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The Effects of Short-Term Capital Flows on Exchange Rates in Intermediate and Flexible Exchange Rate Regimes: Empirical Evidence from Turkey

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Abstract

The aim of this paper is to analyze empirically the effects of short-term capital flows on exchange rates in Turkey under intermediate and flexible exchange rate regimes. In this framework, the periods where intermediate (January 1994-February 2001) and flexible (March 2001-September 2012) exchange rate regimes implemented in Turkey were taken as a base. The estimation results show that foreign exchange rate regimes are significant factors for the effects of short-term capital flows on exchange rates. While the short-term capital flows have significant effects on exchange rates in the flexible exchange rate regime, they have no significant effects on exchange rates in the intermediate exchange rate regimes. In the intermediate exchange rate regimes, price differentials have significant effects on exchange rates. These empirical results are consistent with the theory.

Keywords: short-term capital flows, exchange rate, intermediate exchange rate regime, flexible exchange rate regime

1. Introduction

Economic theory suggests that capital will move from countries where it is abundant to countries where it is scarce because the returns on new investment opportunities are higher where the capital is limited. The reallocation of capital will increase investment in the recipient country and will bring enormous economic and social benefits. In this framework, starting from the 1990s, after the liberalization of capital movements, private capital flows to emerging market economies increased (Lopez-Mejia, 1999). However, capital inflows have the potential to increase volatility of monetary variables which can be used as intermediate or final target of the monetary policy such as monetary aggregates, inflation, exchange rate and foreign exchange reserves (Hoggarth & Sterne, 1997). Capital inflows may also reduce the usage of interest rates as a monetary policy instrument to achieve monetary policy targets. Besides, Hammond and Rummell (2005) states that in many of the emerging market economies, instead of economic growth and trade deficit, the magnitude and gyrations of capital flows were becoming the primary determinants of exchange rate movements in the short-term.

This study investigates the effects of short-term capital flows on exchange rates under different exchange rate regimes. The exchange rate regimes play an important role in providing economies to take the maximum advantage of increasing openness and depth of international financial markets. In the fixed exchange rate regime, capital inflows leads to higher inflation rates if there is no sterilization. In the case of non-sterilization, the central bank purchases foreign currency in exchange for domestic currency. The appreciation of nominal exchange rate leads to decline in interest rate differential. But, with the expansion of monetary base inflationary pressures may also increase. In the flexible exchange rate regime, exchange rates are determined freely by demand and supply.The main advantages of the floating regimes are their invulnerability to currency crisis, their ability to absorb adverse shocks and pursue an independent monetary policy. It is assumed that exchange rates quickly adjust to changes in the volume of short-term capital flows, thus, short-term capital flows should have significant effects on exchange rates. On the contrary, since in the intermediate exchange rate regimes exchange rates do not

quickly react to changes in the volume of short-term capital flows, they should not have significant effects on exchange rates (Yağcı, 2001).

On the other hand, in the flexible exchange rate regime, exchange rate flexibility would raise exchange rate risk premium and by driving a wedge between interest rate differential, helping to dampen interest sensitive capital flows. Real exchange rate volatility is mostly explained by short-term movements in the capital flows Hammond and Rummell (2005). Besides, in the flexible exchange rate regime, large volume of capital flows lead to exchange rate appreciation, weakening the competitiveness of domestic currency in the international trade. As a result, foreign demand for domestic goods decreases and domestic demand for foreign goods increases, thereby current account deficit increases. Then, the expectation of exchange rate depreciation may cause sudden stop and reversal of capital inflows that may result in a financial crisis.

