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Research Article

The Effect of Selected Macro-Economic Indicators on the Frequency of Initial Public Offerings: A Research on the G-7 Countries

Seçilmiş Makro-Ekonomik Göstergelerin İlk Halka Arzlarin Sıklığına Etkisi: G-7 Ülkeleri Üzerine Bir Araştırma

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Abstract

The main objective of this study is to investigate effects of macroeconomic indicators on IPO wave. In this study, the relationship between macroeconomic indicators and frequency of the initial public offerings in a given country are examined. Macroeconomic indicators such as Gross Domestic Product (GDP), Net Portfolio Investments (NPI) and Net Foreign Direct Investment (NFDI) are used as independent variables. All data have been obtained from the World Bank for the widest possible date range. Analyzes are performed for 1999-2020 period based on the data set consisting of the public offerings frequency and macroeconomic indicators of the G-7. Panel data method is applied in the analysis. According to the results of the cross-section dependency test, it has been determined that there is a cross-section dependence between the series in the model. Therefore, the Peseran (2007) unit root test, which takes into account the cross-sectional dependence of the stationarity of the series, is applied. For model estimation, fixed and fixed-trend models are applied to all dependent and independent variables. According to results of the analysis, it has been determined that the GDP, NPI and NFDI in the model do not have a statistically significant effect on the public offering frequency. According to the findings obtained from the study, it can be concluded that the companies do not consider these indicators when timing the IPO. Developing the scope of this study by applying it on different developed and developing country groups comparatively is recommended to researchers working in this field in order to obtain more meaningful and comprehensive findings

Keywords: *Initial Public Offering, GDP, Net Portfolio Investments, Net Foreign Direct Investments, Panel Data*

Öz

Bu çalışmanın temel amacı, makroekonomik göstergelerin halka arz dalgası üzerindeki etkilerini araştırmaktır. Bu çalışmada, belirli bir ülkede makroekonomik göstergeler ile halka arzların sıklığı arasındaki ilişki incelenmiştir. Bağımsız değişken olarak Gayri Safi Yurtiçi Hasıla (GSYİH), Net Portföy Yatırımları (NPI) ve Net Doğrudan Yabancı Yatırımlar (NFDI) gibi makroekonomik göstergeler kullanılmaktadır. Tüm veriler mümkün olan en geniş tarih aralığı için Dünya Bankası'ndan alınmıştır. G-7'nin halka arz sıklığı ve makroekonomik göstergelerinden oluşan veri seti üzerinden 1999-2020 dönemi için analizler yapılmıştır. Analizde panel veri yöntemi uygulanmaktadır. Yatay kesit bağımlılığı testi sonuçlarına göre modelde yer alan seriler arasında yatay kesit bağımlılığı olduğu tespit edilmiştir. Bu nedenle serilerin durağanlığının yatay kesit bağımlılığını dikkate alan

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Peseran (2007) birim kök testi uygulanmıştır. Model tahmini için, tüm bağımlı ve bağımsız değişkenlere sabit ve sabit eğilim modelleri uygulanır. Analiz sonuçlarına göre modelde yer alan GSYİH, NPI ve NFDI'nin halka arz sıklığı üzerinde istatistiksel olarak anlamlı bir etkisinin olmadığı tespit edilmiştir. Çalışmadan elde edilen bulgulara göre şirketlerin halka arz zamanlaması yaparken bu göstergeleri dikkate almadıkları sonucuna varılabilir. Bu çalışmanın kapsamını gelişmiş ve gelişmekte olan farklı ülke gruplarına karşılaştırmalı olarak uygulayarak geliştirmesi, bu alanda çalışan araştırmacılara daha anlamlı ve kapsamlı bulgular elde edebilmeleri için önerilmektedir.

Anahtar Kelimeler: *İlk Halka Arz, GSYİH, Net Portföy Yatırımları, Net Doğrudan Yabancı Yatırımlar, Panel Veri*

1. Introduction

Firms determine their capital components as a result of the decisions they make in order to meet their long-term fund needs. Since capital structure decisions are associated with long-term financing decisions, they have strategic importance. Typically, firms have 2 alternatives as either debt or equity financing methods to raise capital.

As it is known, as external financing tool debt financing refers to the transfer of funds provided to the company by third parties and institutions apart from its existing shareholder. In debt financing, although the lenders (creditors) are not shareholders of the firm, they can have financial claim on the cashin flows of the firm up to the amount of funds they provide. The most basic elements of debt financing can be indicated as maturity, repayment obligation and interest amount / rates. The cost of financial debt can be defined as a fixed cost that puts pressure on the profitability of the firm, due to its nature as being independent of the firm's operational transactions such as production and sales etc.

However, if the provided debt is obtained from existing or new investors, the amount of funds provided represents a new capital inflow to the company. In the capital inflow provided to the firm, unlike debt financing, the firm shares the management power and there is no repayment obligation for the obtained fund. Firms don’t have to incur on fixed (flat) repayment cost thanks to the absence of a repayment obligation. This may be considered as advantage of the equity method compared to debt method. However, firm managers have some concerns about equity financing since it allows sharing managerial power with new investors in return for the fund obtained.

Firms should determine their optimal capital breakdown according to risk and return of both methods.

Public offerings either through IPOs and SEOs are the most classical examples of the equity financing in the capital markets. When the public offering is performed by the firms for the first time, it is described as initial public offering while it is expressed as a seasoned public offering, if a company that has been already listed on the stock exchange makes public offering to the again.

In this study, the public offering term will be used as the concept of Initial Public Offering, which expresses the process of inviting the public to become a partner in a company for the first time and selling capital market instruments for this purpose. With the public offering, cash inflow is provided in return for the shares representing the capital sold by the issuer company. It has been observed that this sale proceed acquired in initial public offering is generally used in long-term investment decisions. In this model, the first or current shareholders obtain a long-term fund without incurring interest costs, but their share in the firm's capital decreases in return.

The decision of going to the public is a strategic decision, it contains many factors, including micro and macro ones. In this study, selected macroeconomic indicators, which are thought to have an impact on the timing of a firm's public offering, will be examined and whether these indicators have an effect on the frequency of initial public offerings will be analyzed. Data in the study covers number of the initial public offerings made annually, annual GDP, annual Net Foreign Direct Investment and annual Net Portfolio Investment variables of the G-7 countries between 1999 and 2020. While the number of the initial public offerings was included in the analysis as a dependent variable, other variables are included in the analysis as independent variables.

In the second part of the study, the theoretical framework related to the concept of public offering will be examined and especially the concepts of hot and cold issue markets will be explained in a brief way. In the third part, previously published studies both in the national and international literature on this subject will be reviewed and in the analysis part of the study, the statistical relationship between selected

macroeconomic indicators and the frequency of the initial public offerings will be analyzed. In the conclusion part, the findings will be interpreted and evaluated.

