The effect of hot money on stock exchange index exchange rates and interest rates: the case of Turkey

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Abstract

Hot money flows refer to short-term foreign currencies entering the country's economies through short-term loans and portfolio investments. The purpose of the study is to determine the impact of hot money flows in Turkey on stock exchange index, exchange rates and interest rates. For this purpose, BIST-100 Index closing values, US dollar exchange rates and five-year Treasury bond interest rates were considered to explain hot money data. The data are in an annual frequency and the analyses were made for the period between 1989 and 2019. The structural equation model was applied in the study. The model fit index values that helped to determine the success rate of the established model was examined before passing on to the analysis. According to the model fit index values, it was determined that the model was compatible with the data. It was found that hot money has a positive effect on the stock exchange index and a negative effect on interest rates and exchange rates.

Keywords: hot money, exchange rate, interest rate, stock exchange index, structural equation model

Introduction

The foreign capital investments needed for the development of countries have also caused disagreements for years due to the possibility of dragging the economy into a downturn. While it seems advantageous for national economies to attract foreign capital by some segments, some see it as objectionable, especially if foreign capital comes suddenly and contributes to economic welfare and then leaves the country within a short term again. This causes the economic balance to deteriorate. Therefore, what is important here is that both long and short-term foreign capital investments should be allowed to enter the country at a level that does not harm national economic policies.

Hot money flows refer to short-term foreign currencies entering the country's economies excluding exports, tourism revenues and direct investments (Bulut and Aykırı, 2018, p. 541). Hot money flows, which are an important part of the financial liberalization policies implemented in the world economy after the 1980s have a significant impact on the macroeconomic variables in the countries. It is known that hot money investments, which became more attractive with the high

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interest and low exchange rate policy implemented with the effect of liberalization, affect many variables such as current account deficit, inflation, stock exchange indexes, loan volumes, exchange rates, foreign trade, growth, confidence indexes and interest rates.

Hot money flows are also very important for the economies of the country (Chari and Kehoe, 2003, p. 1275). Because a large portion of the hot money investments in Turkey is known to be in stock, it is possible to say that hot money has a significant impact on the stock exchange. Foreign exchange rates are also affected by this situation as foreigners convert their foreign currency into Turkish Lira (TL). It is also possible that hot money flows, especially towards countries with high interest rates, may have an impact on interest rates at the end of the short-term investment period. In this context, the purpose of the study is to determine the impact of hot money on stock exchange index, exchange rates and interest rates for the period covering the years 1989-2019 in Turkey. In line with this purpose, firstly, information was given about hot money and its economic effects and the relevant literature was summarized by examining the studies on the subject. The data set and the methodology for the structural equation model to be applied in the study were explained in detail and the findings obtained were evaluated.

Most of the studies on hot money are aimed at examining the impact of hot money flows on economic crises. These studies were generally conducted to theoretically examine macroeconomic variables on which hot money is effective, and to interpret the relationship between them. On the other hand, the number of studies on hot money flows supported by empirical findings was found to be few. In addition, only one study was found on the relationship between hot money and stock exchange index. Since this study covers a long period of 31 years and is supported by empirical analysis, it is believed to make an important contribution to the literature. For future studies, it could be suggested that factors affecting hot money and factors affected by hot money can be evaluated together and comparisons can be made between countries.

1. Hot Money and Its Economic Impacts

Countries meet their foreign financing needs through direct and indirect foreign capital investments. In the long term, foreign direct investments, which express the investments of investors in the form of real estate acquisition, establishment of a new factory, becoming a partner in an existing factory and thus creating production, employment and added value, are preferred by both developed and developing countries. On the other hand, indirect foreign capital investments, which are short-term and include portfolio investments such as the purchase of stocks and bonds, are one of the

methods used to overcome the foreign resource deficit of especially developing countries (Turan, 2011, p. 2).

