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THE IMPACT OF CAPITAL FLOWS ON CURRENT ACCOUNT DEFICIT FOR TURKEY

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ABSTRACT

The impact of capital flows on macroeconomic variables is widely studied in applied literature. In this context, this paper aims to analyze the impact of short-term capital flows and foreign direct investment on current account deficit for Turkey by using quarterly data for the time period 1998-2015. We find out a positive and significant relationship between capital flows and current account deficit and negative insignificant relationship between capital flows and foreign direct investment. We use vector autoregression (VAR) model and impulse responses to analyze dynamics between variables.

Keywords: *Capital flows, Foreign direct investment, Current account deficit, Turkey.*

JEL Codes: *F32, H62.*

1. INTRODUCTION

Short-term capital flows (CAP) and current account deficits (CAD) have been extremely important issues for the economies. The effect of current account deficit is positive for many developing countries. In this context, the problem is how to finance current account deficit. Because current account deficit is not sustainable for the country's foreign debt and increasing CAD may lead to turbulence in financial markets (Yaman, 2011). From this point of view, the effect of capital flows and foreign direct investments (FDI) will be matter on CAD. Therefore, we analyze the dynamics between CAP, CAD and FDI by employing VAR specification, variance decomposition, impulse responses and granger causality analyses in this paper.

Balance of payments (BOP) is a statistical report consisting of a total of four times including particularly current accounts, capital and financial accounts, net errors and omissions and reserve assets. If a country spends more than its earnings, current account deficit occurs; if

credits exceed debits, current account surplus occurs. The determinants of current account deficit have key role for the economies. One of them is GDP which increase the CAD by causing an appreciation in the real exchange rate so that an appreciation in imports. The higher import means higher CAD. Especially the studies in empirical literature include mostly the exchange rate, GDP, interest rate and the inflation rate to analyze current account deficit.

Therefore, one of the most important vulnerabilities of the Turkish economy is CAD besides external debt, this is similar especially for most of the developing countries that most of the studies try to explain the determinants of current account and how to manage it. Hence, the main motivation of this study is to explain current account, capital flows and foreign direct investment nexus and the gap in the applied literature for Turkey.

The purpose of this study is to investigate the dynamic link between current account deficit, short-term capital flows and foreign direct investment for Turkey from 1998 to 2015 using quarterly data. In order to capture the dynamics, impulse responses are gathered by using VAR model. This study proceeds as follows: Section 2 summarizes the theoretical framework and literature while Section 3 presents the data and methodology. In Section 4, the empirical results are discussed and lastly, Section 5 concludes.

2. THEORETICAL FRAMEWORK AND LITERATURE

This part of the study tries to explain theoretical framework and to summarize the literature review. This subject has been studied from all over the world such as the studies[1] of Howard (1989), Mann (2002) and Edwards (2005) for *the USA*; Horne (2001) for Australia, and Hudson and Stennett (2003) for Jamaica can be given as an example of the studies which include theoretical approaches. Besides, a number of previous empirical studies including Tuffle (1996), Ansari (2004) and Matsubayashi (2005) for the USA; Wu, Chen and Lee (2001) and Lee and Chinn (2006) for *G7 countries*; Nason and Rogers (2002) for *Canada*; Kano (2008) for *Canada and England*; Adedeji and Handa (2008) for Nigeria; Bannaga (2004) for Sudan; Apergis, Katrakilidis and Tabakis (2000) for *Greece*; Gruber and Kamin (2007) for nineteen different countries. Such studies generally used vector autoregressive (VAR) and vector error correction (VEC) models, Granger causality, co-integration analysis and panel data models.