2. Theoretical Framework

2.1. Underpricing Anomaly and Hot & Cold Issue Markets

The most critical decision types for a company preparing for the initial public offering are the pricing of the public offering and the decisions regarding the ratio of the shares to be offered to the public in the total company capital. Because the pricing of the public offering and the rate of the public offering can be considered as factors that will directly affect the market value of the firm. There are many studies in the literature for the above-mentioned decision types in initial public offerings. Agency problem hypothesis put forward by Jensen and Meckling (1976), reduced monitoring hypothesis put forward by Brennan and Franks (1997) and agency cost hypothesis put forward by Stoughton and Zechner (1998) are some of these studies (Field and Sheehan, 2004, pp. 263-280).

Many macro and micro determinants lie behind the companies going public. One of the micro-factors is the expected capital raised through IPO. By public offerings firms will be able to receive huge amount of investment (IPO proceed) in exchange for their capital shares. Therefore, evaluation of firm's shares are strictly important to maximize firm's market value. However some price anomalies can be observed in the capital markets. According to studies conducted in the existing literature, there are 2 main type of price anomalies. Underpricing anomaly for short-term and underperformance anomaly for the long-term respectively. Underpricing phenomenon of initial public offerings indicates that investors benefit from short-term excessive price volatility. IPO underpriced is described as offering price (initial price at issuance) will be less than firms shares' intrinsic value (fundamental value) and refers a potential increase in short term after issuance (Iding, 2016, p.1-2). Since the underpricing of initial public offerings means short-term excessive returns for investors, investors will try to get a share of the IPO they consider as underpriced. The reason for firms to underprice their shares at the issuance can be outlined as information asymmetry among investors, investment bank's pricing behaviors, interactions between investors and etc. (Katti and Phani, 2016, p.36-36). For information asymmetry Rock's Adverse Selection Model (1986) can be given as example. His model is based on information asymmetry among investors and states that informed investors who have superior information compared to others will have comparative advantage in underpricing issues while uninformed ones may invest in all IPOs since they cannot recognize overpriced or underpriced IPOs (Lin and Hsu, 2008, p.955-963). Due to lack of information, investors may purchase all stocks from all IPOs without find out they are overpriced or not and it will be resulted as a big loss for uninformed investors particularly for short-term (Rock, 1986, p.187-189). Investment bank's pricing approach is discussed by Logue (1973). He examined investment bank's pricing behaviors during IPO process and concluded that investment banks to sell out all shares successfully at the issuance and can get new IPO underwriting requests from potential customers may tend to underprice shares intentionally (Logue, 1973, p.93-95). There are also some studies that argue that competition among investment banks has an impact on IPO underpricing. When there is high aggressive competition among investment banks, investment banks will have excessively high initial public offerings in order to generate revenue from more clients by providing more underwriting services, and as a result, investors who buy stocks from the initial public offering will have lower initial returns (Simon et.al, 2014, 1297-1298). In terms of interactions between investors, waterfall effect model is developed by Welch (2002). He pointed out that investors don't only rely on their own analysis and evaluations but also other investors' opinions. Moreover, sometimes they take other investors' evaluation into account more importantly and they may change their first idea about given IPO alternative (Welch, 1992, p.697-698).

In developed economies IPO underpricing is more clear and quickly and can be recognized even after the 1st trading day (Beck, 2017, p.3-4).

It is desirable for investors to join IPOs that underpricing anomaly that the initial returns due to excessive demand in public offerings are above the average is observed. When IPO is underpriced, the demand for the public offering increases and all stocks are sold in the public offering. In this way, a successful public offering can also affect other companies. As a result, in some periods, a serious concentration can be seen in the number of public offerings.

Firms aware of this situation want to guarantee the success of the public offering by pricing the public offering low. In this way, as a result of many companies applying for public offering, the frequency of IPOs increases.

The frequency of IPOs (IPO numbers) in the hot public offering market is higher than in the cold public offering market. Hot issue refers to an upcoming public offering. In hot issue market, generally thanks to short-term speculative earnings expectation of investor's oversubscription issue is observed. Nearly all investors concentrates short term abnormal returns instead of firm's long term projections (investopedia, 2021). Firm management and their underwriter, before offering tries to create adequate interest for the firm's shares through roadshows (corporatefinanceinstitute, 2021). Hot issue markets are accepted as temporary windows of opportunity when investors are too optimistic and cost of equity is relatively low (Banerjee et.al, 2016, p.309).

Theoretically, each firm can be an example of the hot issue market, but in fact hot issue market may vary from one industry to another. In general, this phenomenon is observed in fast-growing high-tech companies (investopedia, 2021). Due to the fact that saturated mature sectors have more robust and stable business models, they may not try to attract the investors by providing abnormal returns in the short term through hot issue markets.

Depending on the change in the number of public offerings in a country, there may be a transition between hot and cold issue markets. For example, there are some theories explaining the transition from hot IPOs to cold IPOs. These are theories that include hot public offerings expressing clustering in a new industry, and signal models predicting that hot public offerings attract higher quality firms (Helwege and Liang, 2004, p.545).

It has been observed that the dimensions of the short-term underprice anomaly and the long-term underperformance anomaly seen in initial public offerings may vary between hot and cold issue markets, and these anomalies are more depressive in hot issue periods, especially in high volume public offerings (Ritter, 1984, p.217).

Studying the long-term price performance of initial public offerings highlights the role of investor sentiment in the price behavior of stocks, and investor sentiment is considered particularly acute in hot issue markets (Ljungqvist, Nanda and Singh, 2006, p.1670-1671).

The main factors that make up the hot issue market can be shown as the high initial returns of the public offerings in the short term and the high volatility in the initial returns (Lowry, Officer and Schwert, 2010, p.430-431).

As seen in the literature, there is a positive correlation between the underpricing of initial public offerings, hot issue markets and the number of initial public offerings. In this study, it will be analyzed whether macro variables instead of micro determinants have a statistically significant effect on the number of initial public offerings in a given country.

2.2. Macro-Economic Indicators

In this part of the study, 3 macroeconomic variables that are thought to affect the number of public offerings in a country will be examined. Variables considered in the study are Gross Domestic Product (GDP), Net Foreign Direct Investment (NFDI), and Net Portfolio Investment (NPI). The data for these variables included in the analysis were obtained separately for each country in the sample from the official website of the World Bank. In this part of the study, definition of these indicators, methodology regarding on their calculations and how to interpret figures will be explained briefly.

a- Gross Domestic Product – GDP (at Current Price)

GDP is sum of market value of all products and services produced in a country for a given fiscal year (investopedia, 2021). It is mostly used to measure domestic production power of a country. This indicator is generally used to compare and sort all countries all over the world. GDP has become a base indicator that is used to evaluate economic growth (Nyangarika et.al., 2018, p. 42-43). It is one of the most conventional macro-economic indicator that are used by the policy makers and investors.