Some studies are devoted to the analysis of those issues. Combes, Kinda, and Plane (2011) investigates the effects of different forms of private capital flows on the real effective exchange rate using a sample of 42 developing countries for the period 1980 to 2006. They find that short-term capital flows, especially portfolio investment has the highest appreciation effect, seven times that of foreign direct investment (FDI) and bank loans and private transfers have the least effect. They propose that allowing more exchange rate flexiblity would dampen appreciation due to capital inflows and avoid a significant loss of competitiveness. Bakardzhieva, Naceur and Kamar (2010) examines the effects of different forms of capital flows and foreign exchange flows (i.e., remittances, aid & income) on the real exchange rate for 57 developing countries and six regions over the 1980-2007 period. They find that capital flows have significant effects on real exchange rate in all regions except Central and Eastern European Countries. When capital flows and foreign exchange flows are disaggregated, it is found that income, remittances, aid, portfolio investment and debt have appreciating effects on the real exchange rate. They also showed that FDI is the only type of capital flow that has no significant effects on the real exchange rate appreciation.

The empirical studies on the relationship between short-term capital flows and exchange rates in Turkey are few. Ersoy (2013) investigates the role of capital inflows and the exchange market pressure on the real exchange rate appreciation in Turkey for the period January 1992 to September 2007. He finds that while FDI and worker's remittances do not have a positive effect on real exchange rate appreciation, portfolio investment liabilities and banks' foreign currency liabilities cause real exchange rate appreciation. Ersoy (2013) suggests that more flexibility introduced by the flexible exchange rate regime may help to loss of competitiveness or dampen the appreciation of Turkish lira related with short-term capital inflows. Mete (2012) investigates the relationship between banks' foreign currency liabilities and exchange market pressure in Turkey for the period December 1991 to August 2008. He finds that banks' foreign currency liabilities induce selling pressure in the exchange market and a fear of floating. Karahan and Çolak (2011) explores the behavior of economic growth rates and exchange rates during financial capital movements in Turkey for the period January 1992 to December 2010. They find that capital inflows are the major cause of real exchange rate appreciation but sooner or later has to be reversed with the expectation of exchange rate depreciation. Finally, Erdal and Pınar (2014) shows that foreign exchange rate regime is significant factor in the validity of the purchasing power parity in Turkey. While the purchasing power parity is not valid in the intermediate exchange rate regimes, it is valid in the flexible exchange rate regime. However, none of these studies takes into consideration foreign exchange rate regimes when analyzing the effects of capital inflows on the exchange rates.

The rest of this study is organized as follows: In Section 2, the history of short-term capital flows in Turkey is explained. In Section 3, the foreign exchange rate regimes implemented in Turkey are discussed. In Section 4, theoretical framework of the study is explained. In Section 5, data and empirical result are presented. Section 6 concludes the paper.

2. History of Short-Term Capital Flows in Turkey

The capital account liberalization in Turkey was initiated in conjunction with the process of economic and financial reforms that started in 1980, and was fully completed in 1989. Before 1980s, the control of capital inflows was realized through foreign exchange controls. The evaluation of capital flow movements shows that in the first half of the 1980s, the magnitude of capital inflows was limited. However, starting from the second half of the 1980s, there has been a visible increase in the volume of capital inflows. At the beginning of the 1990s, the capital flows to Turkey increased as in other emerging market economies. The establishment of money and capital markets together with the liberalization of foreign trade and capital movements led to increase volume of capital inflows.