Foreign direct investment has been argued to play a key role in accelerating growth in developing economies (Siddiqui, Ahmad and Asim, 2013). As the World Bank (1993, p. 3) claimed that "Foreign direct investment is a large and growing source of finance that may help developing countries close the technology gap with high-income countries, upgrade managerial skills, and develop their export markets" (Siddiqui et al., 2013). Therefore to finance current account deficit, FDI should be an important factor so that we include FDI in this paper. Few studies included FDI into their analysis namely Yurdakul and Cevher (2015); Siddiqui et al. (2013); Sahoo et al. (2015), Fry et al. (1995). Yurdakul and Cevher (2015) analyzed the determinants of current account deficit in Turkey including growth rate, real effective rate, direct foreign capital investment, openness and energy import variables. They found that highest impact comes from exchange rate than it is followed by growth rate, energy import and openness variables while foreign direct investment has the least impact. Siddiqui et al. (2013) investigated the relationship between FDI and current account for Pakistan. They found a cointegrating and long run relationship. Therefore, the causality between FDI and current account is uni-directional. Sahoo et al. (2015) analyzed the relationship between globalization, institutional quality, foreign direct investment and current account for 23 Asian countries. They found that FDI inflows and institutional reforms have negative and significant impact on current account balances. Fry et al. (1995) examined the relationship between capital flows, FDI and

[1] The list of the studies are taken from Akgul and Ozdemir (2014).

current account deficit. They found granger causality from capital to current account for some countries, while vice versa is valid for the others.

After the global economic crisis, policy makers try to find alternative policy to avoid the negative effects of short-term capital flows, current account deficit and rapidly-developing credit expansion (Başçı and Kara, 2011). Başçı and Kara (2011) analyzed the details of CBT's new monetary policy in their paper. Policy makers try to control CAD by using monetary policy, fiscal policy and restricting the inflow of hot money to the economy (Dinçer and Yaşar, 2015). Capital flows to developing countries increased after the crisis period 2003.

In the literature short-term capital flows has been a threat for the Turkish economy such that it has been one of the factors of instability (Kiran, 2007). Therefore the sustainability of current account deficit has been another important issue for policy makers because a stationary current account means sustainable external debt. For the sample studies about sustainability, see Murat, Hobikoğlu and Dalyancı (2014) and Chen (2011).

The policy makers tried to maximize the benefit of capital inflows to finance current account deficit (Bakardzhieva, Naceur and Kamar, 2010). There are many studies that analyzed the relationship especially between current account deficit and short term capital flows for Turkey. Akbas, Lebe and Uluyol (2014) searched for the casual relationship between these variables by adding the effect of GDP. They used panel causality test and find out that there is a relationship between GDP and current deficit in emerging markets while no relationship was found between GDP, current deficit and short-term capital flows. Berument and Dincer (2004) analyze the effects of capital inflows on macroeconomic performance by using monthly data 92:1-2001:6. They use capital inflows, industrial production index, consumer price index, interest rate, money supply, real exchange rate. They found out that higher capital inflows raise output so that economic growth and money supply but lower prices and interest rates. They suggested encouraging FDI's since FDI is less volatile than portfolio investment. The review of the national studies can be seen in Direkci and Kaygisiz (2013). Moreover, we couldn't find any studies that try to analyze CAD by using FDI in applied literature for Turkey. Thus, this study tries to fill this gap in the applied literature.

Capital flows played an important role for the economic crisis periods such as after 2008 global crisis (Kara, 2013). CBT's policy framework was changed from inflation targeting to liquidity management and the interest rate corridor. It has been implemented by the CBT since the last quarter of 2010. Kandil and Trabelsi (2015) analyzed capital account liberalization and its effect on macroeconomic performance of the Turkish economy for the period of 1989:01-2009:03. They compared the pre and post-crisis period for 2001:02. They found that capital flows had varying effect on Turkish economy before and after the crisis in 2001. As the effect of capital flows for pre and post crisis periods differ, there can be a nonlinear relationship. The nonlinearity of macro economic variables should not be ignored. There are some but not much studies in the literature that take into account the possible nonlinear relationship. Akgul and Ozdemir (2014) modeled monthly CAD data by regime switching models. They found nonlinear relationship. Cecen and Xiao (2014) suggested that there is nonlinearity in capital flows and current account deficit series. They used nonlinear unit root tests by Caner and Hansen (2001) and concluded that there is a nonstationary according to nonlinearity. Chen (2014) and Chen (2011) analyzed the current account nonlinearity and sustainability for OECD and European Countries. Cengiz and Karacan (2015) examined the macroeconomic consequences of capital flows for developing countries.

Before the financial crises, the capital account balance of Turkey was positive due to capital inflows. The 1994 and 2001 domestic economic crises caused massive capital outflows

from Turkey as external crises such as the Asian crisis in 1997-98 and mortgage crisis from the USA had same effects (Cinar and Kose, 2015).