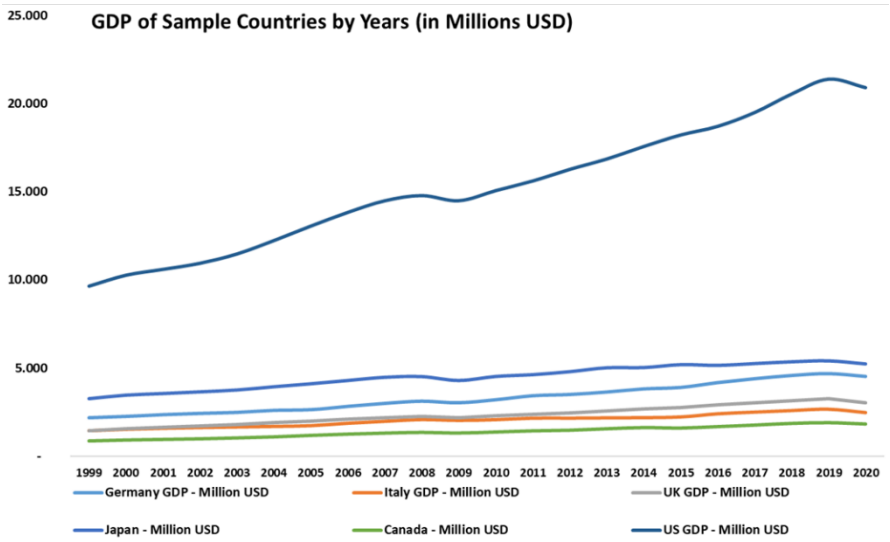
GDP can be calculated by expenditure volume, production volume and income level (investopedia, 2021). In this study, methodology followed to calculate GDP can be shown in equation 1 as follows (World Bank, 2021):

GDP =

Gross value added by all resident producers (+) Product taxes (-) any subsidies not included in the value of the products (1)

As stated above, GDP is used to rank World Countries Economies. According to latest figures, USA is still top ranked with approximately 20,9 Trillion USD. Following chart illustrates GDP of sample countries for the analysis period:

Chart 1: GDP of Sample Counties by Years (In Millions USD)



Source: World Bank/Databank

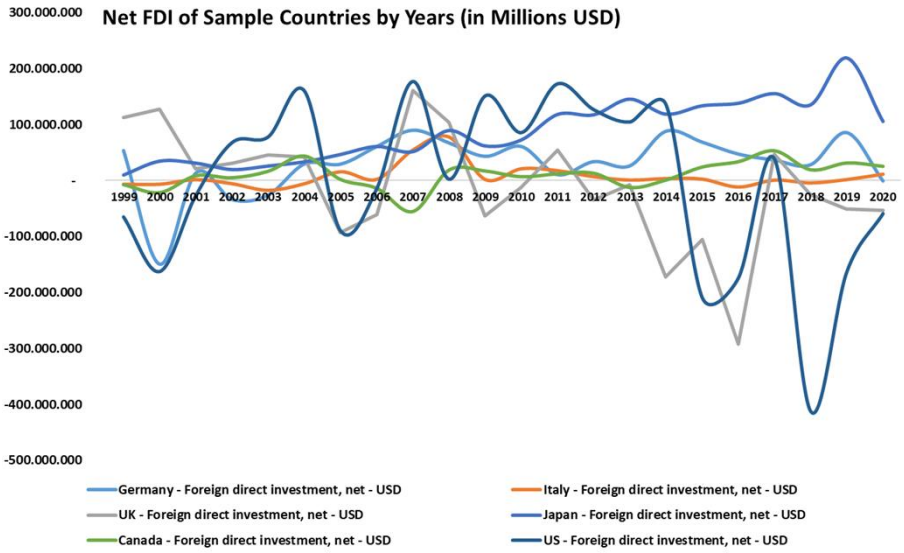
b- Net Foreign Direct Investment (NFDI)

Foreign direct investment is and investment amount performed in a company / country by another company / country located outside its borders (investopedia, 2021). It differs from a foreign portfolio investment by a notion of direct control (Wikipedia, 2021). FDI is very important since it provides international presence and make firms sure to reach strategic materials and sources. Through FDI, transfer of management, technology and equipment are performed as a result it is more important than simple capital investment (Adams, 2009, p. 939 - 949).

In 2020, due to the COVID-19 global outbreak global FDI amount is slammed and decreased to 859 Billion USD from 1,5 trillion USD last year.

Chart 2 shows FDI of sample countries for the analysis period:

Chart 2: Net FDI of Sample Counties by Years (In Millions USD)



Source: World Bank/Databank

By the World Bank, NFDI is defined as net inflows of investment to purchase lasting management interest (10 percent or more of voting stock) in a company by another company. In this study, methodology followed to calculate NFDI can be shown in equation 2 as follows (World Bank, 2021):

NFDI = Equity capital (+) reinvestment of earnings (+) other long-term capital (+) Short-term capital as shown in the balance of payments (2)

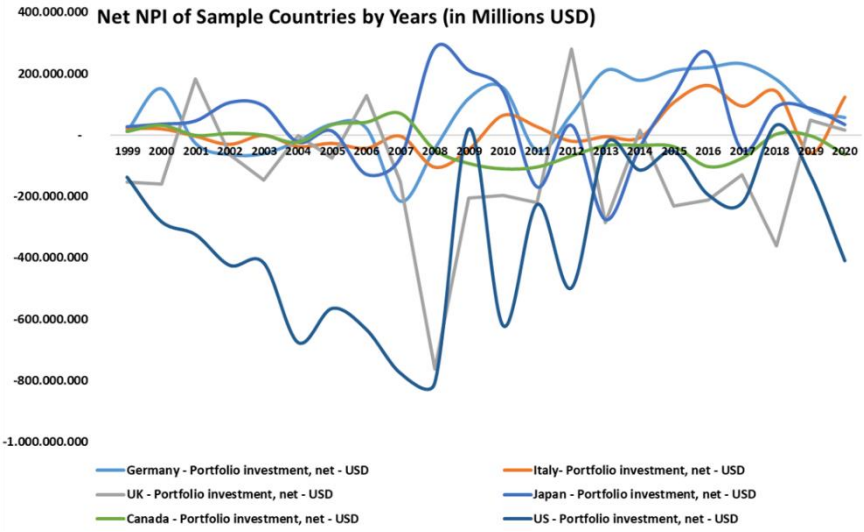
c- Net Portfolio Investment (NPI)

Portfolio investment is acquiring ownership of financial securities under the high return expectation. Unlike NFDI, NPI doesn't include mobility in terms of management, technology and equipment, only portfolio investments through digital platforms are occurred. NPI requires passive or hands-off ownership as opposite to direct investment (investopedia, 2021). Portfolio investments include all transactions regarding on both debt equity financial assets. It excludes financial liabilities stemming from foreign authorities' reserves (knoema, 2021).

