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The Asymetric Relationship Between Hedge Funds and Financial Indicators: Evidence From Turkey

Hedge Fonları ile Finansal Göstergeler Arasındaki Asimetrik İlişkiler: Türkiye Örneği

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Abstract:

As a result of the liberalization, technological developments, innovations in financial transactions and the formation of new financial instruments since the 1990s, hedge funds have taken their place in the financial markets. It has reached important points in the international markets due to the size of the transaction volume and being the investment fund of the super rich. Strategies used in hedge funds and risks arising from these strategies affect financial markets. Influence of financial markets directly or indirectly affects financial assets and financial indicators. In this context, the study aims to investigate the relationship between hedge fund investments in Turkey and financial indicators. For this purpose, weekly data covering periods 14.08.2015 - 17.01.2020 were used. Then traditional causality and Hatemi-J asymmetric causality tests (2012) were applied to analyze the time series data. As a result of the applied analyzes, both of symmetrical and asymmetrical relationships were determined between the mentioned variables.

Keywords: *Hedge funds, Financial indicators, Financial assets, Hatemi-J assymetric causality*

Özet:

1990'lı yıllardan itibaren yaşanan serbestleşme, teknolojik gelişmeler, finansal işlemlerdeki yenilikler ve yeni finansal araçların oluşması sonucunda hedge fonları, finansal piyasalarda yerini almıştır. İşlem hacminin büyüklüğü ve süper zenginlerin yatırım fonu olmasından dolayı uluslararası piyasalarda önemli noktalara ulaşmıştır. Hedge fonlarında kullanılan stratejiler ve bu stratejilerden doğan riskler finansal piyasaları etkilemektedir. Finansal piyasaların etkilenmesi doğrudan veya dolaylı şekilde finansal varlıkları ve finansal göstergeleri de etkilemektedir. Bu bağlamda çalışmada Türkiye hedge fon yatırımları ile finansal göstergeler arasındaki ilişkinin araştırılması amaçlanmıştır. Bu amaç doğrultusunda 14.08.2015 – 17.01.2020 dönemlerini kapsayan haftalık veriler kullanılmış, verilere önce geleneksel nedensellik daha sonra Hatemi-J asimetrik nedensellik (2012) testleri uygulanmıştır. Uygulanan analizler sonucunda konusu geçen değişkenler arasında hem simetrik hem de asimetrik boyutta ilişkiler tespit edilmiştir.

Anahtar Kelimeler: *Hedge fonları, finansal göstergeler, finansal varlıklar, Hatemi-J asimetrik nedensellik*

1.INTRODUCTION

In today's complicated financial markets, we hear colorful stories regarding to investors who trading in these markets. Some of the stories are harmful for those investors who lose money in their transactions. Meanwhile, some other investors gain remarkable profits to their accounts. Investors and policymakers are in terrible due to the rapid changes in economic growth and the consequences that happens in the world. It is widely accepted that the changes in financial indicators can generate global impacts on firm fundamentals either positively and negatively. These changes in financial indicators may cause investment opportunities, international transactions, cash flows, risk adjusted discount factors and also make uncertainty in the market. Therefore, investors are looking to find the most reliable way to in order to be surer in decision making.

Simultaneously, gaining money may not be consequence for hedge fund investors among all other investors in the market. This may because of the depth and breadth mean that hedge funds are providing to investors. Some researchers claim that the hedge funds are playing a priceless arbitrage role in decreasing or removing mispricing in financial markets. Because they are a significant source of liquidity in both of calm and stress periods. As also known that international investors have many opportunities to invest with. Different investment vehicles have provided various opportunities for investors and this makes financial markets more complicated, and also makes uncertainty in the market. However, therefore, due to the facilities that the hedge funds are providing to investors. Hedge funds are one of the most preferable vehicles in getting investors' attraction among all other vehicles in the market.