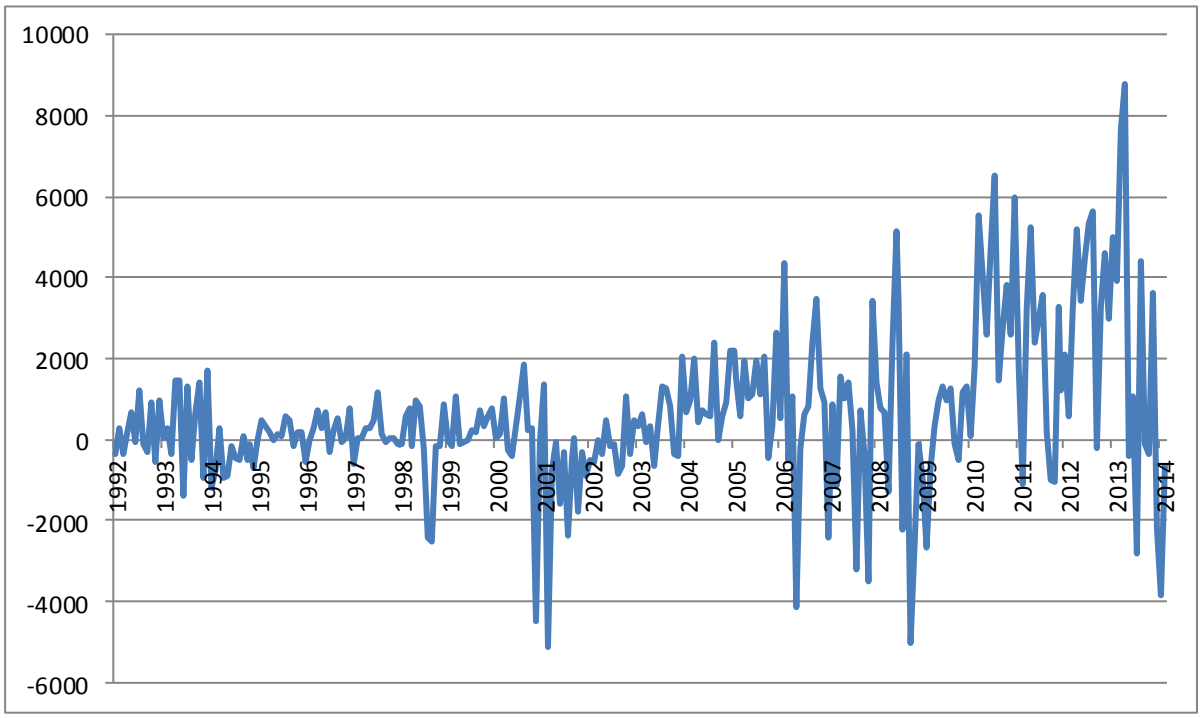

Figure 1. The volume of short-term capital inflows between 1992 and 2013 (monthly, million US $)

The capital inflows to Turkey after full capital account liberalization in 1989 were mainly short-term capital flows (Figure 1). These short-term capital flows constituted mostly credits obtained by banks (Figure 2). The short-term bank credits were the type of credit that responded immediately and in the highest magnitudes to the capital account liberalization during the 1990s. During this period, high budget deficits were financed by these short-term capital flows. Unlike the Asian countries, FDI did not constitute an important share of capital inflows. Portfolio investment was slow, and until 1992, it was mostly in the form of the Undersecretariat of Treasury's borrowing from abroad through bond issues. This outcome could be attributed to less-developed domestic financial markets. The establishment of domestic financial markets was conducted together with liberalization process. There was a change in the origin of the capital inflows after the liberalization. That means, while the public funds were constituted an important portion of the capital inflows before the 1980s, private capital inflows had an important share of the capital inflows during and after the 1980s.

From this point of view, the capital account liberalization process in Turkey started without establishing domestic financial markets and a strong financial system supervision and regulation. The establishment of financial markets and financial system supervision were conducted during the liberalization process. For that reason, it is possible to say that a financial environment that could promote foreign capital flows did not exist. On the other hand, the macroeconomic indicators were not so bright during the liberalization process. For instance, when the liberalization process was completed successfully in 1989, inflation rate was 38 percent and the ratio of public sector borrowing requirement to GNP was 5.3 percent. A high inflationary environment creates an uncertain environment for foreign investment; especially it may prevent foreign capital inflows. For that reason, it is possible to say that during this period, the government's financing requirement only encouraged short-term capital inflows through banks' credits.