Hot money differs from short-term capital movements in terms of its high mobility and rapid entry into the market and exit from the market (Turan, 2011, p. 2). Although it does not have a generally accepted definition, the concept of hot money is defined as expected return rates and capital flows that react immediately to changes in risks. Therefore, unlike short-term capital movements, hot money includes portfolio investments consisting of stock and government debt securities as well as net errors and omissions, and are calculated as shown in Figure 1 (www.tcmb. gov.tr.):

Figure 1. Components of hot money

Hot Money	=	Portfolio Investments	➡	● Foreigners' domestic stock purchase / sales, ● Foreigners' buying / selling domestic government debt securities.
		+		
		Short Term Capital Movements	➡	● Short-term loans extended abroad by banks, ● Short-term loans used by resident banks and non-banking private sector from abroad, ● Change in short-term deposits held by foreigners in resident banks.
		+		
		Net Errors and Omissions		

Source: Central Bank of the Republic of Turkey, www.tcmb.gov.tr

Common cause of crisis in Turkey such as 1994 interest rate crisis, 2000 financial crisis, 2001 crisis called black Wednesday and the 2008 crises is the high rate of capital outflows from the country. Hot money flows constitute an important part of these capital movements. Reduction of the interest rates without favourable conditions after the removal of the obstacles to capital movements caused the 1994 crisis, while the increasing risk of both interest rates and exchange rates caused the 2000-2001 crisis and high-rates of capital outflows are seen as important reasons of the 2008 global crisis. Thus, the first effect of liberalization on Turkey's economy was the need for borrowing and basing its financing on hot money flows (Bulut and Aykırı, 2018, pp. 542-543). It was seen that hot money fled from Turkey in the recent 2018 exchange rate shock[2] and during the 2020 pandemic crisis. It is

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[2] Exchange rate shocks is a term used to describe when the value of one currency spikes relative to another in an extremely short period of time. Exchange rate shocks have a significant impact on inflation, interest rates, and trade, just to name a few (www.nasdaq.com). As a result of sudden changes in exchange rates, the exchange rate shock was experienced in Turkey in August 2018.

noteworthy that especially with the pandemic process, from the beginning of 2020 until the middle of August, foreign investment from the stock and the bond market amounted to approximately 12.5 billion US dollars. Their share in the stock market fell below 50 % and plummeted to historical lows in government debt securities with 4 % (www.dunya.com).

Hot money is also expressed as the money that adds momentum to the event in a volatility situation and causes the movements/flows to gain strength. If there is a negative change in the risk perception of the investors, the foreigners try to get the hot money abroad immediately, and this causes the economy to become vulnerable to foreign impacts. Therefore, the increase in political and economic risks in a country may cause hot money to leave the country rapidly, and this situation may cause instability in financial markets and with its effect in all markets. (Özyıldız, 2017; Eğilmez, 2014). Hot money movements that can lead to instability and even crises in the markets also refer to the flow of capital from one country to another in order to catch the short-term profits in the interest rate or the expected changes in the exchange rate. According to this definition, with high interest rates and low exchange rates, hot money entering countries affects exchange rates and interest rates, stimulating stock markets and providing resources to economies (Martin and Morrison, 2008, pp. 1-3).

Since the acceleration of capital mobility reduces the predictability of financial crises, regulators are working on various measures such as the Tobin tax to reduce the rate of capital change. Although the Tobin tax brings various questions regarding its implementation, it is regarded as a solution to prevent sudden exchange rate fluctuations by controlling short-term speculative movements. It is emphasized that macroeconomic stability could be achieved by applying this tax in the same way and rate all over the world (İnam, 2014). Therefore, policies of hot money are among the economic issues that should be evaluated carefully for countries. Indeed, the amount of hot money, used especially in financing the current account deficit in Turkey between the years 2010 and 2014, ranged between 155 billion Dollars and 131 billion Dollars, whereas it declined to an average level of 20 billion Dollars in 2016 and 2017 (www.dunya.com; www.tcmb.gov.tr). On the other hand, it was observed that there were more hot money outflows in 2015, 2018 and 2019 and they surpassed hot money inflows.