There are many definitions for hedge funds and they are described by many researchers in different ways. In the past two decades the hedge fund has grown from a small number of firms to a huge number of activities that managing billions of dollars in today's financial market activities. Hedge funds are known as non-widely public investment vehicles that privately organized and managing by professional investment managers. As well as, due to their great flexibility and wide range of investment alternatives the hedge funds are popular and well known in the industry of finance. An absolute return methodology is operated by hedge fund managers in order to eliminate risks and also maximize returns. Nonetheless, increasing profitable returns by operate of leverage, and hedge fund managers seize more opportunities than traditional mutual fund managers by taking both of short and long positions in their investment. Particularly in equities and this authorizing them to preserve assets during market downturns. The hedge fund investments have also many different characteristics that make give them a different face compared to the traditional investment firms such as mutual funds.

Financial indicators have a significant rule in the direction of financial markets. In other word, the fluctuations in financial indicators can cause many changes in financial markets. These changes can be considered as a source of macroeconomic risks and then uncertainty in economy. As we mentioned before, the hedge fund managers have the ability to deal with unexpected changes and uncertainties in the market. Therefore, this paper tries to examine the relationship between financial indicators and hedge funds by applying asymmetric causality test on the determined variables. The considered financial indicators in the study are including BIST-100 index, exchange rates of TL/USD and TL/Euro, Turkish bond index and free-risk interest rate in Turkey. In the last few years Turkey could develop its investment fund strategy due to the legislations that determines several sorts of funds and set up there. Nevertheless,

foreign investment funds are allowed to trade on Turkish capital markets and sell their assets with its national currency and then encounter the criteria of the Capital Market Board (CMB) which is in charge with the confirmation of all kinds of investment funds including hedge funds. Due to its higher risk and complex portfolios, hedge funds are only available to wealthy accredited individuals and/or professional investors in Turkey.

This study aims to investigate the asymmetric relationships between financial indicators and hedge funds on Turkish capital market. The considered financial indicators that this study includes are BIST-100 index, exchange rate of TL/Euro, exchange rate of TL/USD, Turkish bond index and free-risk interest rate. The time series data has been collected from Thomson Rueters which starts from 14.08.2015 and ends from 17.01.2020 based on weekly data. The assymetric causality test is applied to analize the collected data. The study is divided by five diffirent sections. The first section provides an introduction regarding to the aforementioned title. The second part throws light on empricial studies concering the financial indicators such as BIST-100 index, exchange rate, Turkish bond index and free-risk interest rate and then explains the term of assemetric casuality test. The third part describes the data and methodolgy of the study. The findings and data analysis take places in the forth part and then a brief conclusion will be givin in the last section.

2.LITERATURE REVIEW

It is very clear that the hedge funds have an important role in today's financial markets. The landscape of hedge funds is different than traditional vehicles, such as mutual funds. They may affect the balance of supply and demand of assets in financial markets with their high transaction volumes. And this may asymmetrically impact the prices and/or returns of alternative financial assets in the market. Despite the fact that the term of hedge funds is back to 1949, but its industry has been one of the fastest growing sectors inside the financial services industry. Jaeger (2003) stated that many investors are not qualified to treat with hedge funds and they are not for everybody (Jaeger, 2003, 340). Bali, Brown and Caglayan (2014) studied both of the hedge funds and mutual funds to measure the newly impacts of macroeconomic risks that elucidated as economic uncertainty in the market. They found a significant relationship between uncertainty beats and hedge funds; meanwhile no significant relationship existed for mutual funds. Therefore, they argued that the macroeconomic risks can be a forceful determinant upon the cross-sectional distinctions in hedge fund returns. The study also mentions that the changes in financial indicators can be determined by directional and semi-directional hedge fund managers via increasing/decreasing the exposure of their portfolios in order to determine the changes in macroeconomic factors when uncertainty is high/low (Bali, Stephen, & Caglayan, 2014, 1-19). Lambert and Platania (2016) studied the macroeconomic uncertainties and hedge fund styles. They found that the hedge fund managers can observe the macroeconomic changes by up and down. Nonetheless, they showed that the managers can also control their exposure the economic uncertainty in the market (Lambert & Platania, 2016, 3-29). According to her study, Zhou claimed that the growth of hedge funds is surprisingly changed compared to the last decades. As we take a look at the number of hedge funds from year 1968 there were nearly 200 hedge funds, meanwhile, after 34 years and exactly in year 2002 the total number of hedge funds were jumped to 2000 hedge funds and then reached 10,000 by the end of 2015. Furthermore, its growth includes both of the number of funds and Assets Under Management (AUM), the study also mentions that the total number of AUM between 1997 and 2018 has recorded 2335% of growth (Zhou, 2019, 2-38). Kamisli and Temizel (2019) studied the time varying efficiency structure of regional hedge