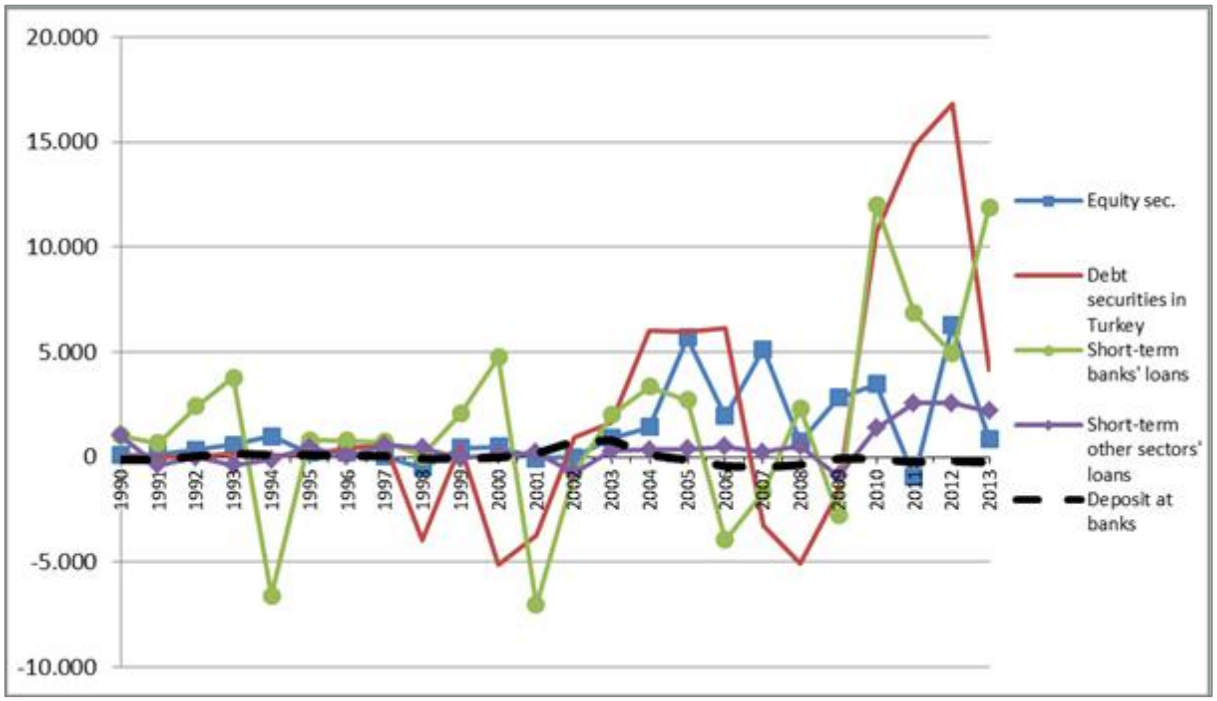

Figure 2. The components of short-term capital inflows between 1990-2013 (monthly million $)

After the financial crisis in February 2001, with the implementation of disinflation program the public sector borrowing requirement decreased, inflation rates and interest rates fell, economic growth rate increased and macroeconomic stability achieved. As a consequence, during 2004-2008 period the amount of FDI and long-term capital flows increased (Figure 3). However, the global crisis in 2009 and 2010 led to decrease of FDI and long-term capital flows, and so, short-term capital flows increased again.