2. Literature Review

Hot money flows have been the subject of numerous studies since the 1990s. Although the number of studies examining the relationship between hot money and economic crises are high in number, the relevant literature is presented below briefly.

Corbo and Hernandez (1996) investigated the capital movements of four Latin American and five East Asian countries in the period between 1986 and 1993 in order to reveal their effects on the economy theoretically. As a result of the study, it was emphasized that short-term capital movements caused instability and crises in the economy. It was stated that when necessary, restrictions could be imposed on short-term capital inflows to countries. Agenor *et al*. (1997) studied the relationship between monetary policy, real exchange rate and capital movements in Turkey in the period covering the years 1987 to 1995 using the vector autoregressive (VAR) method. They concluded that the real exchange rate gave a meaningful response to positive shocks in interest rates and capital movements. In addition, it was stated that capital inflows to the country occurred when there was deterioration in the fiscal balance and an increase in interest rates. Kara (2001) analysed the economic effects of hot money flows for the period 1980-1997 using a stepwise multiple regression estimation method. In the model, Gross Domestic Product (GDP) was taken as the dependent variable, whereas annual foreign credit utilization, total foreign exchange income and current balance were considered as independent variables. As a result of the study, it was stated that the financial liberalization process, which provides high revenues to hot money holders in the short term, has serious negative effects on macro economy.

Berument and Dincer (2004) studied the impact of capital flows on Turkey's macroeconomic performance in the period between January 1992 and June 2001. As a result of the study, in which the VAR model was used with monthly data, it was determined that short-term capital movements positively affected the amount of output and money supply, and negatively affected prices and interest rates. İnandım (2005) investigated the interaction between short-term capital movements and real exchange rates for the periods 1995-2001, 2001-2005 and 1995-2005 using Kalman and HP filtering methods, Granger causality test and regression analysis. Although the findings obtained did not support the proposition that capital movements caused excessive deviations on real exchange rates, it was found that the deviations obtained from the HP filter were affected at anticipated levels by hot money flows in the period 1995-2005 and by short-term capital movements in the period 1995-2001. The findings of the study revealed that short-term capital movements are not the exact reason for the appreciation of the Turkish Lira. Barışık and Açıkgöz (2007) investigated the relationship between interest rates and international capital flows to Turkey and the Istanbul Stock Exchange (ISE)100 Index using the VAR model for the 1992-2005 period. As a result of the study, it was determined that capital movements in the form of direct and indirect foreign capital investments had a decreasing effect on the interest rates on deposits and government debt securities. In addition, it was found that short-term capital movements positively affected the ISE and that Granger causality test verified this effect.

Özbilen (2007) analysed the financial and economic problems that emerged in Turkey's economy after the January 24 economic measures package in 1980. It was stated in the study that large amounts of hot money began to enter the country following the 1989 liberalization process due to the rising inflation rates and the state's prioritizing domestic and foreign debts. While hot money provided its investors with interest rate and exchange rate arbitrage, it increased the short position in the Turkish economy. Şimşek (2007) examined the impact of short term capital movements on Turkey's economy the period between 1992 and 2005. According to the results of the Granger causality test conducted in the study using GDP, foreign trade deficit and real exchange rate data, it was found that the data were co-integrated with each other and that there was a bidirectional causality relationship between short-term capital movements and the other variables. Duasa and Kassim (2009) aimed to examine the effect of hot money on the economic performance of Malaysia. For this purpose, Vector Error Correction (VECM) model was applied by using quarterly data for the period 1991-2007. In the study, where GDP was used as a measure of economic performance, it was concluded that hot money, especially from England and Singapore, contributed positively to Malaysia's economic performance.