funds in different countries. Therefore, they applied the Harvey at al test and then they employed KSS unit root test in order to determine the nonlinear hedge fund indices. The findings show that the weak form efficiency of determined hedge funds changes over time (Kamisli & Temizel, 2019). A study by Kamisli (2020) which analysis the relationship between hedge fund investments and returns of financial assets in Turkey demonstrated a causality relationship between the hedge fund investments and financial assets returns. The results show that the hedge funds have a great share in directing foreign exchange markets. Moreover, it is found that the hedge funds preferred the high-risk assets in the market (Kamisli M., 2020). Direkci and Eksi (2020) studied the five years data to analyze the performance of hedge funds in Turkey. They could show that more than 90% of hedge funds have positive retunes based on monthly data during 2014-2017 years (Direkci & Eksi, 2020, 855-876).

One of the most important terms that have a key role in financial market performance is financial indicators. The changes in each financial indicators can impact business activities in the market. Hence, there are many academic researches reagrding to the impacts of the financial indicators in the market. Altin (2014) examined the impacts of exchange rate on stock prices by taking evedince from BIST-100 index. According to the application results, there is a signififcant relationship between the taken variables. Furthermore, they mentioned that international currencies also have various impacts on the stock market in Turkey (Altin, 2014, 65-78). Yang, Kim, Kim and Ryu (2017) used SVAR model to eximine the shocks of macroeconomic variables on key indicators containing Korian stock markets. They found that the supply shcoks do not influnce stock returns compering to the way that demand shocks do. Hence, the results of the study support both of the demand and supply shocks in stock market returns (Yang, Kim, Kim, & Ryu, 2017, 757-773). Lee and Ryu (2018) studied the impacts of macroeconomic shocks on stock price movements by appling ARDAL and nonlinaner model. The results of ARDAL model showed a insignificant relationship between the indicators. Meanwhile, the results of nonlinaner model indicate a significant and negative long run impact for every discribed varibale (Lee & Ryu, 2018, 343-359). Basarir (2018) studied the volatility structure of exchange rate as an indicators and stock price indiecs by taking Turkey as evidence. The results of the study demonistrate that the variables are linked together and all the sereis have their volaility (Basarir, 2018, 331-349). Kwetcezer and Akerlind (2018) stuied hedging foreing exchange exposure in private equity by applying financial derivatives. They could prove that a higher internal rate of return can not be achvied by private hedges funds via hedging their tradings. They also found that forward exchange rate is a suprior estimation for future exchange rate (Akerlind & Kwetczer, 2018, 5-132). Cinguz and Kendirli (2019) researched the impacts of exchange rate of US dolar and BIST-100 index on gold prices in Turkey. The time series data was collceted from Jun 2006 to Jun 2018 and data was analyzed by using Johansen cointegration test and VECM in order to show both of the long term and short term relationships between the variables. The results show that the price of gold cointegrates with both of exchange rates for US dolar and BIST-100 for long term. Meanwhile, no casuality determined for short term times between the variables (Cingoz & Kendirli, 2019, 545-554).