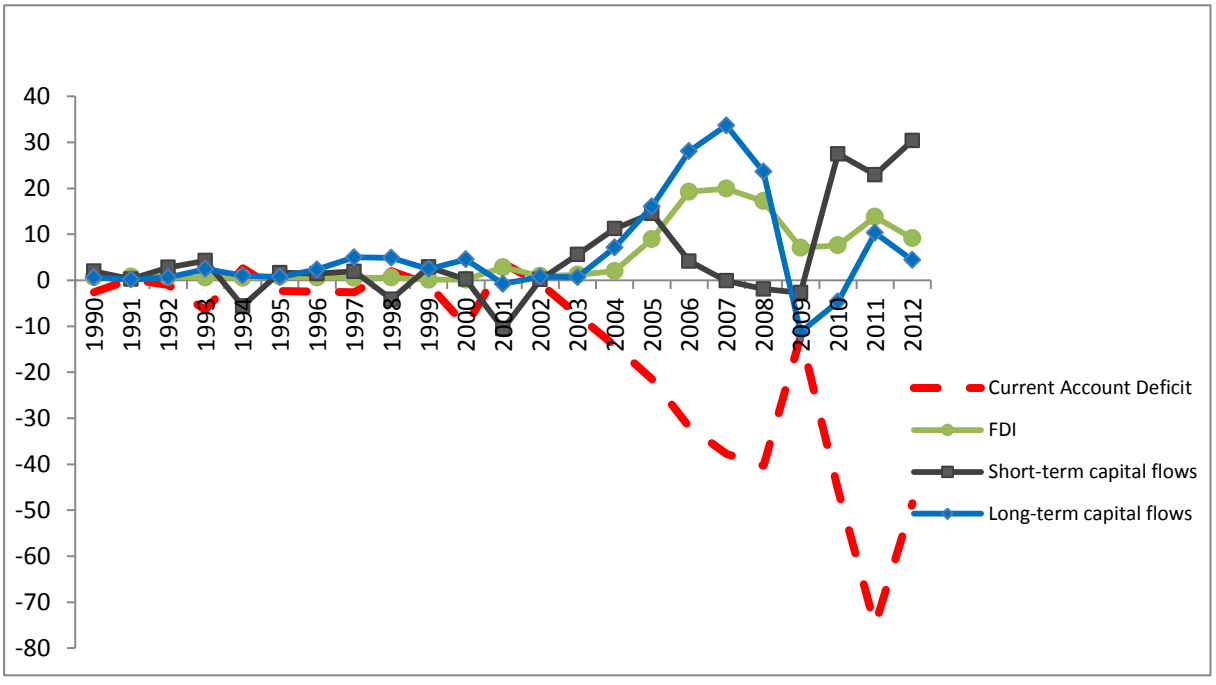

Figure 3. The current account deficit and capital flows between 1990-2012 (yearly, billion US $)

3. Foreign Exchange Rate Regimes in Turkey

The exchange rate regimes implemented in Turkey from 1923 to 2001 were described as fixed and managed floating exchange rate regimes (Reinhart & Rogoff, 2002; Bubula & Ö tker-Robe, 2002; Pınar &d Erdal, 2011). Beginning from 1990, de jure flexible exchange rate regime was implemented and the Central Bank Bank of Turkey often intervened the exchange rate volatility. For that reason, the exchange rate regime was called "managed floating". At the beginning of 1995, the value of the Turkish lira was pegged to the currency basket consisted of 1 US dollar and 1.5 Deutsche mark. It was also decided that the monthly value of the currency basket would be increased with respect to expected monthly inflation rates. The Central Bank of Turkey intervened in the foreign exchange market to maintain foreseen increase in the currency basket.

Between 1996 and 1999, the Central Bank of Turkey regulated the foreign exchange rate policy with respect to the monetary policy. In this period, since the primary objective of monetary policy was to maintain financial markets' stability, with the exchange rate policy the exchange rate volatility tried to be minimized. The Central Bank of Turkey intervened in the foreign exchange market in order to minimize exchange rate volatility. The devaluations were made with respect to expected inflation rates. So, the exchange rate regime implemented this period can be described as "managed floating with no predetermined path for the exchange rate".

In December 1999, a stand-by arrangement was signed with the International Monetary Fund (IMF) and within the framework of the disinflation program "forward looking crawling pegs" started to be implemented. The exchange rate increases were determined in accordance with the targeted inflation rate. The value of the exchange rate basket consisted of 1 US dollar and 0.77 euro was announced for one year. But, after the 22 February 2001 financial crisis, this regime was abandoned and flexible exchange rate regime was adopted. Currently, the Central Bank of Turkey intervenes in the foreign exchange market to minimize excessive exchange rate volatility and in the case of excess foreign exchange supply in the market buy them to increase its foreign exchange reserves.