To sum up, Turkey suffers from current account problem as can be seen at following Table 1. According to Table 1, it can be seen that Turkey has moved from 7th level to 4th level in World Top 10 Economies comparing 2012 and 2014. Besides Turkey, the United States, United Kingdom and Brazil suffer from CAD problem and their deficits increased through 2012-2014 periods. The fact that current account deficit of Turkey became chronic as the Turkey is the fourth largest country in terms of CAD makes this issue vulnerable.

Table 1. Current Account Deficit, Top 10 Economies (Billions of US $)

	2012	2013	2014
United States	-449.7	-376.8	-389.5
United Kingdom	-86.4	-122.2	-151.9
Brazil	-74.1	-74.8	-104.2
Turkey	-48.5	-64.7	-46.5
Australia	-66.3	-51.2	-44.1
Canada	-59.9	-54.7	-37.5
Indonesia	-24.4	-29.1	-27.5
France	-32.2	-22.5	-27.5
India	-91.5	-49.2	-27.5
Mexico	-15.9	-29.7	-24

Source: *International Financial Statistics by IMF*

3. DATA & METHODOLOGY

We use quarterly data covering 1998:01-2015:04 period to observe dynamic behavior of the current account balance, short-term capital flows and FDI for the Turkish economy[2]. All the variables in the model are the ratios to GDP so that they are used as levels. The data series are obtained from electronic data delivery system (edds) of the Central Bank of the Republic of Turkey (CBRT) and Turkish Statistical Institute (TUIK).

We apply VAR model approach to analyze the dynamics of the current account deficit in Turkey. Quarterly exchange rate for US dollar is obtained from OECD. The current account deficit which is in terms of million $ is changed from US Dollar to Turkish Liras. GDP at 1998 prices seasonally and calendar adjusted expenditure is obtained. Then the CAD to GDP ratio is calculated. Same procedure is done for short-term capital flows and foreign direct investment as well. All of the variables are used as the ratio of GDP and they are in million TL. Since the aim is to analyze the effect of other variables on current account balance; it is placed at the end of the settings. The ordering of VAR specification is as follows: FDI_t, CAF_t, CAD.

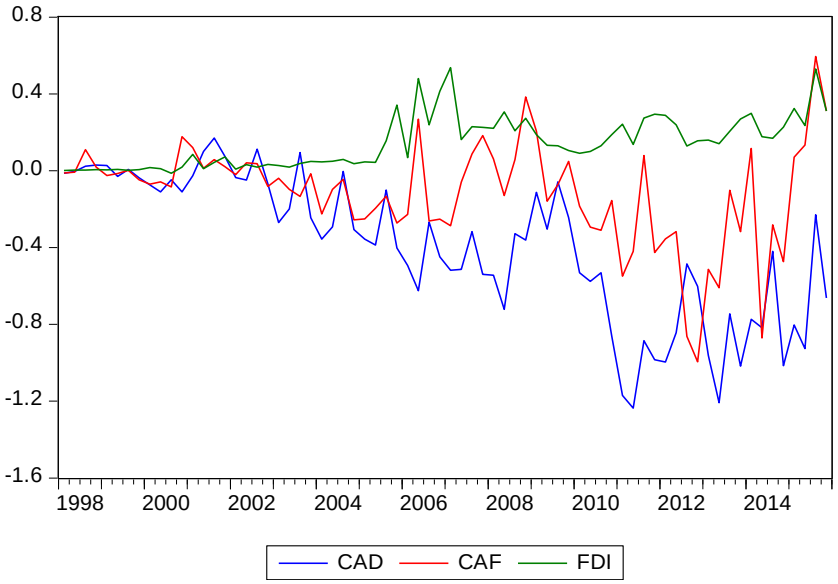
The time period covers the financial crisis period, so we use a dummy variable in the VAR model in order to capture any possible outlier that might be due to the crisis. The crisis dummies cover 2009 and 2010 periods.

Graph 1 presents CAD, CAF and FDI variables (ratios to GDP) over the period. Graph 2 shows seasonally and calendar adjusted expenditure on the GDP (at 1998 prices). The study period begins from 1998 as the GDP variable is available from 1998.

[2] The GDP data is available after 1998.