Boskovska (2013) researched the problems in selecting risk free returns. These difficulties that the researcher pointed out in the article are disclosure to the risk of government default, alteration the risk free rate of return over time and also the deficiency of government bonds on the capital markets are the problems that the article throws light on (Boskovska, 2013, 70-73). Gunay (2014) studeid the total risk composition of the manufacturing firms trading on BSIT-100 index from Oct 1998 to Jun 2013. Different models like FGLS ,Pooled OLS, Random and Fixed effect models are used in the study in order to analyze

the collected data. According to the results, external risks have lower impact on composition risk within the examined companies (Gunay, 2014, 1150-1167). Nakamura and Steinsson (2018) demonistrated the assumptions of unexpected changes in interest rate after 30 mintue announcements by Federal Reserve regarding to monetory policy. In response to higher interest rate, nominal and real interest rates increase approximately one for one, while the response for inflation is not that big. Furthermore, the response of predections regarding to outputs also rises. At the same time, they bulid a model to determine the effects of Fed annuncements, these announcements not only effect the monetory policy, but also have impact on the beliefs concerining to other economic fundamentals. They belive that their model hint the important role of information effects in the whole causal effect of monetary policy shocks on outputs (Nakamura & Steinsson, 2018, 1183-1330). Eyuboglu and Eyuboglu (2018) studied the relationship between the stock indices in Istanbul stock exchange and exchange rates of Euro/TL and Dollar/TL from January 2011 to May 2016 based on daily data. The ARDL model was applied in order to analyze the relations. They could find that there is a long term relationship bteween exchange rate of Euro/TL and some indices in the market (Eyuboglu & Eyuboglu, 2018, 8-28). Binsbergen, Diamon and Grotteriia (2019) studied the risk free interest rates in order to estimate them and inerring them from future prices and risky options. As well as, they appraised that the risk free interest rates is uninfluenced by convenience yield on safe asstes. According to the results, most of the convenience yields strongly responded the policy of central bank during financial crisis (Binsbergen, Diamond, & Grotteria, 2019, 1-47). Demir (2019) used quarterly data which starts from first quarter of 2003 and ends with forth quarter of 2017 by appling ARDL model to analyze the impacts of some financial indicators on BIST-100 index. The results suggest that the Turkish stock makret needs greater international capital inflows, lower energy with lower investment costs and also a stronger domestic currency was suggested in the study (Demir, 2019, 2-14). Soyaslan (2019) studied both of long term and short term relationships between the exchange rates of TL/USD and TL/Euro and BIST Tourisim Index in Turkey. The data was collected from January 2, 2015 to March 30, 2019 based on daily data, the time data series analyzed by using economitric analysis method. The findings of the study show that there is no long term relationship between the two variables. Meanwhile, there was a change from Euro shocks to BIST Tourism Index by 5% and 10% short term relation was found from shock of USD to the index (Soyaslan, 2019, 774-793).

Hatemi-J (2011) studied the asymmetric granger causality and determined its cumulative for pozetive or negative shocks, as well as, the economic performance of three different Scandinavian countries was demonistrated in the study. The findings of the study show that allowing asymmetry in the causality testing have a singificant echo for the underlying causal speculation (Hatemi-J, 2011, 1-11). Hatemi-J (2012) in his article argues some reasons for the existence of Assymetric casuality test by using cumulative sums for shocks ethier negative or pozitive. The outcomes of the study show that there is an effecincy in equity market regarding to the shock in the oil without considration for pozetive or negative shocks (Hatemi-J, 2012, 447-456). Yildirim and Ozturk (2014) used both of assymetric and non-assymetric causality test in order to investigate the oil prices and industrial production in G7 countries by taking monthly data between 2003 and 2013 years. The applied methods provied various results, according to non-assymetric causality test the shocks from oil prices can impact the industrial production index. Meanwhile, the asymmetric test results indictae that there is no reflection from oil price shocks to industrial production (Yildirim & Ozturk, 2014, 1020-1024). Alper and Oguz (2016) used both of ARDL and asymmetric causality test approach in order to test the causality among some economic indicators for EU member countries. The considered financial indicators were renewable

