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Global Credit Supply and External Exposure in Turkey

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Abstract

Present study investigates the link between net capital inflows and the current account balance in Turkey. Using monthly data for the period of 2002-2014, we provide evidence that higher capital inflows are associated with larger deficits in the current account. We include two alternative measures of the net inflows – the financial account and foreign liabilities of the banks in Turkey. The paper analyzes this relationship under the different model specifications with a number of control variables that capture both domestic and external factors. We also show that imbalances in the current account are highly responsive to the fluctuations in the real exchange rates, mostly triggered by the changes in capital flows. The Granger causality test reveals one-directional causal link from the financial account to the external balance but not the reverse. Given exogenous character of the global capital and random nature of the developments in the financial account, high inflows to Turkey have been creating high exposure and fragility of its external balance. Our findings highlight on the importance of the macro-prudential policies to monitor short-term inflows and on minimization of destabilizing effects of the real exchange rate fluctuations on the external account in Turkey.

Key Words: *Net Capital Inflow; Current Account Deficit; Financial Account; Global Capital Flows.*

JEL Classification: *C32, F32, F41*

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1. Introduction

Current account (CA) balance is viewed as the difference between economy's savings and investments. In an open economy, when a country's savings are not sufficient to fuel its investments, it borrows from abroad and its CA exhibits deficits. Equivalently, the CA can be defined as the net foreign asset position of a country. A country invests abroad when its domestic savings exceed domestic investment expenditure, referred to as a capital outflow. On the contrary, when savings are not sufficient to finance domestic investments, a country must attract surplus savings from the rest of the world, in the form of a capital inflow. Such a country records negative net foreign asset purchases, or equivalently, is a net borrower from the world. In this way, the accounting relationship in the balance of payments indicates that a deficit in the CA should be associated with an increase in the capital account[1] (Higgins and Klitgaard, 1998).

Turkey's remarkable growth in the period of 2002-2012 was associated with rising deficit in its CA. This is not surprising as many developing countries need to borrow from abroad at times of rapid growth. However, prolonged excessive foreign borrowing comes at the cost of greater foreign debt. This raises economy's external exposure and may lead to the unsustainability of its CA. When the financing consists of short-term foreign loans (also called as hot-money flows), domestic economy becomes highly exposed to the changes in the capital flows and the CA reversal. The same can be attributed to the portfolio investments, which have relatively short-term character and higher liquidity.

The deficits in the CA may be associated with the following dynamics in the domestic economic structure. First, the CA exhibits deficits when the volume of imports exceeds that of exports. Second, deficits indicate that a given country consumes/invests considerably larger than it produces. In this case, the country has to borrow capital from abroad to finance its consumption/investment with repayment in the future. Obstfeld and Rogoff (1996) propose the inter-temporal approach to explain this phenomenon. It suggests that expected rise in the future income, especially in boom times, triggers grater borrowing and consumption

[1] This accounting relationship is true when excluding change in reserves. Capital account is the difference between capital inflows and outflows. When inflows exceed outflows (country is borrower) this positive gap indicate surplus in the capital account. Capital account (KA) is the reflection (liability side) of the current account (CA); surplus in the KA at the same time shows deficit in the CA. The sum of the both account should net out to zero and called the balance of payments. In purely floating exchange rate regimes, exchange rates serve as a benchmark to balance these two accounts to zero (Colander and Gambler, 2006).

today with the repayment in later periods. This is because rational, forward looking agents prefer smoothed consumption and this leads to higher borrowing at the first period of extensive growth. Mentioned factors are usually associated with behaviour of the domestic economy and its participants.

We suggest that there are external factors that play equally important role in determining CA imbalances among countries. Rise in the global liquidity and financial flows over the last decade largely contributed to the expansion of the global cross-border lending (Bruno and Shin, 2014). Such monetary spillovers came out as a result of expansionary and low interest rate policies in many developed economies during 2000s [2] (Shin, 2013). Foreign developments combined with perceptions of better macroeconomic foundations in emerging markets triggered financial flows towards these countries. Such upsurge in international capital flows to the developing countries is usually reflected in their CA balances by rising deficits.