Foreign portfolio investments (FPI), used in the calculation of NPI, are of vital importance to close the gap between savings and foreign exchange, especially in developing countries. For the purpose of profit maximization foreign investors make foreign portfolio investments by investing in non-controlling interests in companies in another country or by purchasing debt securities issued by foreign companies or governments. FPI provides to increase the fund supply needed for the realization of local investments in a country (Ezeanyeji and Maureen, 2019, p.24).

Chart 3 indicates NPI of sample countries for the analysis period:

Chart 3: Net NPI of Sample Counties by Years (In Millions USD)



Source: World Bank/Databank

Effects of macroeconomic variables on NPI is vary between developed countries and emerging countries. In developed countries low interest environment has negative effect (push effect) to increase NPI while in emerging countries financial liberalization has positive impact (Gumus et.al, 2013, p.210).

The number and volume of net portfolio investments realized between countries increased especially after the mobility of capital, which started after the 1990s and accelerated. While increasing capital flows are positive in terms of global liquidity, they also made global capital markets more fragile. The removal of national and international borders to capital movements with new legal regulations, the increase in the frequency of fund transfers with globalization, has created an arbitrage and speculative investment opportunity for many international investors. As a result, sudden and high changes were observed in the number and volume of capital movements. Due to these sudden changes, deteriorations occurred in money and capital markets in many countries and the power of countries to resist a financial crisis decreased and the financial stability of the countries deteriorated (Gumus et.al, 2013, p.210).

It has been still debated that financial markets are fully integrated with the acceleration of global capital movements mentioned above. Bodnaruka et.al. (2017) identified the governance problems in the country of investment, which they defined as implicit barriers, as one of the biggest obstacles to international investment. International investors avoid investing in countries where their investments will be taken away by the government of the target country or the controlling shareholders in the investee company (Bodnaruk et.al. 2017, p.96-97).

3. Literature Review

Dai, Kang and Hu (2021), examined the relationship between the number of initial public offerings and the USD index. They found that the number of initial public offerings is a variable that can be used in oil price estimation. In particular, they made oil price predictions based on the complementary relationship between the USD index and the number of initial public offerings. They used a linear model in their analysis and determined that the variables of the USD index and the number of initial public offerings could give stronger results in nonlinear models (Dai, Kang and Hu, 2021, p.1-12).

Signori and Vismara (2018), investigated the determinants of the change in the initial public offering of companies over time. In their study, the authors explained the decrease in the number of public offerings over time with the desire of the companies to be purchased by another company or fund instead of continuing their activities as an independent legal entity. For this purpose, they examined the trend of initial public offerings and the trend of M&A made in the same period. In particular, they analyzed companies that they defined as young innovative companies. They determined that the explanation of preferring to be bought by other companies, which they determined in their studies, was correct for these

companies. They observed that the number of quarterly public offerings made by these companies during the analysis period decreased by 20% compared to the previous 15 years (Signori and Vismara, 2018, p.141-153).

Yang and Lu (2012), examined the effects of investor sentiment on initial public offerings in REITs. They found that investor sentiment affects the hot and cold public offering markets in REITs in different ways. They observed that investor sentiment did not affect the frequency of public offerings, especially for the initial public offerings in 1993 and 1998, which were the hot public offering periods. They stated that when the public offering market matured after 1998, company managers adjusted their public offering decisions according to market sensitivity. In their study, they found that the frequency of public offerings was positively related to investor sentiment. They also find that IPO frequency or IPO revenue is always negatively correlated with the mortgage rate, which acts as a proxy for real estate holding costs (Yang and Lu, 2012, p. 1-32).

Gao, Ritter and Zhu (2013), stated in their study that an average of 310 companies went public annually in the United States between 1980 and 2000, but since 2000, only 99 IPOs have taken place per year on average. They found that this decrease, which was noted in the public offering, was faster in relatively small-sized companies. The authors generally attributed this decrease in IPO frequency to the Sarbanes-Oxley Law published in 2002. As a result, the authors feel that the advantages of selling to a larger organization, which can speed up the launch of a product, are more beneficial than operating as an independent firm (Gao, Ritter and Zhu, 2013, p.1663-1692).

Sejkora (2013), studied the initial public offerings in the Czech and Polish capital markets. Author observed that the Czech capital market lagged significantly behind the Polish capital market in terms of the number of public offerings carried out. Market value, liquidity and the qualitative characteristics of the market are examined as the factors that affect the public offerings in both markets. It is found that the number of public offerings in the Czech market contrasted with the number of public offerings in developed markets and many emerging markets. In the study, it has been determined that the liquidity factor did not give a significant result in explaining the difference between the number of initial public offerings in the Czech and Polish capital markets. In terms of the market value factor affecting the number of IPOs, it has been found that the Polish capital market is more attractive than the Czech Republic capital market (Sejkora, 2013, p.160-169).

Overli and Wiklund (2018), observed in their study that there is a positive correlation between the frequency of initial public offerings in the Swedish capital market and short-term underpricing and long-term underperformance anomalies in initial public offerings. In their study, they examined 173 initial public offerings on the Nasdaq OMX Stockholm stock exchange between 2002 and 2017. They included the hot issue market variable among the explanatory variables in the analysis. They defined the hot issue market explanatory variable as the period in which the number and first day returns of initial public offerings are higher than the sample average. They confirmed that the effect of this variable on short-term underpricing is significantly positive (Overli and Wiklund, 2018, p.).

Angelini and Foglia (2018), examined the relationship between initial public offerings and macroeconomic variables in the UK between 1996 and 2016. They found that business cycle, volatility and interest rates as variables used in the analysis statistically explain the change in the number of public offerings. On the other hand, it could not be statistically confirmed that stock market returns affect the initial public offering activities of the companies in the sample. Among the 4 macroeconomic variables included in the analysis, it has been determined that the most influential factor in the public offering decision of the companies is volatility. In addition, VECM was applied in the analysis in order to determine the interdependencies between the variables, and the error correction coefficient of the initial public offering frequency was found to be statistically significant at 1%. Finally, Granger and Toda - Yamamoto causality tests were applied to measure the causality relationship between macro variables and initial public offering frequency. According to the results of the analysis, it was determined that there was a significant causality between the variables. While Granger causality was detected between volatility, industrial production and interest rates and initial public offering, T-Y causality was found only between volatility and number of initial public offerings. According to the findings, it is

recommended that companies that want to go public in the UK should consider these macro variables (Angelini and Foglia, 2018, p.319-336)

4. The Effect of Macro-Economic Indicators on the Initial Public Offerings Frequency

4.1 Dataset and Sample Structure

In this study, the effect of macroeconomic indicators such as gross domestic product, net portfolio investments and net foreign direct investments on the initial public offering frequency in a country has been investigated. Therefore, the frequency of Initial Public Offerings (IPO), Gross Domestic Product (GDP), Net Portfolio Investments (NPI), Net Foreign Direct Investments (NFDI) variables are included in the analysis annually. Analysis period covered 1999-2020 period for G-7 countries.