energy consumption, capital, economic grwoth and labor in the aforementioned countries between 1999-2009 period. The findings show that the renewable energy consumption pozetively impacts the economic growth in new EU member countires (Alpera & Oguz, 2016, 953-959). Kamisli, Kamisli and Ozer (2016) applied the asymmetric causality test which developed by Hatemi-J (2012) over the collected weekly data from 2005 to 2015 to determine the asymmetric interactions between the performance of hedge funds. The findings of asymmetric causality test indicate only one evidence of causal relations between hedge funds' performance based on the nature of the country. for example, the shocks in one country can have both of positive and negative impacts on other counters, such as the case of causality relations from Latin America to Asia and Europe (Kamisli, Kamisli, & Ozer, 2016, 214-231). Ozer, Yagcıbası and Karaoglan (2017) investigated the impacts of military expenditures on economic growth by determine the asymmetry causality between the moentioned variables. They used time varing asymmetric causality test to show the relations. The results show that there is a unidirectional causality between mentioned indicators. Moreover, the reuslts demonistrate that the shcoks from one variable can impact other variables (Ozer, Yagcıbası, & Karaoglan, 2017, 900-907). Farhani and Solarin (2017) applied a newly developed unit root test with asymmetric causality test to exam the series for four different decades which started from first quarter of 1973 and ends from fourth quarter of 2014. The study aimed to analyz e the situations for different financial indicators. The findings of asymmetric causality test showed that energy demand can be affected by FDI, capital granger, trade and real GDP in the long term, meanwhile, a feedback effect was found for trade and FDI (Farhani & Solarin, 2017, 1029-1037).

3.DATA AND METHODOLOGY

This study demonistrates the assymetric relationships between hedge funds and aforementioned financial indicators. Therefore, we applied the assymetric causality test which developed by Hatemi-J (2012). The data analysis by assymetric causality test is explaned below:

In the 1st and 2nd equations, the causality relationship between y_{1t} and y_{2t} variables is defined by random walk processes, as shown below:

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i} \quad (1)$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i} \quad (2)$$

Here, the constants t=1,2,... T, T, $y_{1,0}$ and $y_{2,0}$ denote initial values and the white noise error terms ε_{1i} and ε_{2i}. The positive and negative shocks are shown in 3rd equation;

$$\varepsilon_{1i}^{+} = maks\ (\varepsilon_{1i}, 0)\ \varepsilon_{1i}^{-} = min\ (\varepsilon_{1i}, 0)$$

$$\varepsilon_{2i}^{+} = maks\ (\varepsilon_{2i}, 0)\ \varepsilon_{2i}^{-} = min\ (\varepsilon_{2i}, 0) \quad (3)$$

Here, $\varepsilon_{1i} = \varepsilon_{1i}^{+} + \varepsilon_{1i}^{-}$ ve $\varepsilon_{2t} = \varepsilon_{2i}^{+} + \varepsilon_{2i}^{-}$. Thus 1st ve 2nd equations can be writtin as below;

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}^{+} + \sum_{i=1}^{t} \varepsilon_{1i}^{-},$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}^{+} + \sum_{i=1}^{t} \varepsilon_{2i}^{-} \quad (4)$$

The positive and negative shocks of each variable can be shown in the cumulative form as follows;

$$y_{1i}^{+} = \sum_{i=1}^{t} \varepsilon_{1i}^{+} \quad , y_{1i}^{-} = \sum_{i=1}^{t} \varepsilon_{1i}^{-}, y_{2i}^{+} = \sum_{i=1}^{t} \varepsilon_{2i}^{+}, y_{2i}^{-} = \sum_{i=1}^{t} \varepsilon_{2i}^{-} \quad (5)$$

In the methodology developed by Hatemi-J, the causality relationship between variables can be tested

by using the delayed vector autoregressive model (VAR (p)) as given below based on the assumption of $y_t^+ = (y_{1t}^+ + y_{2t}^+)$;

$$y_t^+ = v + \emptyset_1 y_{t-1}^+ + \cdots + p y_{t-p}^+ + u_t^+ \qquad (6)$$

As can be seen, y_t^+ is a 2x1 vector of variables, v is a 2x1 vector of constant terms and u_t^+ is a vector of error terms. The matrix $\emptyset_r$ is the 2x2 matrix of parameters with r ($r =$ delay. In the asymmetric causality test, the absence hypothesis $(H_0: C\beta = 0)$ which states that there is no causality is tested with the following Wald statistics;

