between foreign ownership and stock prices in the long term for 9 out of 10 stocks. All coefficients of foreign investor share were positive showing that increasing foreign ownership will result in increase in stock prices in the long-term. Other control variables such as basket currency, Turkey's CDS, Borsa Istanbul index and interest rate had significant linkages on stock prices in the long-term. Conversely, foreign ownership did not exhibit any significant impact on stock prices in the short term for all 10 stocks. The only explanatory variable found significant impact on price was BIST100 in the short-term. Remaining variables such as CDS of Turkey, basket currency and interest rate did not indicate any effect on stock price. In other words, effect of change in foreign ownership on stock prices will be observed one or two weeks later not the day after the change.

Subsequent studies could extend their exploration of the impact of foreign ownership on stock prices by encompassing a broader range of explanatory variables. This may involve considering factors such as the unemployment rate, inflation, GDP growth, and other relevant economic indicators to provide a more comprehensive understanding of the relationship. Expanding the scope of the study with more stocks having lower traded value and market capitalization could enhance the understanding and dynamics of the variables on various stocks in different sectors.



REFERENCES

- Adler, M., & Dumas, B. (1984). Exposure to currency risk: definition and measurement. *Financial management*, 41-50.
- Anari, A., & Kolari, J. (2001). Stock prices and inflation. *Journal of Financial Research*, 24(4), 587-602.
- Bartram, S. M., Griffin, J. M., Lim, T. H., & Ng, D. T. (2015). How important are foreign ownership linkages for international stock returns?. *The Review of Financial Studies*, 28(11), 3036-3072.
- Ben Naceur, S., Ghazouani, S., & Omran, M. (2007). The determinants of stock market development in the Middle-Eastern and North African region. *Managerial Finance*, 33(7), 477-489.
- Bernoth, K., & Colavecchio, R. (2014). The macroeconomic determinants of private equity investment: a European comparison. *Applied Economics*, 46(11), 1170-1183.
- Bloomberg L.P. (2023). *Stock prices, Turkey's CDS, Interest Rates and BIST100 Index 31/11/2020 to 31.12.2022*. Retrieved July 12, 2023 from Bloomberg terminal.
- Caporale, G. M., Hunter, J., & Ali, F. M. (2014). On the linkages between stock prices and exchange rates: Evidence from the banking crisis of 2007–2010. *International Review of Financial Analysis*, 33, 87-103.
- Ceylan, N. B., Dogan, B., & Berument, M. H. (2015). Three-factor asset pricing model and portfolio holdings of foreign investors: evidence from an emerging market–Borsa Istanbul. *Economic research-Ekonomska istraživanja*, 28(1), 467-486.
- Chari, A., Chen, W., & Dominguez, K. M. (2012). Foreign ownership and firm performance: Emerging market acquisitions in the United States. *IMF Economic Review*, 60(1), 1-42.
- Choi, D., & Jen, F. C. (1991). The relation between stock returns and short-term interest rates. *Review of Quantitative Finance and Accounting*, 1, 75-89.
- Choudhry, T. (2001). Inflation and rates of return on stocks: evidence from high inflation countries. *Journal of International Financial Markets, Institutions and Money*, 11(1), 75-96.

- Douma, S., George, R., & Kabir, R. (2006). Foreign and domestic ownership, business groups, and firm performance: Evidence from a large emerging market. *Strategic management journal*, 27(7), 637-657.
- Firth, M. (1979). The relationship between stock market returns and rates of inflation. *The Journal of Finance*, 34(3), 743-749.
- Fisher, I., (1930). *The Theory of Interest*. MacMillan, New York.
- Froot, K. A., O'connell, P. G., & Seasholes, M. S. (2001). The portfolio flows of international investors. *Journal of financial Economics*, 59(2), 151-193.
- Garg, R., & Dua, P. (2014). Foreign portfolio investment flows to India: determinants and analysis. *World development*, 59, 16-28.
- Gultekin, N. B. (1983). Stock market returns and inflation: evidence from other countries. *the Journal of Finance*, 38(1), 49-65.
- Haider, M. A., Khan, M. A., Saddique, S., & Hashmi, S. H. (2017). The impact of stock market performance on foreign portfolio investment in China. *International journal of economics and financial issues*, 7(2), 460-468.
- Hao, J. (2004, January). Foreign ownership and equity returns: Evidence from Japan. In *17th Australasian Finance and Banking Conference* (pp. 15-17).
- He, W., Li, D., Shen, J., & Zhang, B. (2013). Large foreign ownership and stock price informativeness around the world. *Journal of International Money and Finance*, 36, 211-230.
- Hooker, M. A. (2004). Macroeconomic factors and emerging market equity returns: a Bayesian model selection approach. *Emerging markets review*, 5(4), 379-387.
- Hussainey, K., & Khanh Ngoc, L. (2009). The impact of macroeconomic indicators on Vietnamese stock prices. *The Journal of Risk Finance*, 10(4), 321-332.
- Kandir, S. Y. (2008). Macroeconomic variables, firm characteristics and stock returns: Evidence from Turkey. *International research journal of finance and economics*, 16(1), 35-45.
- Li, D., Nguyen, Q. N., Pham, P. K., & Wei, S. X. (2011). Large foreign ownership and firm-level stock return volatility in emerging markets. *Journal of Financial and Quantitative Analysis*, 46(4), 1127-1155.
- Ma, C. K., & Kao, G. W. (1990). On exchange rate changes and stock price reactions. *Journal of Business Finance & Accounting*, 17(3), 441-449.
- Pal, P. (2010). Foreign portfolio investment, stock market and economic development: A case study of India. *Capital Without Borders: Challenges to Development*, 1, 121.

Pan, M. S., Fok, R. C. W., & Liu, Y. A. (2007). Dynamic linkages between exchange rates and stock prices: Evidence from East Asian markets. *International Review of Economics & Finance*, 16(4), 503-520.

Thanatawee, Y. (2021). The impact of foreign ownership on stock price volatility: Evidence from Thailand. *Journal of Asian Finance, Economics and Business*, 8(1), 007-014.

Tsay, R. S. (2005). *Analysis of financial time series*. John Wiley & Sons.

Ülkü, N., & İkizlerli, D. (2012). The interaction between foreigners' trading and emerging stock returns: Evidence from Turkey. *Emerging Markets Review*, 13(3), 381-409.

Ünal, S. (2021). Yabancı Yatırımcıların Payı İle Hisse Senedi Getirileri Arasındaki İlişki. *Journal of Management and Economics Research*, 19(1), 1-21.

Url-1 <<https://borsaistanbul.com/tr/sayfa/68/pay-piyasasi>>, date retrieved 09.08.2023.

Url-2 <<https://www.isyatirim.com.tr/tr-tr/analiz/hisse/Sayfalar/Temel-Degerler-Ve-Oranlar.aspx#page-3>>, date retrieved 01.02.2023.

Url-3 <<https://evds2.tcmb.gov.tr/>>, date retrieved 09.03.2023.

Url-4 <<https://borsaistanbul.com/en/sayfa/3278/tlref-data>>, date retrieved 22.03.2023



CURRICULUM VITAE

Name Surname

: Ömer Abdurrahman
DEMİRCAN

PHOTO

EDUCATION

:

- **B.Sc.** : 2019, İstanbul Şehir University, Faculty of Engineering and Natural Sciences, Industrial Engineering Department

PROFESSIONAL EXPERIENCE AND REWARDS:

- 2021-2023 Investor Relations Assistant Specialist at Turk Telekom, Istanbul
- 2023-Present Sector Research and Analytics Specialist at Turk Telekom, Istanbul