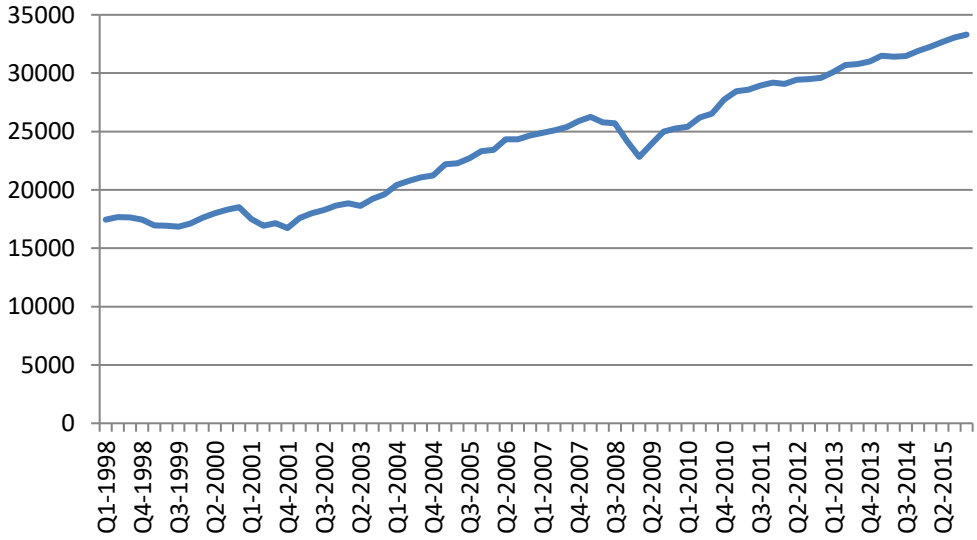
The most widely used method for the unit root test is the Augmented Dickey Fuller (ADF) test[3] which has been also used in this paper.

Graph 1. Current Account Deficit, Capital Flows and Foreign Direct Investment



Source: Central Bank of the Republic of Turkey, Electronic Data Delivery System, http://evds.tcmb.gov.tr, 2 April 2016.

Graph 2. Seasonally and calendar adjusted expenditure on the Gross Domestic Product (at 1998 prices)



3.1 VAR Specification

VAR is first used in macroeconomics following the seminar paper of Sims (1980). It is argued by the authors (Sims, 1980; Litterman, 1986) that VARs model would forecast better than the other structural equation models (Greene, 2003). VAR model is the multivariate type of a single equation autoregressive model (Davidson and MacKinnon, 2004). The nature of the VAR is such that all endogenous variables are jointly determined.

[3] The detailed test procedure can be found in Hamilton (1994).

A p[th] order vector autoregression, referred as a VAR(p) model is expressed in Hamilton (1994) and Davidson and MacKinnon (2004) as:

$$Y_t = \alpha + \sum_{j=1}^{p} \phi_j Y_{t-j} + \varepsilon_t \quad (1)$$

Where Y_t is an (1xn) vector of variables and denotes the t[th] observation on a set of n variables in equation (3.1), α denotes a (1xn) vector of constant terms and ϕ_j an (nxn) matrix of autoregressive coefficients for j=1, 2, ……p. The (1xn) vector ε_t is a white noise series:

$$E(\varepsilon_t) = 0 \quad (2)$$

$$E(\varepsilon_t) = \begin{cases} \Omega \ for\ t = \tau \\ 0 \ otherwise \end{cases}$$

with Ω an (nxn) symmetric positive definite matrix. Thus, a vector autoregression is a system in which each variable is regressed on a constant, p lag of its own and p lag of the other variables in the VAR.

The VAR model considered in this study can be given as follows:

$$CAD_t = \alpha + \sum_{i=1}^{5} \beta_i CAD_{t-i} + \sum_{i=1}^{5} \delta_i CAF_{t-i} + \sum_{i=1}^{5} \gamma_i FDI_{t-i} + u^t \quad (3)$$

In equation (3) all variables are taken as endogenous.