Descriptive statistic for the data set included in this study are summarized in Table below as follows.

Table 1: Summary of Descriptive Statistics

Indicators	IPO	GDP	NPI	NFDI
Average	91.42	4803.39	-61.55	20.06
Standard deviation	99.06	5045.48	208.93	87.08
Kurtosis	3.42	2.63	2.95	5.29
Skewness	1.81	1.94	-1.52	-1.41
Min	0.00	846.42	-807.95	-412.78
Max	486.00	21372.58	282.69	218.53

Source: Author's Own Calculations

According to the descriptive information shown Table above, the average of the IPO variable was 91.42 in the period under consideration. Considering all countries, this series reached the highest value of 486 in 1999 for the USA, while the lowest value was observed as 0 for Germany in 2003. If panel structure is ignored, it may be claimed that the series exhibits an ogive structure from the normal distribution with a kurtosis value of 3.42, while it can be said that it exhibits a right-skewed structure due to the skewness coefficient being 1.81.

The GDP variable averaged 4.80 trillion dollars in the period under consideration. Considering all countries, this series reached the highest value of 21.37 trillion dollars for the USA in 2019, while the lowest was 846.42 billion for Canada in 1999. When the panel structure of the series is ignored, it can be said that the series shows an ogive structure compared to the normal distribution with a kurtosis value of 2.63, while it can be said that it exhibits a right-skewed structure due to the skewness coefficient being 1.94.

The NPI variable was realized as -61.55 billion dollars on average in the period under consideration. Considering all countries, this series reached the highest value of 282.69 billion dollars in 2008 for Japan, while the lowest value was observed as -807.95 billion dollars for the USA in 2008. When the panel structure of the series is ignored, it can be said that the series exhibits an ogive structure compared to normal distribution with a kurtosis value of 2.95, while it can be said that it exhibits a left-skewed structure due to the skewness coefficient being -1.52.

The FDI variable was $20.06 billion in average during the period under consideration. Considering all countries, this series reached the highest value of 218.53 billion dollars in 2019 for Japan, while the lowest was -412.78 billion dollars for the USA in 2018. The series exhibits a pointed structure from the normal distribution with a kurtosis value of 5.29, while it can be said that it exhibits a left-skewed structure due to the skewness coefficient being -1.41.

4.2 Methodology

In this study the relationship between selected macroeconomic indicators and IPO frequency is tested. As macroeconomic indicators Net Portfolio Investment (NPI), Net Foreign Direct Investment (NFDI)

and Gross Domestic Product (GDP) will be used. In the analysis macroeconomic indicators will be used as independent variable while IPO frequency will be taken as dependent variable.

The main research question is that whether investors considers these macroeconomic indicators as signals while they invest in stock market. Hypothesis of the study can be shown as follows:

H_0: Macroeconomic indicators has not effect on IPO frequency

H_1: Macroeconomic indicators has not effect on IPO frequency

In the study, the panel-data analysis was applied because it offers a wider data-set compared to the time-series and cross-section models, provides more reliable estimates in this context, and has the advantages of controlling individual heterogeneity.

Firstly, to determine stationarity of the series included in the analysis a unit root test will be applied. As known, it is most likely possible to face spurious regression problem in the series which are not stationary.

Before applying unit root test, kind of unit root test should be determined. For this purpose, the cross-section dependency will be investigated. After unit root test, the fixed effects and random effects model will be established and estimated for the period under consideration. Then, a choice between fixed effects and random effects model will be made through Hausman test. After determining the appropriate model, finally the model will be estimated and model suitability tests will be performed. If it is considered as necessary, the model will be corrected and re-estimated.

Regression model applied in this study is shown in equation 3 as follows:

$$Y = a + b*X + e \qquad (3)$$

The explanation of the notations in the equation is as follows:

Y = The dependent variable,

X= The Independent variable,

a = Constant term

b = The coefficient of the independent variable, the degree to which the independent variable affects the dependent variable,

e = Error terms

4.3 Test Results – Findings

In the panel-data model established to investigate the effects of GDP, NPI and NFDI variables on the IPO variable, all series should represent stationary feature. The type of unit-root test will be determined according to whether there is a cross-section dependency in the model or not. For this reason, firstly, it is determined that whether a cross-section dependency exist in the model by using with the Friedman, Breusch Pagan and Pesaran' (2007) tests and the results are provided in Table 2 as follows.

Table 2: Cross-Section Dependency Test

IPO	Coefficient	Standard Error	p-val*
GDP	-0.0094	0.0043	0.0300
NPI	0.0500	0.0432	0.2490
NFDI	-0.0998	0.0823	0.2270
Fixed	141.8832	22.5695	0.0000
R2	0.0512		
F-Test	2.2100		0.0901
Friedman Cross-Section Dependency Test	65.6360		0.0000

Breusch Pagan 1980 Cross-Section Dependency Test	56.0400		0.0000
Pesaran 2007 Cross-Section Dependency Test	16.6700		0.0000
Number of observations	132		
N	6		
T	22		

*The results are statistically significant at the 1% significance level.

Hypotheses of the Test:

H_0: There is no cross-section dependency

H_1: There is cross-section dependency

Table above indicates the results of the cross-section dependency test for the panel data model. As a result of the Friedman test, the coefficient was calculated as 65.6360 and the probability value (p-val) for this coefficient was found as approximately 0. While the Breush Pagan cross-sectional dependency test coefficient was calculated as 56.0400 and the p-val for this coefficient was approximately 0, the Pesaran 2007 test coefficient was also calculated as 16.6700 and the p-val for this coefficient was approximately 0. Since the time dimension T is 22 in the panel-data structure and this time dimension is greater than 6 which is panel unit number - N , consequently the condition T>N is provided. In this case, it can be claimed that the Breush Pagan cross-section dependency test gives more consistent results. As a result, since the p value is less than 0.01, the null hypothesis stating that there is no cross-sectional dependence was rejected at 99% confidence interval, and it was concluded that there was a cross-section dependency in the model.

Pesaran 2007 panel unit root test, which is one of the second generation tests that takes into account the cross-sectional dependence among panel unit root tests, was applied to the dependent and independent variables in the model. The test results are provided in the table below as follows: follows.