4. Theoretical Model

In the theoretical part of study, the purchasing power parity (PPP) hypothesis is taken as a base. The PPP explains the relationship between exchange rates and national price levels. It represents an equilibrium relationship between the exchange rate (i.e., the cost of a unit of foreign currency in terms of domestic currency) and national price levels. The origins of the PPP hypothesis goes back to the Salamanca School in Spain in the 16^{th} century and to the works of Gerrard de Malynes in England at the Tudor period in 1601. In the 19^{th} century some classical economists, including Wheatley, Ricardo and Mill developed the PPP hypothesis. However, the Swedish economist Gustav Cassel became the first author to reexamine the PPP in the 20^{th} century. (Balassa, 1964; Holmes, 1967). He recognized that the PPP can be regarded as an extension of the quantity theory of money to an open economy. In the 1970s, the interest in the theory revived when the flexible exchange rate regime begun.

The basic concept of PPP is the law of one price that implies the price of identical goods is equalized between countries by perfect arbitrage assuming there are no transportation costs and no barriers to trade such as tariffs, custom duties, quotas etc. An alternative interpretation of the law of one price is mentioned in the Cassel's theory (Balassa, 1964; Holmes, 1967). The absolute PPP assumes that if different goods are produced and the law of one price holds for each of the goods, then the cost of a basket of goods and services should be the same in all countries when measured in terms of a common currency.

$$Nominal\ exchange\ rate\ (e_{nominal}) = P^{*} / P$$

The absolute PPP assumes that real exchange rates continuously equal to 1. The real exchange rate is the nominal exchange rate adjusted to the foreign and domestic price levels.

$$Real\ exchange\ rate\ (e_{real}) = e_{nominal}\, x\, P^{*} / P$$

The relative PPP states that the exchange rate changes should be equal to the differences between domestic and foreign inflation. So, the value of a currency tends to rise or fall at a rate equal to the difference between domestic and foreign inflation.

The empirical studies about the validity of the PPP show that while the absolute PPP is not valid in practice, the relative PPP is valid in the long-term and the exchange rates may deviate from the PPP in the short-term (Frenkel, 1981; Frenkel, 1978; Hakkio, 1992; Hakkio, 1984; Krugman, 1978). One of the major reasons for the deviations from the PPP is that the PPP only consists of international trade flows and does not take into account international capital flows (Seyidoğlu, 2003). This may not be a problem during the period when the PPP theory was developed since the volume of international capital movements were not very large. However, starting from

the 1990s the volume of international capital flows was more than the volume of foreign trade flows, so their exclusion from the PPP may lead to failure of the validity of the PPP. For that reason, in this paper the short-term capital flows are included in the estimation regressions to see the effects of them on the exchange rates under intermediate and flexible exchange rate regimes.

5. Data and Empirical Results

In the empirical part of the study, the effects of short-term capital flows on exchange rate are analyzed empirically for Turkey under intermediate (January 1994-February 2001) and flexible exchange rate regimes (March 2001-September 2012). To this aim, firstly, cointegration is tested for the nominal exchange rate, short-term capital flows and price differentials between Turkey and the United States. Secondly, the following equation is estimated for the intermediate and flexible exchange rate regimes:

$$LN(NER) = (LN(TRCPI) - LN(USCPI)) + LN(SHORT - TERM\ FLOWS)$$

Where NER is nominal exchange rate, i.e., the amount of Turkish lira per unit of US dollar, TRCPI is the Turkey's Consumer Price Index and USCPI is the United States of America's Consumer Price Index, SHORT-TERM FLOWS is the short-term capital-flows in Turkey. All the variables are in the logarithmic forms. Thirdly, the error correction mechanism (ECM) was tested.