Impulse response functions are used to examine the dynamics of the current account deficit. Impulse response analyses which trace out the response of current and future values of each of the variables to a one unit of increase in the current value of one of the VAR errors, are calculated by bootstrapping method of 100 draws over a 10 quarter response horizon. Generalized impulses decomposition method is used which does not take into account the VAR ordering. In addition to impulse responses, a forecast error variance decomposition analysis of current account deficit is undertaken. The forecast error variance decomposition is the percentage of the variance error made in forecasting a variable due to a given shock at a specified time horizon. Thus, it shows the relative importance of the shocks (Dincer and Yasar, 2015).

3.2 Empirical Results

For the determination of the optimal lag lengths of the model, the Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC) and Hannan Quinn (HQ) are employed. As a part of robustness of the estimates, we also consider alternative lag lengths. According to the selection criteria AIC, HQ and diagnostic results, we select lag order 5.

As the GDP series is seasonally and calendar adjusted, seasonal dummies are found statistically insignificant so that the seasonal dummies are dropped from the estimation.

Table 2 presents the unit root test results, according to it CAD to GDP ratio and CAF to GDP ratio variables are found stationary, I(0) while FDI to GDP ratio is found nonstationary, stationary at 1[st] level, I(1). Phillips-Perron and KPSS tests are also applied and obtained same results. Than we take the first differences of FDI variable. As all variables are not at the same integrated order, they cannot be cointegrated.

Chow breakpoint test is also applied for particular crisis periods and conclude there is no statistically significant break in the series. Unrestricted VAR estimates are given in

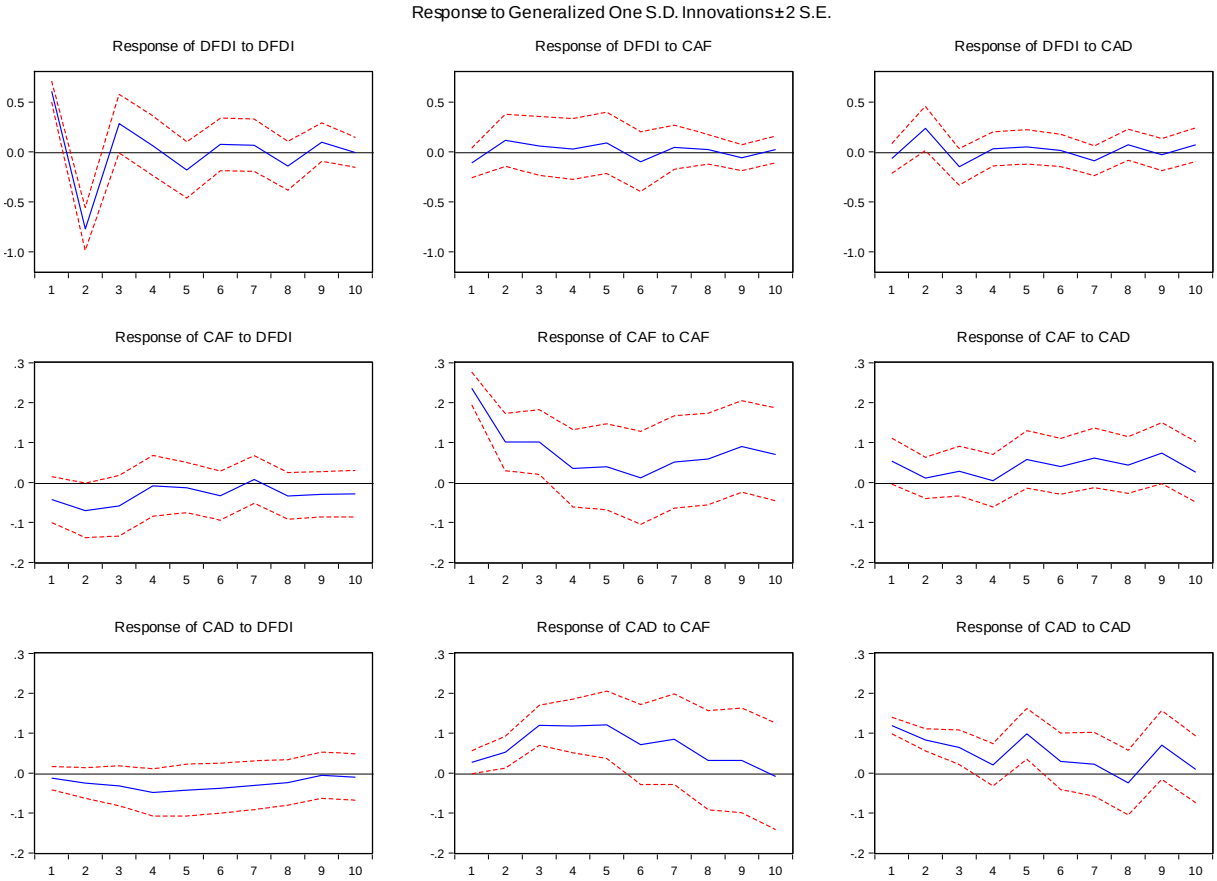
Appendix A. When we examine the third model (CAD), a significant trend effect is found for current account deficit. There seems significant positive effect of capital flows while insignificant negative effect of FDI on current account deficit from Unrestricted VAR analysis.