Erataş and Öztekin (2010) aimed to determine the impact of real interest rates and nominal exchange rates on short-term capital flows for the 1995-2009 period in Turkey. As a result of the study, in which the Autoregressive Distributed Lag Bound Test (ARDL) was used, it was found that as the real interest rates increased, so did the short-term capital flows coming to Turkey. In addition, it was stated that nominal exchange rate had a negative effect on short-term capital flows. Bildirici *et al*. (2011) examined the impact of hot money into the Turkish economy for the period covering the years 1997 to 2010. The variables of the study, in which MSVAR-VECM and TAR co-integration methods were used, were determined as interest rate, budget deficit, net foreign purchases in the ISE, current account deficit, exchange rate and industrial production index. The findings of the study indicated that hot money flows to the country continued due to high interest rates, but this situation did not reduce real interest rates. In addition, it was emphasized that the increase in exchange rates would increase foreign exchange flow to the country. Thus, it was concluded that as imports became cheaper, exports became more expensive thanks to the foreign exchange effect, while the foreign trade deficit and thus the current account deficit grew. Turan (2011) theoretically examined the effect of hot money flows on economic crises. He emphasized that the increase in short-term capital mobility in developing countries might cause great economic losses leading up to crises. Therefore, it was reported that sudden cessation of hot money inflows or occurrence of sudden money outflows after 1990 had significant impacts on the crises that took place in Turkey.

Aslan *et al.* (2014) conducted Granger causality test and impulse-response analysis in their study. They examined the relationship between short-term capital movements in Turkey and economic growth and the exchange rate. As a result of the analysis, a one-way causal relationship was found from short-term capital movements to GDP whereas bidirectional causality was identified between the short-term capital movements and the real exchange rate. Bulut and Karluk (2016) investigated the effect of hot money flows on crisis indicators in Turkish economy for the period 1991-2014 using the VAR method. The findings obtained as a result of the study indicated that hot money flows had a negative effect on the current account deficit and foreign trade deficit, which are indicators of pre-crisis. In addition, it was stated that hot money flows caused instability in growth and inflation indicators. Koç Aytekin (2018) examined the economic effects of hot money flows within the scope of international capital movements. It was stated that with the globalization process, hot money flows within the scope of international capital movements reached high volumes with the effect of developments and advances in information and communication technology, and investors were more oriented towards developing international markets. In addition, it was commented that the rapid inflows and outflows of short-term capital movements negatively affected economies of countries, thus leading to crises.

Bulut and Aykırı (2018) investigated the relationship between the consistency of components of hot money movements and economic growth in Turkey for the period 1998-2017 with the help of quarterly data. The Zivot-Andrews unit root test, the ARDL boundary test approach and the Toda-Yamamoto causality test were used in the study. Components of hot money movements were taken as portfolio investments, other investments and net error-and-omission variables, and GDP data were used with the expenditure method as an indicator of economic growth. According to the results, a long-term equilibrium was observed between components of hot money movements and economic growth. Ifeoluwa *et al.* (2019) examined the effect of hot money inflows and monetary system on Nigeria's economic growth using the structural vector autoregressive (SVAR) method. The findings obtained from the research revealed that economic growth was positively and significantly affected by hot money inflows through the monetary system. The authors suggested that policies to attract more short-term capital inflows should be followed without compromise.

3. Data and methodology

The dependent and explanatory variables used in the study and the abbreviations are given in Table 1.

Table 1. Variables used in the study

Dependent Variables	Abbreviation		Explanatory Variable	Abbreviation
Stock Exchange Index	SEI		Hot Money	HM
Exchange Rate	ER			
Interest Rate	IR			

Among the data in Table 1, the stock exchange index consists of the closing prices of the Borsa Istanbul (BIST) 100 Index, the exchange rate variable consists of the US dollar / Turkish lira exchange rate and the interest rate consists of the five-year Treasury bond interest rates. The BIST-100 closing prices were obtained from Borsa Istanbul official website (www.borsaistanbul.com), whereas the US dollar rate and bond interest data were obtained from the official website of Central Bank of the Republic of Turkey (CBRT) (www.tcmb.gov.tr). Hot money values were obtained by collecting portfolio investment data on the World Bank official website (www.worldbank.org) and short-term capital movements and net errors and omissions on the CBRT official website. The data frequency was taken on an annual scale for 31 years covering the period 1989-2019.