The nominal exchange rate and consumer price indices are monthly and are obtained from the IMF International Financial Statistics (IFS), the short-term capital flows are monthly and are taken from the Balance of Payment Statistics of the Central Bank of Turkey. The short-term capital flows include the following items of the Balance of Payment Statistics: (B.2.2.1) Equity Securities, (B.2.2.2.2.1) Debt Securities, (B.3.2.2.4.2) Short-term Banks' Loans, (B.3.2.2.4.2) Short-term Other Sectors' Loans, (B.3.2.3.2) Deposits at Banks.

In Table 1, the cointegration test results for nominal exchange rate, short-term capital flows and price differentials in the intermediate and flexible exchange rate regimes are presented. The cointegration test results show that under the intermediate exchange rate regime, there is 1 cointegrating vector at the 0.05 level. Under the flexible exchange rate regime 3 cointegrating vectors at the 0.05 level.

Table 1. Cointegration test results

Period	EigenValue	Trace Statistic	0.05 Critical Value	Probability***	n
Intermediate exchange rate regime*					
None**	0.213941	31.37267	29.79707	0.0327	84
At most 1	0.123449	11.15192	15.49471	0.2023	
At most 2	0.001000	0.084083	3.841466	0.7718	
Flexible exchange rate regime****					
None**	0.175236	60.15713	29.79707	0.0000	139
At most 1	0.145657	33.37767	15.49471	0.0000	
At most 2	0.079377	11.49590	3.841466	0.0007	

(*) Trace test indicates 1 cointegrating vector at the 0.05 level.

(**) denotes rejection of null hypothesis at the 0.05 level.

(***) MacKinnon-Haug-Michelis (1999) p-values.

(****) Trace test indicates 3 cointegrating vectors at the 0.05 level.

As a second step, three period lags of the independent variables are included in the regression and they are estimated for intermediate and flexible exchange rate regimes. Then, the statistically insignificant variables are dropped from the regressions and the statistically significant ones are kept in the regressions and they are re-estimated. These estimation results are presented in Table 2 and Table 3 respectively. As can be seen from Table 2, in the intermediate exchange rate regime, price differentials and one and two quarter lags of the nominal exchange rate have significant effects on nominal exchange rates. The short-term capital flows have significant effects on nominal exchange rate after three quarters.

Table 2. Estimation results for intermediate exchange rate regime

$$LN(NER) = B_o + B_1(LN(TRCPI) - LN(USCPI)) + B_2LN(SHORT\text{-}TERM\ FLOWS) + u_t$$

Dependent variable: LNNER	
LNSHORT-TERM FLOWS	-0.0233
	(-1.153)
LNTLCPI - LNUSCPI	1.4819**
	(5.772)
LNNER (-1)	0.5739**
	(5.826)
LNSHORT-TERM FLOWS (-3)	-0.0949**
	(-2.924)
LNTLCPI - LNUSCPI (-1)	-1.2356**
	(-4.607)
LNNER (-2)	0.1778**
	(1.728)
Number of observations: 84	
R-squared: 0.99	
Durbin-Watson statistic: 1.99	

Note. The values in the parenthesis are t statistics. ** denotes the coefficient is statistically significant at 5%.

In the flexible exchange rate regime (Table 3), short-term capital flows have statistically significant effects on nominal exchange rates. The price differentials do not have significant effects on nominal exchange rates and one quarter lag of the nominal exchange rate has significant effects on exchange rates.

Table 3. Estimation results for flexible exchange rate regime

$$LN(NER) = B_o + B_1(LN(TRCPI) - LN(USCPI)) + B_2LN(SHORT - TERM\ FLOWS) + u_t$$

Dependent variable: LNNER	
LNSHORT-TERM FLOWS	-0.0438**
	(-4.459)
LNTLCPI - LNUSCPI	-0.0004
	(-0.031)
LNNER (-1)	0.909**
	(27.053)
LNSHORT-TERM FLOWS (-1)	0.011
	(1.282)
Number of observations: 139	
R-squared: 0.87	
Durbin-Watson statistic: 1.61	

Note. The values in the parenthesis are t statistics. ** denotes the coefficient is statistically significant at 5%.