Table 3: Pesaran (2007) Panel Unit-Root Test Results

Variable	Fixed.		Fixed and Trending	
	t statistic	p-val	t statistic	p-val
IPO	-2.82	0.00	-3.34	0.00
GDP	-2.28	0.10	-2.73	0.14
NPI	-3.76	0.00	-4.04	0.00
NFDI	-2.37	0.06	-2.75	0.13

Source: Author's Own Calculations

In Table 3, the findings of the Pesaran (2007) panel unit-root test conducted on the dependent and independent variables used in the study are shown for the fixed model and the fixed and trended model. According to results of this test:

- In the panel unit root test applied for the IPO variable, the test statistic for the fixed model was calculated as -2.82 with a p-val of around 0. For the fixed and trend model, the test-statistic was calculated as -3.34 with a p-val of around 0. As a result, the null hypothesis that the variable has a unit root was rejected at 99% confidence interval, and it was concluded that the series was first level integrated, I(0).

• In the panel unit root test applied for the GDP variable, the test statistic for the fixed model was calculated as -2.28 with a p-val of 0.10. For the fixed and trend model, the test-statistic was calculated as -2.73 with a p-val of 0.14. As a result, the null hypothesis that states the variables have a unit root was rejected at 90% confidence interval, and it was concluded that the series was first level integrated, I(0).

• In the panel unit root test applied for the NPI variable, the test statistic for the fixed model was calculated as -3.76 with a p-val of 0. For the fixed and trend model, the test-statistic was calculated as -4.04 with a p-val of 0. As a result, the null hypothesis that states the variable has a unit root was rejected at 99% confidence interval, and it was concluded that the series was first level integrated, I(0).

• In the panel unit root test applied for the FDI variable, the test statistic for the fixed model was calculated as -2.37 with a p-val of 0.06. For the fixed and trend model, the test statistic was calculated as -2.75 with a p-val of 0.13. As a result, the null hypothesis states that the variable has a unit root was rejected at the 90% confidence interval, and it was concluded that the series was first level integrated, I(0).

As a result, all variables used in the study were found to be stationary at the level. By taking the first row differences of the first row integrated series, SEM and REM were established and the appropriate model was selected by the Hausman test. Hausman test results are given in Table 4.

Table 4: Hausman Test Results

IPO	**Coefficients**			
	Fixed	**Random**	**Difference (Df)**	**Std Error**
GDP	-0.01	0.01	-0.02	0.00
NPI	0.05	-0.04	0.09	0.01
NFDI	-0.10	-0.10	0.00	0.01

Source: Author's Own Calculations

After the panel unit-root tests of the series used in the study were performed, the Hausman test was applied to select between the fixed effects model and the random effects model during the model creation phase.

The hypotheses of this test are:

H_0: Individual effects are random.

H_1: Individual effects are fixed.

As a result, since the relevant test statistic was calculated as 13.32 with a p-val of 0.004, the null-hypothesis was not rejected at 99% confidence level.

Therefore, the fixed effects Model was used in the rest of the analysis.

The results of the fixed effect Panel-data model established in the study are given in Table 5.

Table 5: Panel-Data Model Results

IPO	Standard Model			Driscoll Kraay - Standard Error		
	Coefficient	Standard Error	p-val	Coefficient	Standard Error	p-val
GDP	-0.0094	0.0043	0.0300	-0.0094	0.0105	0.3800
NPI	0.0500	0.0432	0.2490	0.0500	0.0470	0.2990
NFDI	-0.0998	0.0823	0.2270	-0.0998	0.1045	0.3500
Fixed	141.8832	22.5695	0.0000	141.8832	59.7807	0.0270
R2	0.0512			0.0512		
F Test	2.2100		0.0901	0.8300		0.4917
Wald Test	15411.7800		0.0000			
Wooldridge Test	77.0530		0.0003			
Friedman Cross-Section Dependency Test	65.6360		0.0000			
Breusch Pagan 1980 Cross-Section Dependency Test	56.0400		0.0000			
Pesaran 2007 Cross-Section Dependency Test	16.6700		0.0000			

Source: Author's Own Calculations

he hypotheses of the model are as follows:

H_0: The variable coefficient is 0.

H_1: The variable coefficient is not 0.

Table-5 presents the results of the first panel-data model established to investigate the effects of GDP, NPI and NFDI variables on the IPO variable, and the corrected model results.

According to the established standard model:

- The coefficient for the GDP variable is estimated as -0.0094 with a p-val of 0.0300. Accordingly, the null hypothesis stating that this variable is statistically insignificant was rejected at the 95% confidence interval, and it was concluded that the variable had a significant and negative effect on the IPO variable. Accordingly, it can be said that a one-unit increase in the GDP variable will decrease the IPO variable by 0.0094 units.
- The coefficient for the NPI variable is estimated as 0.0500 with a p-val of 0.2490. Accordingly, the null hypothesis states that this variable is statistically insignificant was not rejected at the 90% confidence interval, and it was concluded that the variable had a positive but insignificant effect on the IPO.
- The coefficient for the NFDI variable is estimated to be -0.0998 with a p-val of 0.2270. Accordingly, the null hypothesis states that this variable is statistically insignificant was not rejected at the 90%

confidence interval, and it was concluded that the variable had a negative but insignificant effect on the IPO.

When the R2 coefficient of the established model is examined, it is seen that this value is calculated as 0.0512. Accordingly, it can be said that 5.12% of the changes in the D_IPO variable are caused by the changes in the explanatory variables. In addition, according to the F test results, it can be said that the model is significant as a whole in the 90% confidence interval.

The existence of heteroscedasticity, autocorrelation and cross-section dependency problems related to the established model was tested with Wald, Wooldridge and Breush Pagan tests, respectively. Wald test hypotheses are shown below as follows:

H_0: There is no heteroscedasticity

H_1: There is heteroscedasticity

The Wald test-statistic was calculated as 15411.7800 with a p-val of 0. Based on this test result, H0 is rejected at the 99% confidence interval.

Wooldridge test hypotheses are shown below as follows:

H_0: There is no autocorrelation

H_1: There is autocorrelation

The Wooldridge test-statistic was calculated as 77.0530 with a p-val of 0.0003. Accordingly, the null hypothesis stating that there is no autocorrelation problem in the model was rejected at 99% confidence interval.

Breush Pagan test hypotheses are shown below as follows:

H_0: There is no cross-section dependency

H_1: There is cross-section dependency

The test statistic for the Breush Pagan 1980 Cross-Section Dependency Test was calculated as 56.0400 with a p-val. of approximately 0. Accordingly, the null hypothesis stating that there is no cross-section dependency problem in the model was rejected at 99% confidence interval.

As a result, it can be said that there are problems of heteroscedasticity, autocorrelation and cross-section dependency in the first fixed-effect panel data model established. The model was re-estimated using the Driscoll Kraay standard error model to solve the existing varying variance, autocorrelation and cross-section dependency problems.