Structural equation model (SEM) allows testing of more than one dependent variable at the same time and is superior to the classical regression method. It is a multivariate model used to test direct and indirect relationships between dependent and explanatory variables. In addition, SEM, which enables solving linear equations at the same time and covers different techniques such as regression and factor analysis, has two basic components, namely measurement model and path analysis (Stein *et al*., 2012, p. 495; Lam and Maguire, 2012, p. 1).

Instead of using ANOVA and regression analysis, it is preferred to use the structural equation model separately in the testing of models containing many variable sets and relationships. Because the structural equation model enables to see the relationships that are difficult to notice between variables. Moreover, it can easily test models that are difficult to solve. In addition, the biggest difference of SEM from methods such as analysis of variance, MANOVA, factor analysis and regression is that it can examine the relationship between many variables in the form of models (Ayyıldız and Cengiz, 2006, p. 64). The SEM application was performed using the AMOS 19 package program in the study, in which multiple explanatory variables were analysed.

The hypotheses of the study, which aims to determine the effect of hot money on the stock exchange index, exchange rate and interest rate, were formulated as follows:
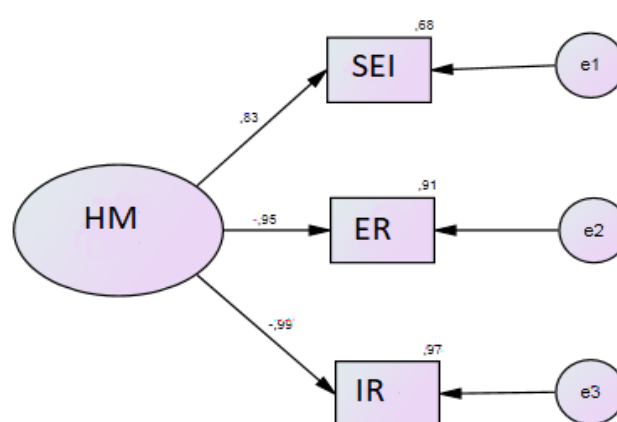
H_1: Hot money has a positive effect on the stock exchange index.

H_2: Hot money has a negative effect on the exchange rate.

H_3: Hot money has a negative effect on the interest rate.

The structural equation model established to test the hypotheses is shown in Figure 2.

Figure 2. Structural equation model


4. Empirical Findings

Based on the findings obtained from the study, it was determined that the model fit index values were within acceptable limits. According to this, CMIN / DF, which is considered to be very good if it is less than 3, but for which values below 5 are also accepted for model fit, was found to be 4.288. In addition, it was observed that the NFI value, which needs to be above 0.90, is below that value with a slight difference of 0.879, but the CFI value is above the normal value at 0.902. Moreover, it was found that the RMSEA value, which is an important indicator of model fit indices, was 0.032 and below the acceptable value of 0.10. As a result of these findings, the model can be interpreted to be compatible with the data.

After the evaluation of the fit indices, the coefficients were examined to determine whether the hypotheses were supported or not. Figure 3 contains the model and beta coefficients of the model established to test the hypotheses.

According to the model coefficients in Figure 3, the effect of hot money on the stock exchange index (β = 0.825; p <0.05) was determined to be significant, so hypothesis H_1 was supported.

Likewise, the effect of hot money on exchange rate (β = -0.951; p <0.05) and interest rate (β = -0.986; p <0.05) was found to be significant and therefore hypotheses H$_2$ and H$_3$ were also supported.