Capital inflows to Turkey sharply intensified from $1.1bn in 2002 to over than $70bn in 2013. Out of this huge amount, net foreign direct investments (FDIs) constituted for only about $9bn or one eighth of the total net inflows in 2013. The rest of the capital surplus was financed by portfolio and other types of financial investments, which unlike the FDIs, can hold short-term liquid characteristics, validating financial fragility (CBRT, 2013).

The study of the capital inflows as a determinant of the CA imbalances has important implications for the sustainability of the current account deficits (CADs) and policy measures. This work investigates the link between net capital inflows (NKI) and the current account balance in Turkey. We are particularly interested in the sensitivity of the CA balance to the change in the NKI; high level of responsiveness is associated with higher exposure of the external balance to the fluctuations in the capital flows. We take the financial account of Turkey as a measure of the NKI (Clausen and Kandil, 2009; Yan and Yang, 2012). As an alternative measure, we also include the foreign liabilities of the banking sector in Turkey. The criterion for inclusion is that banks represent the largest part of the financial sector in Turkey[3] and serve as a bridge in transfer of the liquid global flows to the domestic economy (Caliskan, 2011; Bruno and Shin, 2014). We also aim to study several other determinants of the CA in terms of control variables;

[2] It is noteworthy to state about the dramatic upsurge of the global financial capital following the post 2008-crisis stimulation programs by the advanced economies.

[3] According to Caliskan (2011), the share of banks (including depository banks, investment banks and development banks) in terms of asset size in total financial system was 81.2% as of December 2009.

these are the real exchange rates, interest rates, economic growth and the fiscal balance. We carry out Granger causality test to examine bi-directional causal link between the NKI and the CA. These implications shed light on the adjustment of the CA, associated with the changes in NKIs and on the importance of the macroprudential policies aimed at the reduction of deficits through capital control.

2. Literature Review

The significant role of the capital inflows in generating external deficits has long been recognized. However, there is scarce empirical literature on the analysis of the capital account as a driver of deficits. Yet, empirical investigation of the CA from the capital channel may provide important insights about countries' external imbalances given a considerable rise in financial globalization and integration of the financial markets over the recent decade. Early work on modelling a small open economy was conducted by Mundell (1962) and Fleming (1962) that linked NKI to the CAD through changes in the real interest rates. Other examples include (among others) Higgins and Klitgaard (2012), Dornbusch (1999), Krugman (1998), Calvo et al. (1996) and Calvo and Reinhart (2002). Yeldan (2006) highlights about the detrimental effects of the speculative flows to Turkey's CA balance. The work mentions that increased short-term foreign capital investments raise demand for domestic financial assets. In this way, the upsurge in capital inflows leads to appreciation in the real exchange rate (ER hereafter), which makes imports cheaper and hence, results in the worsening of the CA balance in Turkey.

In an open economy, there are "pull" and "push" factors that link capital inflows and the CA. If "pull" factors are more effective, this represents that the domestic economic environment is favourable to attract foreign investors. On the other hand, if "push" factors are more influential, then external developments could be triggering NKI to the domestic markets. In practice, pull and push effects might be equally and simultaneously effective and it is a matter of the empirical investigation to see degree of the individual effect (Yan and Yang, 2012). Calvo et al. (1996) finds external factors to be more influential to explain the foreign capital inflows into Latin America in the late 1980s. Karaman and Can (2014) argues about the role of the global liquidity and financial integration in the expansion of the CA deficit Turkey. Shin (2013) and Chui et al (2014) state that rise in international spillovers show reflection in a number of capital-dependent EMs, including Turkey.

Figure 1 plots the changes in the global liquidity (GL) and in the CA balance in Turkey using quarterly data between 2000 and 2013. Global liquidity is measured

as the change in the world cross-border credit supply[4]. Changes in the CA balance of Turkey looks reflecting GL conditions; as GL rises Turkish CA worsens (falls) and deficits become greater. It is worth noting about the trends around the 2008-crisis; we can see dramatic fall in the supply of the GL, which is matched up by improvement (rise) in CA balance at this period.