Table 2. Unit Root Test Results

	ADF (Levels)	
	Intercept	**Trend and Intercept**
CAD	0.5135	0.0124*
CAF	0.0004**	0.0014**
FDI	0.4715	0.2132

Note: The superscripts ** and * denote rejection of hypothesis of a unit root at 1% and 5% significance levels respectively.

Graph 3. Impulse responses of variables to generalized one standard deviation of each variable



Graph 3 presents the impulse responses to generalized one standard deviation shock in all variables. 3 graphs in the first row give the responses of FDI to its own shock, capital flows and current account deficit shock. In first graph in Graph 3, FDI responses negatively for first 2 quarter to its own shock and then positive response which persists for almost 1.5 years.

3 graphs in the second row of Graph 3 present the responses of CAF to foreign direct investment, its own shock and current account deficit shock. In last row of Graph 3, 3 graphs give the responses of CAD to foreign direct investment, capital flows and its own shock. Current account deficit respond positively in first 3 quarter to capital flows shock than negative response persist for almost 2.5 years. Current account deficit response to FDI seems negative and persists for almost 2 years.

Table 3. Variance Decomposition of CAD

Period	S.E.	FDI	CAF	CAD
1	0.119	1.161	4.404	94.435
2	0.150	3.547	13.333	83.121
3	0.195	4.729	42.882	52.389
4	0.230	7.884	54.170	37.946
5	0.270	8.183	57.325	34.491
6	0.281	9.414	58.477	32.109
7	0.294	9.690	60.965	29.344
8	0.298	10.046	60.160	29.794
9	0.307	9.526	57.873	32.601
10	0.307	9.599	57.795	32.606

Table 3 reports the variance decomposition of current account deficit, where the first column shows the time horizon, second column gives the standard errors, third column gives FDI part while fourth and fifth column gives CAF and CAD decompositions of CAD. At the end of the periods, the proportional rate of capital flows shocks in explaining the dynamics in current account deficit is around 58%, which is the largest contribution among the other channels while about 10% is explained by FDI and about 32% comes from own effect.

Table 4 presents the Granger Causality test to see capital flows granger cause of current account deficit or vice versa. According to Table 4, a significant causality relationship can be found between CAD and other variables that capital flows granger cause of current account deficit.

Table 4. Granger Causality Test

Dependent variable: FDI			
Excluded	**Chi-sq**	**df**	**Prob.**
CAF	1.751787	5	0.8823
CAD	9.298754	5	0.0977
All	13.83442	10	0.1807
Dependent variable: CAF			
Excluded	**Chi-sq**	**df**	**Prob.**
DFDI	7.098672	5	0.2134
CAD	7.115455	5	0.2122
All	15.18925	10	0.1253
Dependent variable: CAD			
Excluded	**Chi-sq**	**df**	**Prob.**
DFDI	1.793998	5	0.8769
CAF	31.07182	5	0
All	36.72799	10	0.0001

Table 5 presents the diagnostic results that there seems no normality, autocorrelation and heteroscedasticity problems in the analysis.

Table 5. Diagnostic Test Results

	CAD	CAF	FDI	VAR
$\hat{\sigma}$	0.119	0.236	0.607	
$\bar{R}^2$	0.924	0.489	0.783	
$F_{ar}(5)$				10.53
				(0.31)
χ^2_{het}				199.72
				(0.572)
χ^{2s}_{nd}				3.99
				(0.26)
χ^{2k}_{nd}				4.40
				(0.221)
χ^{2j}_{nd}				8.39
				(0.21)

Note: p-values are given in parenthesis.