Figure 3. Coefficients of the model
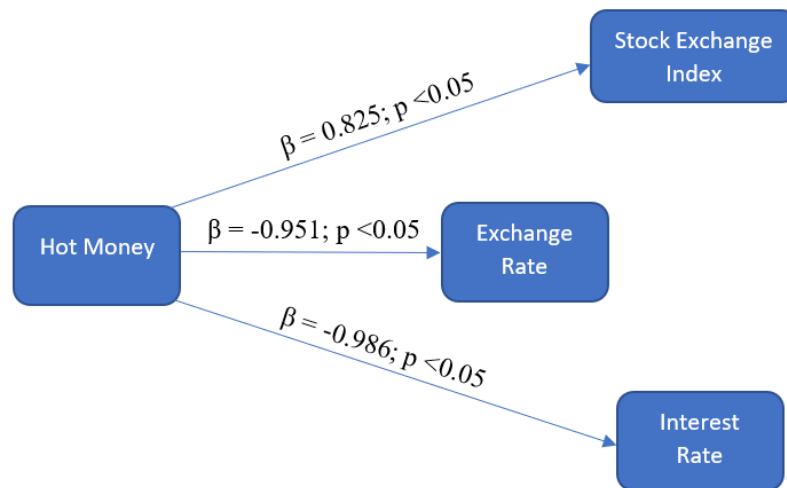
The standardized regression coefficients of the model established to determine the effects of hot money on the stock exchange index, exchange rate and interest rate are given in Table 2.

Table 2. Regression coefficients of the model

	Constant	Standard Deviation	β	R^2
HM ---→SEI	1,002	0,018	0,825***	0,681
HM ---→ER	-0,019	0,003	-0,951***	0,905
HM ---→IR	0,089	0,000	-0,986***	0,973

Note: *** p<0,05

According to Table 2, it is seen that hot money has a significant effect on all explanatory variables at 0.05 level. In addition, it has been determined that hot money has a positive effect only on the stock exchange index, whereas it has a negative effect on the exchange rate and interest rates. It has been found that hot money has the highest explanatory power with 97.3 % for the interest rate. The explanatory power of hot money for stock exchange index and exchange rate is 68.1 % and 90.5 %, respectively.

The positive effect of hot money on the stock exchange index can be explained as follows: Stock exchanges, which are one of the most valuable indicators in terms of their place and importance in the economies of countries, are among the most preferred investment tools of both domestic and

foreign investors. Foreign investors that enter stock exchanges taking into account factors such as risks of countries, political and economic conditions, credit default swaps (CDS) premiums and exchange rate volatility have had a higher share in Borsa Istanbul than domestic investors for many years. Consequently, the influence of foreign investors on Borsa Istanbul indices is also quite high. Therefore, capital inflows from foreigners to the stock exchange generally increase the prices of capital market instruments and this situation contributes to the orientation of more buyers to the market. Thus, stock exchange index values increase in parallel with the number of investors. While these short-term capital inflows stimulate the country's economy along with the stock exchanges, it should be noted that the withdrawal of foreigners from the market may have adverse effects on economies.

Another finding reached as a result of the study, namely the effect of hot money on reducing exchange rate is in line with the literature. According to the general opinion expressed in the literature, foreigners tend to invest in countries with low exchange rates. As they convert their foreign currencies into TL when they make these investments, the hot money entering the country will cause a demand for Turkish Lira, and thus will cause a decrease in exchange rates. In other words, as a result of the investors' selling foreign currency and buying TL will gain in value, whereas the exchange rate will enter a downward trend. In a period when countries base their economic policies on hot money, the high cost of domestic goods decreases exports and increases imports, as national currencies become overvalued. The increasing competitive power in imports due to the economic movements resembling the links of many interconnected chains brings the current account deficit problem with it. As a consequence of this situation, which is seen as one of the reasons of the 2008 global financial crisis in Turkey in particular, fixed capital investments were preferred over hot money in financing the current account deficit in order to change the import-dependent structure over time. Therefore, as the decreasing amount of hot money will affect the export-import balance, there will be an increase in exchange rates.