Ozbek (2008) and Baydur (2007) argue about Turkey's relatively high interest rate as a driver of capital inflows and, consequently CAD. This view is supported by Ener and Arica (2012) who analyze a link between the real interest rates and CA in Turkey. Guerin (2012), Yan and Yang (2012) and Clausen and Kandil (2009) empirically investigate the relationship between capital inflows and CA in the example of different countries and find causal link from capital flows to the CA. However, Chakraborty et al. (2010) conducts the same research in the example of India and finds no evidence of strong link.

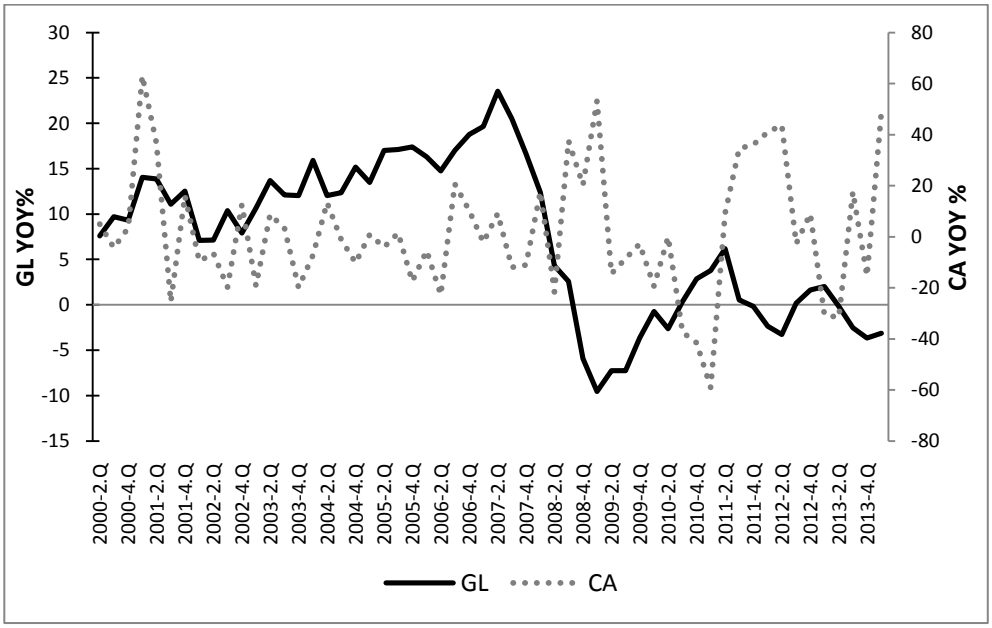

Figure 1. Global liquidity, measured as world cross-border credit supply (yoy %) and the current account balance of Turkey (yoy %).
Source: BIS International Banking Statistics (GL data) and CBRT (CA data).

[4] This proxy for GL is used in IMF BIS statistics as one of the benchmarks for calculating GL and defined by Cerutti et al. (2014) as "ease of funding" in global financial markets.

This work formulates the impact of the NKI on the CA in a dynamic cycle that includes the following elements. First, low interest expansionary policies in the developed economies and high savings in surplus countries[5] invoke capital to flow out of these countries into the developing countries that typically offer higher yields. Second, arbitrage seeking financial capital start to flow into the EMs. The capital account of a recipient country rises and registers surplus. Next, excess liquidity causes credit expansions, investments and increased demand in the domestic economy. Demand for domestic assets (caused by capital inflow) also validates appreciation in the real exchange rate. Finally, cheapened price of imports and elevated domestic demand stimulate rise in imports, negative trade balance and the worsening of the current account. Current account falls in order match up with rising surplus in the capital account.