$$Wald = (C\beta)'[C((Z'Z)^{-1} \otimes S_U)C']^{-1}(C\beta) \qquad (7)$$

The time series data is collected from Thomson&Reuters data stream and Turkish central bank which starts from 14.08.2015 and ends with 17.01.2020. The variabels are include hedge fund investments (HEF) and financial indicators like: BIST-100 index (BIST), exchange rate of TL/USD (USD), exchange rate of TL/Euro (EUR), Turkish bond index (TBI) and free-risk interest rate (FRI) based on weekly data.

4.DATA ANALYSIS

Data description will be the first step in our study. For that purpose, we first tried to draw a descriptive statistics table regarding to the hedge fund investments and financial indicators in Turkey as shown in the table below:

Table 1. Descriptive Statistics

	Mean	Std. Dev.	Skewness	Kurtosis	Jarque-Bera
HEF	14.16	0.267	0.193	1.622	19.79*
BIST	11.42	0.146	-0.154	1.884	12.95*
EUR	1.517	0.279	0.136	1.509	22.20*
FRI	4.861	0.070	0.195	2.443	4.472
TBI	2.508	0.200	0.589	2.012	22.85*
USD	1.394	0.271	0.250	1.553	22.63*

*1%, **5%, ***10%

As can be seen in the table above, Both of the Hedge funds and BIST 100 index have recorded the most highre averages among all other indicators. On other hand, all indicators have shown a higher volatility except the risk-free interest rate. Moreoever, out of the BIST-100 index all other variables provided a pozetive volatility. However, it has been determined that these variables generally have low kurtosis values. According to the Jarque-Bera test results Turkish hedge fund investments, BIST100 index, TL/Euro exchange rate, Turkish bond index and TL / USD rate series are normally distributed. Meanwhile, risk-free interest rate series is not normally distributed. In order to determine the stationary status of the series, we applied the Ng-Perron unit root test to show the resutls of the unit root test. The results are tabled below:

Table 2. Ng-Perron Unit Root Tests

	Constant				Constant & Trend			
	MZa	**MZt**	**MSB**	**MPT**	**MZa**	**MZt**	**MSB**	**MPT**
HEF	1.413	2.204	1.159	174.0	-6.408	-1.790	0.279	14.21

BIST	-0.387	-0.170	0.440	15.41	-8.927	-2.077	0.232	10.34
EUR	0.914	1.044	1.141	87.44	-8.704	-2.056	0.236	10.58
FRI	-8.642	-2.009	0.232	3.104	-13.16	-2.563	0.194	6.934
TBI	-1.597	-0.892	0.558	15.31	-2.806	-0.805	0.286	22.77
USD	0.982	1.052	1.071	78.91	-8.217	-2.019	0.245	11.11

According to the Ng-Perron test results that has shown in the table above Hedge fonds, exchange rate of TL/Euro, risk-free interest rate, Turkish bond index and exchange rate of TL/ USD variables are not stationary in both of constant and constant & trend sechduales. Furthermore, the unconditional correlations between hedge funds and financial indicators in Turkey are placed in the table below:

Table 3. The Unconditional Correlations between Hedge Funds and Financial Indicators in Turkey

BIST_HEF	0.661	FRI_HEF	-0.137
EUR_HEF	0.968	TBI_HEF	0.832
USD_HEF	0.962		

According to the applied unconditional correlations between hedge funds and financial indicators, there is a pozetive relationship between hedge funds and financial indicators like BIST-100 index with (66%), TL/Euro with (96%), Turkish bond index with (83%) and exhchange rate of TL/USD by (96%). On other hand a negative relationship is determined between the hedge funds in Turkey and free-risk interest rate with (-13%). And then, we employed Granger causality test and Assymetric causality test in order to determine the causality between the aforementioned variables. The table below provides the results of Granger causality test:

Table 4. Granger Causality Test

BIST ≠ > HEF	0.292	HEF ≠ > FRI	0.490
HEF ≠ > BİST	0.297	**TBI = > HEF**	**0.000**
EUR ≠ > HEF	0.681	**HEF = > TBI**	**0.000**
HEF = > EUR	**0.000**	**USD = > HEF**	**0.000**
FRI ≠ > HEF	0.688	**HEF = > USD**	**0.000**

Granger causality test provides different results about the causality between the variables. As we look at the relationship between the Hedge funds in Turkey and Turkish bond index and exchange rate of TL/USD we can see that there is a two way causality between both of the variables. Meanwhile, there is no causality between the BIST-100 index and free-risk interest rate with hedge funds. Nonetheless, a one way causality relationship was found between hedge funds and exchange rate of TL/Euro. However, the assymetric effects is not provided by Granger causality test. Therefore, in the last section of the our analyzation process we applied the Assymetric causality test which develpoed by Hatemi-J (2012) in order to show the causality between the variables. The results are shown in the At-1 table.

Asymmetric causality test outcomes display complicated causality relationships between the hedge fund investments in Turkey and financial indicators like: Turkish bond index, exchange rates of TL/Euro and TL/USD. These results can be supported by the study that ended up by (Kamisli M., 2020) which provide the same results. However, a one-way causality relationship was found between BIST-100 index and free-risk interest rate. Nevertheless, the positive shocks of Turkish hedge fund investments have a

positive impact on BIST-100 index. As well as, the same shock from hedge fund investments can impact the exchange rates of TL/Euro and TL/USD either positively or negatively. On other hand, that will be the cause of reduction in free-risk interest rates and fluctuations in exchange rate of the aforementioned currencies. Furthermore, the positive shocks of TL/USD and TL/Euro exchange rates can negatively impact the hedge funds in Turkey. And also, the decreases in Turkish bond index can increase and/or decrease the activity of hedge fund investments in Turkey.

5.CONCLUSION

The study aims to determine the relationship between hedge funds in Turkey and financial indicators such as: BIST-100 index, exchange rate of TL/USD, Exchange rate of TL/Euro, free-risk interest rate and Turkish bond index. Therefore, we first empolyed the unconditional correlations test to determine the relations between the variables. And then, we applied both of Granger causality test and Assymetric causality test in order to show the causality relationships. According to the findings of unconditional correlation test the relationship between hedge funds and financial indicators like: BIST-100 index, TL/Euro, TL/USD, and Turkish bond index is a pozitive relationship. Meanwhile, the relationship between hedge funds and free-risk interest rate is negatvie. This result shows that in case of increase in hedge fund investments the financial indicators like BIST-100 index, Turkish bond index, TL / Euro and TL / Dollar exchange rate also increased.

Moreover, the results of Granger causality test provides different outcomes. There is no causality relationship between hedge funds and free-risk interest rate. However, a two way causality result is considered between the hedge funds and TL/USD exchange rate. Meanwhile, a one way causality is determined for the rest of variables. On other hand, Assymetric causality test results provide varius scenarios between the aforementioned variables. It means that the relationship between hedge fund investments and Turkish bond index, exchange rates of TL/USD and TL/Euro is different from each other. Therefore, the investors have to be more careful due to the impacts of the variables on each other. As we look at the relationship between free-risk interest rate and hedge fund investmetns, we can see that the decreases of hedge funds investmentes is linked to the reduces of free-risk interest rate. In other words, the deceases of free-risk interest rates have a direct impact on hedge fund investments in Turkey. The sitiuation can natuarly explan as hedge fund investments will not have the same expected returns while these reductions happen to the free risk interest rate. In addition to that, the hedge funds are high-risk bonds and risk-free investment instruments have lower risks than hedge funds. The decrease in the demand for high-risk investment instruments also decreases the demand for the risk-free investment instrument, therefore, the risk appetite of the investors decreases. This result shows that investors want to protect their money.

In summary, when all the results are evaluated together; the hedge fund investors in Turkey that trading with identified financial indicators, particularly TL/Euro TL/dollar exchange rates and the the index of bonds can be recommended in order to have a better decision making and better retuns in their investments.