Then, the error correction model (ECM) is estimated to find the speed at which dependent variable nominal exchange rate return to equilibrium after a change in the independent variables price differentials and short-term capital flows. The ECM is useful for estimating both short-term and long-term effects of explanatory variables. The ECM can be written as:

$$\Delta Yt = \beta 1 \Delta Xt - \pi u(t-1)$$

In this model, "Δ" shows the first difference of the variables, "β1" is the impact multiplier or short-run effect that measures the immediate impact that a change in Xt will have on change in Yt. The "π" is the feedback effect or adjustment effect, which shows how much of the disequilibrium is being corrected, in other words, the extent to which any disequilibrium in the previous period affects any adjustment.

Table 4. Error correction model results for intermediate and flexible exchange rate regimes

$$DLN(NER) = B_o + B_1D(LN(TRCPI) - LN(USCPI)) + B_2DLN(SHORT - TERM\ FLOWS) + u_t(-1)$$

Dependent variable: LNNER	Intermediate Exchange Rate Regime	Flexible Exchange Rate Regime
DLNSHORT-TERM FLOWS	-0.035**	0.013
	(2.635)	(1.608)
DLNTLCPI - LNUSCPI	1.179**	0.423
	(4.526)	(1.578)
$u_t(-1)$	-0.322**	0.136
	(-2.7)	(1.585)
Number of observations: 84		
R-squared: 0.27		
Durbin-Watson statistic: 1.87		

Note. The values in the parenthesis are t statistics. ** denotes the coefficient is statistically significant at 5%.

In the intermediate exchange rate regime (Table 4), the adjustment effect is -0.322 and statistically significant. This means, nominal exchange rate returns to equilibrium value after three months due to change in price differentials and short-term capital flows. On the other hand, in the flexible exchange rate regime, the adjustment effect is statistically insignificant that means there is no deviation from the equilibrium exchange rate due to continuous adjustment.

4. Conclusion

This paper analyzed empirically the effects of short-term capital flows on exchange rates in Turkey under intermediate and flexible exchange rate regimes. In the flexible exchange rate regime, since exchange rates quickly adjust to changes in the volume of short-term capital flows, short-term capital flows should have significant effects on exchange rates. On the other hand, since in the intermediate exchange rate regimes, exchange rates do not quickly react to changes in the volume of short-term capital flows, and hence they should not have significant effects on exchange rates.

In the theoretical part of the study, the PPP hypothesis is taken as a base. The PPP explains the relationship between exchange rates and national price levels. One of the major reasons for the validity of the PPP is that the PPP only consists of international trade flows and does not take into account international capital flows. This may not be a problem during the period when the PPP theory was developed since the volume of international capital movements were not very large. However, starting from the 1990s the volume of international capital flows became more than the volume of foreign trade flows, so their exclusion from the PPP may lead to failure of the validity of the PPP. For that reason, in this paper the short-term capital flows are included in the estimation regressions to see the effects of them on the exchange rates under intermediate and flexible exchange rate regimes.

The empirical findings show that foreign exchange rate regime is a significant factor for the effects of short-term capital flows on exchange rates. While the short-term capital flows have significant effects on exchange rates in the flexible exchange rate regime, they have no significant effect on exchange rates in the intermediate exchange rate regimes. Ersoy (2013) and Karahan and Çolak (2011) also found significant effects of short-term capital flows on exchange rates. In the intermediate exchange rate regimes, price differentials have significant effects on the exchange rates. Further research may be helpful to understand the impact of foreign trade deficit on the short-term capital flows, and hence on the exchange rates.

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Note

Note 1. The views expressed in this paper are those of the author and do not necessarily represent the official views of the institution.