Bringing together foreign direct investment, portfolio investment, and banking and miscellaneous transactions, we find that Turkey residents invested a total of about $8 billion abroad in 2013 (Appendix A). At the same time, foreign residents invested around $80 billion in Turkey, resulting in a net investment inflow of nearly $72 billion. Most of the capital inflows are borrowed by the private sector in Turkey. In 2013 the share of the private sector debt was almost 70% ($268bn) or two third out of the total external debt ($390bn) of Turkey (CBRT, 2013). This raises questions about rising exposure of the Turkish private sector to external imbalances and rekindles issues based on the sustainability of country's external account. It also gives us the reasoning to look at the CAD issue from the larger perspectives of external capital imbalances and go beyond of looking at it in the framework of trade imbalance or structural domestic factors per se.

3. Data and Model

We conduct a regression analysis to empirically test the relationship between net capital inflow and current account balance in Turkey. Suggested hypothesis is that rise in capital inflows should trigger higher deficits in the current account. First, we carry out the Granger causality test to detect bi-directional causal effects between NKI and the CA. In the next step we conduct regression analysis in order: 1) to find out how far NKI is likely to destabilize the CAB; 2) to measure the

[5] See Bernanke (2005) for the "saving glut" explanation of increased cross-border supply of capital. He states that high level of global savings in mature industrial economies as well as in developing economies with high foreign exchange reserve accumulations have been flowing into other countries, which offered higher prospective returns or had lower risk and deeper financial markets.

strength of the interrelationship between NKI and CA balance; 3) to analyse the relationship of the CA with its other determinants.

We take monthly data that covers the period January, 2002 – October, 2014 (the description of the data, variables and sources is given in Appendix B). Table 1 below illustrates the summary statistics for the given variables.

Table 1. Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
ΔCA	153	0.0529	3.5592	-0.8664	0.4170
ΔFA	153	2.3037	3.4800	-0.9935	2.8133
ΔFL	153	0.0181	0.2008	-0.2044	0.0702
ΔINTEREST	153	0.0142	0.3809	-0.4375	0.0743
ΔREER	153	0.0028	0.1202	-0.1293	0.0351
ΔY	151	0.0082	0.2508	-0.2506	0.0842
ΔBUDGET	153	0.0013	0.0686	-0.0379	0.0168
ΔTOT	153	0.0025	0.3099	-0.2762	0.0883

Notes: CA is current account; FA is financial account balance; FL is banks' foreign liabilities; INTEREST is overnight interest rate; REER is the real effective exchange rate; Y is the domestic industrial production; BUDGET is the government budget deficit and the TOT is the terms of trade.

Formally, we use the following model specification:

$$\Delta CA_t = \beta_0 + \beta_1 \Delta FA_{t-1} + \beta_2 \Delta FL_{t-1} + \beta_3 \Delta INTEREST_t + \beta_4 \Delta REER_t + \beta_5 \Delta Y_t + \beta_6 \Delta BUDGET_t + \beta_7 \Delta TOT_t + \varepsilon_t \quad (1)$$

We use *different specifications* of the model with omitting and including variables in each case, however. Model 1 tests the relationship between current account balance and net capital inflows, measured by the financial account (Clausen and Kandil, 2009; Yan and Yang, 2012). The financial account (FA) comprises the biggest part of the capital account and includes items on foreign direct investments, portfolio investments, and other financial transactions. We add the FA as one period lagged variable to allow a period time for the capital effects to reflect in the CA. We also include lagged foreign liabilities of the domestic banks[6] in Turkey to provide an alternative measure for capital inflows. This is because banks constitute the largest part of the financial system in Turkey and serve as a bridge in transferring most of the capital inflows to the domestic economy (Bruno and Shin 2014).

[6] Sample includes foreign liabilities of deposit money banks, and investment and development banks. Participation banks are excluded from the sample because data is not complete.

As other independent (control) variables we include domestic interest rate. Rise in the interest rate should trigger higher CA deficits (reduce CA balance) through attracting larger capital inflows from the rest of the world. We also include the real effective exchange rate. It serves as intermediate control variable between NKI and CA. Rise in NKI validates real ER appreciation (increase in REER) and worsening in the CA, however the relation can be bi-directional. Real appreciation can also attract higher inflows by improving net worth and credit access of banks and corporates with FX debt[7]. Exchange rate change can affect the CA through two channels. In our model, we predict the sign of the REER variable to be negative. TL appreciation (increase in REER) should be associated with both larger imports and higher capital inflows. Both effects will worsen the CA balance (Edwards, 2000; Chui et al., 2014).