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At 1. Asymmetric Causality Test

		Critical B. Values					**Critical B. Values**		
	Wald Ist.	**1%**	**5%**	**10%**		**Wald Ist.**	**1%**	**5%**	**10%**
$BIST^{+} \neq > HEF^{+}$	0.005	7.503	4.081	2.828	$HEF^{+} \neq > FRI^{+}$	0.423	7.491	4.067	2.856
$BIST^{-} \neq > HEF^{-}$	1.483	9.523	4.082	2.585	$HEF^{-} = > FRI^{-}$	**2.732**	6.986	3.892	2.684
$BIST^{-} \neq > HEF^{+}$	0.045	8.696	4.059	2.678	$HEF^{-} \neq > FRI^{+}$	1.160	7.125	3.879	2.744
$BIST^{+} \neq > HEF^{-}$	2.061	8.266	3.947	2.711	$HEF^{+} \neq > FRI^{-}$	2.690	7.687	4.249	2.911
$HEF^{+} = > BIST^{+}$	**3.489**	7.105	3.973	2.775	$TBI^{+} = > HEF^{+}$	**25.83**	11.73	6.676	4.786
$HEF^{-} \neq > BIST^{-}$	1.536	9.540	4.049	2.642	$TBI^{-} = > HEF^{-}$	**14.67**	8.351	3.946	2.686
$HEF^{-} \neq > BIST^{+}$	0.318	7.105	3.863	2.736	$TBI^{-} = > HEF^{+}$	**3.346**	7.968	4.063	2.634
$HEF^{+} \neq > BIST^{-}$	0.908	7.306	3.985	2.739	$TBI^{+} \neq > HEF^{-}$	0.003	8.026	3.983	2.742
$EUR^{+} \neq > HEF^{+}$	1.176	10.04	4.436	4.671	$HEF^{+} \neq > TBI^{+}$	1.221	11.37	6.362	4.604
$EUR^{-} \neq > HEF^{-}$	0.027	9.798	5.964	4.586	$HEF^{-} \neq > TBI^{-}$	0.881	7.757	3.815	2.685
$EUR^{-} \neq > HEF^{+}$	2.084	9.718	6.226	4.658	$HEF^{-} \neq > TBI^{+}$	1.516	8.379	4.049	2.778
$EUR^{+} = > HEF^{-}$	**8.137**	9.371	6.207	4.727	$HEF^{+} = > TBI^{-}$	**7.103**	7.849	3.985	2.629
$HEF^{+} = > EUR^{+}$	**98.54**	10.03	6.160	4.702	$USD^{+} \neq > HEF^{+}$	0.154	9.580	6.379	4.832
$HEF^{-} = > EUR^{-}$	**21.43**	9.833	6.091	4.702	$USD^{-} \neq > HEF^{-}$	1.083	10.30	6.322	4.707
$HEF^{-} = > EUR^{+}$	**4.791**	7.360	4.001	2.697	$USD^{-} \neq > HEF^{+}$	0.138	9.810	6.137	4.622
$HEF^{+} = > EUR^{-}$	**5.025**	7.116	3.916	2.664	$USD^{+} = > HEF^{-}$	**15.54**	10.18	6.536	4.822
$FRI^{+} \neq > HEF^{+}$	0.826	6.708	3.970	2.771	$HEF^{+} = > USD^{+}$	**214.4**	10.55	6.342	4.781
$FRI^{-} \neq > HEF^{-}$	1.327	6.895	3.723	2.615	$HEF^{-} = > USD^{-}$	**72.41**	10.82	6.389	4.808
$FRI^{-} \neq > HEF^{+}$	0.230	6.866	3.886	2.756	$HEF^{-} = > USD^{+}$	**11.63**	10.76	6.443	4.794
$FRI^{+} \neq > HEF^{-}$	0.079	7.859	4.159	2.835	$HEF^{+} = > USD^{-}$	**5.336**	10.98	6.466	4.750