According to Driscoll Kraay standard error model results:

- In the adjusted model, the coefficient of the GDP variable did not change, but the p-val of the coefficient was calculated as 0.3800. Accordingly, the null-hypothesis states that this variable is statistically insignificant was not rejected at the 90% confidence interval, and it was concluded that the variable had a negative but insignificant effect on the IPO.
- Although the coefficient of the NPI variable did not change in the adjusted model, the p-val of the coefficient was calculated as 0.2990. Accordingly, the null-hypothesis states that this variable is statistically insignificant was not rejected at the 90% confidence interval, and it was concluded that the variable had a positive but insignificant effect on the IPO.
- Although the coefficient of the NFDI variable did not change in the adjusted model, the p-val of the coefficient was found as 0.3500. Accordingly, the null-hypothesis states that this variable is statistically insignificant was not rejected at the 90% confidence interval, and it was concluded that the variable had a positive but insignificant effect on the IPO.

5. Conclusion and Discussion

There are debt and equity financing alternatives that companies can use in their long-term financing decisions. The most well-known method among the equity financing alternative is going to public. In this method, firms sell a portion of the shares representing their capital to new investors and obtain a fund (IPO proceed) that can be used for long-term investments with no obligation to pay back.

There are many macro and micro variables examined in the literature that are accepted as effective in decision of IPO or in the timing of IPO.

In this study, the effects of gross domestic product, net portfolio investments and net foreign direct investments on the frequency of initial public offerings made in these countries' stock exchanges were investigated by using the data of six countries included in the sample in a panel structure. For this purpose, panel data analysis was conducted with the annual data of the 1999-2020 period for 6 countries and 4 variables. Before the panel data analysis, the presence of cross-section dependence in the model was investigated and the panel unit root test was applied, which was compatible with the results of the cross-section dependence test. According to the panel unit root test results, all variables were found to be stationary at the level. A standard model was created with the stationarized variables and tests of heteroscedasticity, autocorrelation and cross-section dependence were applied to the standard model. According to the results of these tests, the existing problems were solved by using the Driscoll Kraay standard error model, since the model had varying variance, autocorrelation and cross-sectional dependence.

As a result, it has been determined that the gross domestic product, net portfolio investments and net foreign direct investments in the model do not have a statistically significant effect on the public offering frequency. In the light of the findings, it can be stated that companies do not schedule the public offering in the countries included in the sample by looking at these variables. In other words, from test results it can be inferred that firms are not applying market timing strategy by taking into these macroeconomic indicators account. It is more beneficial for investors to follow other indicators which may provide signal for IPO trends. Other indicators like USD index investigated by Dai, Kang and Hu (2021) may be more powerful to estimate IPO trends since foreign exchange markets has nearly pure negative correlation with stock markets. By tracking forex market a reverse movement can be expected in stock markets.

Contrary to the studies in the previous literature, the findings obtained in the study show that macroeconomic indicators do not have an effect on the IPO decision of the companies. In this respect, the study differs from the previous literature.

Limitations of the Study and Suggestions for Further Researches

The sample of the study consists of developed world economies. More meaningful and inclusive results can be obtained as a result of analyzing the sample as 2 groups as developed and developing countries. Only 3 macroeconomic indicators, which are considered to have an impact on the IPO, were used as independent variables in the analysis. More meaningful and comparable results can be obtained if the number of these indicators is increased. In addition, not only macro variables, but also micro variables related to the company can be effective in the IPO decision of a company. For this purpose, classification of independent variables as macro and micro can also provide more comparable and comprehensive findings.

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Araştırma Makalesi

The Effect of Selected Macro-Economic Indicators on the Frequency of Initial Public Offerings: A Research on the G-7 Countries

Seçilmiş Makro-Ekonomik Göstergelerin İlk Halka Arzlarin Sıklığına Etkisi: G-7 Ülkeleri Üzerine Bir Araştırma

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1. Giriş

Firmalar uzun vadeli fon ihtiyaçlarını karşılamak için aldıkları kararlar sonucunda sermaye bileşenlerini belirlemektedir. Sermaye yapısı kararları, uzun vadeli finansman kararları ile ilişkili olduğundan stratejik öneme sahiptir. Tipik olarak firmaların sermaye artırmak için borç veya öz sermaye finansmanı yöntemleri olarak 2 alternatifi vardır.

Bilindiği üzere dış finansman aracı olarak borç finansmanı, şirkete mevcut ortağı dışında üçüncü kişi ve kuruluşlar tarafından sağlanan fonların aktarılmasını ifade etmektedir. Borç finansmanında, borç verenler (alacaklılar) firmanın hissedarı olmasalar da, firmanın nakit akışları üzerinde sağladıkları fon miktarına kadar mali talepte bulunabilirler. Borç finansmanının en temel unsurları vade, geri ödeme yükümlülüğü ve faiz tutarı/oranları olarak gösterilebilir. Finansal borcun maliyeti, firmanın üretim, satış vb. operasyonel işlemlerinden bağımsız olması nedeniyle firmanın karlılığı üzerinde baskı oluşturan sabit bir maliyet olarak tanımlanabilir.

Ancak sağlanan borcun mevcut veya yeni yatırımcılardan temin edilmesi durumunda sağlanan fon tutarı şirkete yeni bir sermaye girişini ifade eder. Firmaya sağlanan sermaye girişinde, borç finansmanından farklı olarak firma yönetim gücünü paylaşır ve elde edilen fon için geri ödeme zorunluluğu yoktur. Geri ödeme zorunluluğu olmadığı için firmalar sabit (sabit) geri ödeme maliyetine katlanmak zorunda kalmazlar. Bu, özkaynak yönteminin borç yöntemine göre avantajı olarak değerlendirilebilir. Ancak, elde edilen fon karşılığında yönetim gücünün yeni yatırımcılarla paylaşılmasına izin verdiği için firma yöneticilerinin öz sermaye finansmanı konusunda bazı endişeleri bulunmaktadır.

Firmalar, her iki yöntemin risk ve getirisine göre optimal sermaye dağılımını belirlemelidir.

Hem ilk halka arzlar hem de SEO'lar aracılığıyla halka arzlar, sermaye piyasalarında öz sermaye finansmanının en klasik örnekleridir. Halka arz, firmalar tarafından ilk kez yapıldığında ilk halka arz olarak tanımlanırken, daha önce borsada işlem gören bir şirketin tekrar halka arz etmesi ise dönemsel halka arz olarak ifade edilir.

Bu çalışmada halka arz terimi, halka ilk kez bir şirkete ortak olmaya davet edilmesi ve bu amaçla sermaye piyasası araçlarının satılması sürecini ifade eden İlk Halka Arz kavramı olarak kullanılacaktır. Halka arz ile ihraççı şirkete sattığı sermayeyi temsil eden paylar karşılığında nakit girişi sağlanmaktadır. İlk halka arzda elde edilen bu satış bedelinin genellikle uzun vadeli yatırım kararlarında kullanıldığı

gözlemlenmiştir. Bu modelde, ilk veya mevcut hissedarlar, faiz maliyetine katlanmadan uzun vadeli bir fon elde ederler, ancak bunun karşılığında firma sermayesindeki payları azalır.