Next explanatory variable is the economic growth, measured by the domestic industrial index. When production and growth are high, a country registers higher deficits because it needs higher borrowing of capital from abroad (Obstfeld and Rogoff, 1996; Zaidi, 2012). We also added government budget deficit to control for the impact of the budget balance on the CA, also known as a "twin effect" (Aristovnik and Djuri'c 2010). Deficits in budgets can be associated with higher domestic and external borrowings that stimulate greater debt from abroad and higher deficits. Finally, terms of trade to control for export and import activity influences through the trade channel (Zaidi, 2012; Bayraktutan and Demirtas, 2011). Rise in TOT (equivalently rise in imports) should be associated with higher CA balance.

4. Analyses and Estimation

In this part we first, carry out the Granger causality test to detect the bi-directional effect between the CA and NKI. Before empirically validating the fully-fledged model we conduct stationarity and other diagnostic tests to confirm that the regression estimations are robust. In the final part we provide estimation results with discussions.

4.1. Granger Causality Test

The Granger causality test is conducted to check the existence of causal relationship between the NKI and the CA. As explained earlier, this relationship can be bi-directional. For instance, the changes in the CA caused by the goods-services flows may in turn affect amount of net capital flows registered in the FA

[7] This is not under the scope of this research, therefore we will be limiting our attention to the conventional effect of the REER to the CA through rising imports and causing deficits.

balance (Faroque and Veloce, 1990). We employ the Granger causality to determine the direction of causality in the given series. The test is based on the following model:

$$X_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} X_{t-i} + \sum_{i=1}^{n} \alpha_{2i} Y_{t-i} + u_t \quad (2)$$

$$Y_t = b_0 + \sum_{i=1}^{q} b_{1i} Y_{t-i} + \sum_{i=1}^{r} b_{2i} X_{t-i} + v_t \quad (3)$$

where u_t and v_t are zero-mean, serially uncorrelated, random disturbances. The optimum lag lengths m, n, q and r are determined on the basis of Schwarz Bayesian (SBC) and/or log-likelihood ratio (LR) test criterion (Granger, 1988). In eq.(2), the rejection of null hypothesis ($\alpha_{21}=\alpha_{22}=...\alpha_{2n}=0$) would imply that Y Granger causes X. Similarly, the rejection of null hypothesis ($b_{21}=b_{22}=...b_{2n}=0$) in eq.(3) would indicate that X Granger causes Y.

Since we are interested in the causal relationship between the net capital inflows and the CA balance in Turkey, we provide results of only these variables on Table 2.

Table 2. Granger Causality Test Results

Null Hypothesis:	Lags	F-Statistic	Probability
ΔFA does not Granger Cause ΔCA	4	3.8518	0.0053*
ΔCA does not Granger Cause ΔFA	4	0.7185	0.5806

Notes: Sample period covers the period 2002M1-2014M10 with 149 observations. The lag number is determined as 4 with SIC (Schwartz Information Criterion). The * denotes rejection of the null hypothesis at the 0.05 level.

Table 2 reveals existence of one-directional causality from the financial account to the current account balance. However, we cannot reject the null in the second hypothesis that indicates no causality from the CA to the FA balance. Accordingly, we conclude that the causal link goes from the net financial inflows to the current account.

4.2. Unit Root Test

Before empirically validating the fully-fledged model we carry out the unit root test to determine whether the series are stationary. The main motivation behind the unit root test lies on whether the time series are affected by temporary or permanent shocks. Many macroeconomic time series can contain

unit roots dominated by stochastic trends as developed by Nelson and Plosser (1982). When regressors are non-stationary, empirical results in equations are not valid; therefore, unit root tests are important in examining the stationarity of a time-series. In order to find out the stationarity of the series, we carried out the unit root tests via the Augmented Dickey Fuller (ADF) Test. The test is based on the following model:

$$\Delta Y_t = \beta Y_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta Y_{t-i} + u_t$$

In addition, the drift term α and the time trend T can be included into the formulation. The null hypothesis is H_0: β=0 and its alternative hypothesis H_1: β<0; and n is the number of lags necessary to obtain white noise and u is the error term. Accepting the H_0 implies that the time series is non-stationary. Testing for the stationarity using the ADF tests revealed the following results (Table 3).