4. CONCLUSION

In this article we have examined the dynamics of current account deficit, short-term capital flows and foreign direct investment for 1998Q1 to 2015Q4 period for Turkey. Volatile capital flows, banking sector problems and current account deficit are the important vulnerabilities of the Turkish economy. Turkish economy is dependent on international capital flows that makes the economy more volatile (Cinar and Kose, 2015). There seems a gap for the studies including foreign direct investment, capital flows and current account deficit nexus in applied literature for Turkey. Therefore, the main motivation of this paper is to fill this gap.

We can conclude that short-term capital flows have increasing effect for developing countries in the medium and long run while foreign direct investment have decreasing effect on current account deficit. As the domestic investment rate decreases, we need foreign capital investment. In this purpose, to hold the foreign investment, the interest rates go up, as higher interest rates make investment lower than it becomes a vicious circle for the economy. In conclusion, for developing countries, the interest rates will be higher compared with the developed countries. Our results from an impulse response analysis suggest that short-term capital flows have a significant impact on current account deficit. Moreover, shocks to capital flows persist for almost 2.5 years. The diagnostics from the estimated model suggest that our results are robust. Our policy implication is that short-term capital flows could be used as short-term measures to control current account deficit for developing countries. Turkey can stay competitive by improving its investment environment and attracting FDI. In addition, the findings of this study point out the causes of sudden exchange rate shocks that Turkey and Argentine face with in the 3rd quarter of 2018. Furthermore, there can be possible nonlinearity

for the economies which are fragile to economic crises, this can be considered for the future studies.

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APPENDIX A: VAR ESTIMATES

Unrestricted VAR Estimates			
	DFDI	CAF	CAD
$DFDI_{t-1}$	-1.258997	-0.09002	-0.018079
	[-9.21515]	[-1.69547]	[-0.67447]
$DFDI_{t-2}$	-1.098388	-0.147285	-0.011447
	[-4.91323]	[-1.69529]	[-0.26099]
$DFDI_{t-3}$	-0.644961	-0.094176	-0.007483
	[-2.37383]	[-0.89193]	[-0.14038]
$DFDI_{t-4}$	-0.330853	-0.032934	0.020695
	[-1.44245]	[-0.36948]	[0.45989]
$DFDI_{t-5}$	-0.164798	-0.037967	0.017304
	[-1.19307]	[-0.70728]	[0.63850]
CAF_{t-1}	-0.260067	0.402724	0.142194
	[-0.67606]	[2.69393]	[1.88407]
CAF_{t-2}	0.202146	0.228143	0.313382
	[0.49553]	[1.43908]	[3.91552]
CAF_{t-3}	0.076341	-0.059313	0.025224
	[0.16625]	[-0.33238]	[0.27999]
CAF_{t-4}	0.368759	0.00704	0.019857
	[0.85403]	[0.04195]	[0.23440]
CAF_{t-5}	-0.269241	-0.081577	-0.061964
	[-0.62686]	[-0.48873]	[-0.73533]
CAD_{t-1}	1.406424	-0.134724	0.622764
	[3.01433]	[-0.74301]	[6.80317]
$CADt_{-2}$	-0.404263	0.289689	-0.01704
	[-0.75613]	[1.39426]	[-0.16245]
CAD_{t-3}	0.032776	-0.056146	-0.232874
	[0.06211]	[-0.27379]	[-2.24939]
CAD_{t-4}	0.20793	0.332676	0.814466
	[0.37954]	[1.56255]	[7.57745]
CAD_{t-5}	-0.378293	0.045116	-0.796403
	[-0.73979]	[0.22703]	[-7.93824]
C	-0.226047	-0.115548	0.062264
	[-1.03359]	[-1.35953]	[1.45111]
D2010	0.582863	-0.359151	-0.34034
	[0.73083]	[-1.15878]	[-2.17508]
D2009	-2.390044	0.003969	-0.082822
	[-3.19020]	[0.01363]	[-0.56347]
@TREND	0.01718	0.006395	-0.006383
	[1.59200]	[1.52482]	[-3.01486]

Note: t-ratios are in parentheses.