Finally, the following evaluations can be made for the negative effect of hot money on interest rates. Firstly, it is known that foreign capital inflows are directed towards countries with high interest rates. High interest rates, which are important in terms of increasing savings and attracting investors, may cause the competitiveness of international markets to decrease. As they will increase imports in the country after a while and reduce exports. Consequently, thinking that this situation will harm the economic situation to such an extent as to result in a crisis, central banks decide to lower the interest rates and take steps to ensure financial stability. As a result of the falling interest rates, hot money is out of the country and many economic indicators are also balanced.

The current economic situation of Turkey needs to be evaluated in order to explain the effect of hot money on the decrease in interest rates. Turkey experienced a severe economic crisis at the beginning of the 2000s, but the IMF program that was implemented proved successful and the country achieved an economic recovery. While a total of 5 billion dollars of foreign capital entered the country between 2001 and 2004, this figure increased to 72.1 billion dollars with the start of full membership negotiations with the European Union in 2005. This great increase in foreign exchange inflows caused serious increases in the current account deficit as a consequence of the overvaluation of TL. Turkey is still faced with structural problems due to high inflation and high current account deficit. The underlying reason for this is that the country is a consumption-based economy. As production cannot meet the demand, prices are constantly increasing which triggers imports. Imports increasing more than exports cause deterioration of current transactions and current account deficit. The high savings deficit resulting from the decrease in savings rates causes the economy to become increasingly dependent on foreign savings in order to reach the desired investment levels, which renders the economy more vulnerable to foreign capital movements. Unfortunately, as the risks increase in Turkey, which is heavily dependent on external financing, so increase the exchange rates. Exchange rate increases are usually translated into inflation in the country. The reflection of the increase in the exchange rate on prices is due to the significant use of imported inputs in production. 60 % of the export items consist of imported inputs such as raw materials, semi-finished products, fuel and energy. The rise in exchange rates causes the input costs to increase, which in turn raises the prices, and the cost inflation follows an ascending trend as a result of the increasing prices. Therefore, nominal interest rates are increasing in order to maintain the attractiveness of TL in Turkey, which is obliged to meet the current account deficit and short-term debt with the hot money. The inclination of households and real sector companies towards substitution money to protect themselves against high inflation is also very strong.

Conclusions

Foreign capital movements required for the growth of economies and the development of countries are realized as direct investments in the long term and hot money in the short term. The orientation of foreign capital from developed countries to developing countries in the 1990s was undoubtedly due to the higher interest rates in developing countries compared to other countries. Because the mechanism of capital movements works in this way. If the interest rates of a country are higher than others, there is a foreign capital inflow to that country. Because the short-term capital

profitability of investing in this country will be high. In the reverse case, this situation causes capital outflow from the country.

After financial liberalization process in 1980s, hot money flows between countries started to increase gradually and this situation significantly affected the macroeconomic variables in the countries where hot money entered. The impact of hot money on Turkey has been discussed for years, and particularly areas of capital movements were tried to be determined. Since hot money flows in Turkey are known to be in the direction of government debt securities and stocks, the purpose of this study was determined as investigating the effect of hot money on stock exchange index, interest rates and exchange rates. The analyses were made for the period between 1989 and 2019. As a result of the study, it was determined that the effect of hot money on the stock exchange index was positive and significant, whereas its effect on exchange rates and interest rates was significantly negative. Therefore, all of the hypotheses were supported. In addition, the ability of hot money to explain the stock exchange index was determined as 0.681, its ability to explain exchange rates as 0.905, and its ability to explain interest rates as 0.973.

When the findings of the analyses and the results of the studies in the literature are compared, the finding by Berument and Dinçer (2004) and Barışık and Açıkgöz (2007) that hot money has the effect of lowering interest rates supports the conclusion reached as a result of this study. On the other hand, the finding obtained by Bildirici (2011) that hot money does not reduce interest rates contradicts the finding of this study. In addition, İnandım (2005) concluded that hot money could not be proposed as the exact reason for the appreciation of the Turkish Lira, and this is in concordance with the finding of this study. Namely hot money has a decreasing effect on the exchange rate. However, the finding that hot money has a positive effect on the stock market index coincides with the result reached by Barışık and Açıkgöz (2007).

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