Halka açılma kararı stratejik bir karardır, mikro ve makro olmak üzere birçok belirleyici faktörü bulunmaktadır. Bu çalışmada, bir firmanın halka arz zamanlaması üzerinde etkisi olduğu düşünülen seçilmiş makroekonomik göstergeler incelenecek ve bu göstergelerin ilk halka arz sıklığı üzerinde etkisinin olup olmadığı analiz edilecektir. Çalışmadaki veriler, G-7 ülkelerinin 1999-2020 yılları arasında yıllık olarak yapılan ilk halka arz sayısı, yıllık GSYİH, yıllık Net Doğrudan Yabancı Yatırım ve yıllık Net Portföy Yatırımı değişkenlerini kapsamaktadır. İlk halka arz sıklığı bağımlı değişken olarak analize dahil edilirken, diğer değişkenler bağımsız değişken olarak analize dahil edilmiştir.

Çalışmanın ikinci bölümünde halka arz kavramı ile ilgili teorik çerçeve incelenecek ve özellikle sıcak ve soğuk ihraç piyasaları kavramları kısaca açıklanacaktır. Üçüncü bölümde bu konuda hem ulusal hem de uluslararası literatürde daha önce yayınlanmış çalışmalar gözden geçirilecek ve çalışmanın analiz bölümünde seçilen makroekonomik göstergeler ile halka arz sıklığı arasındaki istatistiksel ilişki analiz edilecektir. Sonuç bölümünde ise elde edilen bulgular yorumlanacak ve değerlendirilecektir.

2. Metodoloji

Çalışmada panel veri analizi, zaman serisi ve yatay kesit modellerine göre daha geniş bir veri seti sunması, bu bağlamda daha güvenilir tahminler sağlaması ve bireysel heterojenliği kontrol etme avantajlarına sahip olması nedeniyle uygulanmıştır.

Öncelikle analize dahil edilen serilerin durağanlığını belirlemek için birim kök testi uygulanacaktır. Bilindiği gibi durağan olmayan serilerde sahte regresyon problemiyle karşılaşmak olasıdır.

Birim kök testi uygulanmadan önce, birim kök testinin türü belirlenmelidir. Bu amaçla yatay kesit bağımlılığı araştırılacaktır. Birim kök testinin ardından, söz konusu dönem için sabit etkiler ve rastgele etkiler modeli kurulacak ve tahmin edilecektir. Daha sonra Hausman testi ile sabit etkiler ve rastgele etkiler modeli arasında bir seçim yapılacaktır. Uygun model belirlendikten sonra son olarak model tahmin edilecek ve model uygunluk testleri yapılacaktır. Gerekli görülmesi halinde model düzeltilerek yeniden tahmin edilecektir.

3. Bulgular

Driscoll Kraay standart hata modeli sonuçlarına göre:

• Düzeltilmiş modelde GSYİH değişkeninin katsayısı değişmemiş ancak katsayının p-değeri 0.3800 olarak hesaplanmıştır. Buna göre sıfır hipotezi, bu değişkenin istatistiksel olarak önemsiz olduğunu belirtir ve reddedilmez. %90 güven aralığında, değişkenin halka arz üzerinde negatif ancak önemsiz bir etkiye sahip olduğu sonucuna varılmıştır.

• Düzeltilmiş modelde NPI değişkeninin katsayısı değişmemesine rağmen katsayının p-değeri 0.2990 olarak hesaplanmıştır. Buna göre sıfır hipotezi, bu değişkenin istatistiksel olarak önemsiz olduğunu belirtir ve reddedilmez. %90 güven aralığında, değişkenin halka arz üzerinde olumlu ancak önemsiz bir etkiye sahip olduğu sonucuna varılmıştır.

• Düzeltilmiş modelde NFDI değişkeninin katsayısı değişmemesine rağmen katsayının p-değeri 0.3500 olarak bulunmuştur. Buna göre sıfır hipotezi, bu değişkenin istatistiksel olarak önemsiz olduğunu belirtir ve reddedilmez. %90 güven aralığında, değişkenin halka arz üzerinde olumlu ancak önemsiz bir etkiye sahip olduğu sonucuna varılmıştır.

4. Sonuçlar

Firmaların uzun vadeli finansman kararlarında kullanabilecekleri borç ve öz kaynak finansmanı alternatifleri bulunmaktadır. Öz sermaye finansmanı alternatifleri arasında en bilineni halka açılma yöntemidir. Bu yöntemde firmalar sermayelerini temsil eden paylarının bir kısmını yeni yatırımcılara satarlar ve geri ödeme yükümlülüğü olmaksızın uzun vadeli yatırımlar için kullanılabilecek bir fon (halka arz bedeli) elde ederler.

Halka arz kararında veya halka arzın zamanlamasında etkili olduğu kabul edilen literatürde incelenen birçok makro ve mikro değişken bulunmaktadır.

Bu çalışmada, panel yapısında örnekleme dahil edilen altı ülkenin verileri kullanılarak gayri safi yurtiçi hasıla, net portföy yatırımları ve net doğrudan yabancı yatırımların bu ülkelerin borsalarında yapılan ilk halka arz sıklığı üzerindeki etkileri araştırılmıştır. . Bu amaçla 6 ülke ve 4 değişken için 1999-2020 dönemine ait yıllık verilerle panel veri analizi yapılmıştır. Panel veri analizi öncesinde modelde yatay kesit bağımlılığının varlığı araştırılmış ve yatay kesit bağımlılık testi sonuçlarıyla uyumlu olan panel birim kök testi uygulanmıştır. Panel birim kök testi sonuçlarına göre tüm değişkenlerin düzeyde durağan olduğu görülmüştür. Durağanlaştırılmış değişkenlerle standart bir model oluşturulmuş ve standart modele değişen varyans, otokorelasyon ve yatay kesit bağımlılığı testleri uygulanmıştır. Bu testlerin sonuçlarına göre model değişken varyansa, otokorelasyona ve yatay kesit bağımlılığına sahip olduğundan Driscoll Kraay standart hata modeli kullanılarak mevcut problemler çözülmüştür. Sonuç olarak, modelde yer alan gayri safi yurtiçi hasıla, net portföy yatırımları ve net doğrudan yabancı yatırımların halka arz üzerinde istatistiksel olarak anlamlı bir etkisinin olmadığı tespit edilmiştir. Elde edilen bulgular ışığında, örnekleme dahil edilen ülkelerde şirketlerin halka arzını bu değişkenlere bakarak planlamamaları gerektiği ifade edilebilir.