According to the ADF test results, all variables came out to be stationary at 5% significance level, implying there is no problem of unit root in the series. We can see that ADF t-statistics of the variables are higher than McKinnon critical values fixed for ADF model. Since the issue of the unit roots is solved, we can move to the next step and carry out regression analysis.

Table 3. ADF Test

Variables	None	Intercept	Trend+Intercept
ΔCA	-15.29*	-15.56*	-15.89*
ΔFA	-12.32*	-12.37*	-12.47*
ΔFL	-11.10*	-11.66	-11.62*
ΔINTEREST	-9.97*	-10.24*	-10.40*
ΔREER	-10.49*	-10.50*	-10.47*
ΔY	-19.58*	-19.98*	-19.89*
ΔBUGDET	-9.40*	-9.41*	-9.65*
ΔTOT	-19.23*	-19.19*	-19.16*

Notes: Numbers in the table are t-statistics values. The lags for all variables are determined as zero with SIC. McKinnon critical values for 5% level are -3.50 (with intercept and trend), -2.91 (with only intercept), and -1.94 (without intercept and trend). The * denotes rejection of the hypothesis at the 0.05 level.

4.3. Estimations

The correlation matrix, featured in Table 4, shows the correlation relationship between variables in the regression (1). If the correlation coefficient is high (more than 0.5) there may be a collinearity problem or strong linear relationship between explanatory variables that makes them undistinguishable. In this case, the partial effects of each explanatory variable upon the dependent variable become inseparable and the coefficients cannot be estimated with great precision or accuracy (Gujarati, 2004, pp. 344-345). The correlation coefficients on Table 4 are not high and problematic, suggesting no signs of high collinearity among variables.

Table 4. Correlation Matrix

VARIABLE	ΔCA	ΔFA	ΔFL	ΔINTEREST	ΔREER	ΔY	ΔBUDGET	ΔTOT
ΔCA	1							
ΔFA	0.04	1						
ΔFL	-0.07	-0.01	1					
ΔINTEREST	-0.21	0.09	0.05	1				
ΔREER	-0.41	-0.03	0.19	0.08	1			
ΔY	-0.21	0.03	0.15	0.07	-0.07	1		
ΔBUDGET	0.01	0.03	-0.28	0.11	-0.34	-0.02	1	
ΔTOT	0.36	0.03	-0.06	-0.15	-0.15	0.04	-0.03	1

4.4. Regression Results

Regression results of the model represented by equation (1) are presented on Table 5. Column (1) is the formal specification that includes all the above stated variables. Although the FA variable is negative and significant in all specifications, the coefficient of the banks' liabilities is insignificant. In the second specification we omitted the foreign liabilities (FL) by banks, and kept FA as the only variable that represents NKI. In the following specifications we provide various combinations of variables to test if the coefficients and significance remain unchanged. The R-squared of the main specification explains 39 % of the response data. The Durbin-Watson statistics is around 2.20 in each case and reveals no signs of first-order serial correlation in the residuals (Durbin and Watson, 1951). However, to confirm absence of the serial correlation among the error terms we are going to conduct Breusch-Godfrey serial correlation test in later section.

Table 5. CA Balance and Determining Factors

	1	2	3	4
ΔLagged FA	-0.3000*** [0.0080]	-0.3100*** [0.0080]	-0.3100*** [0.0080]	-
ΔLagged FL	-0.5320 [0.178]	-	-	-0.5570 [0.1700]
ΔInterest	-0.5490 [0.1490]	-0.5170 [0.1730]	-	-
ΔREER	-4.9140*** [0.0000]	-4.8580*** [0.0000]	-5.0000*** [0.0000]	-4.6880*** [0.0000]
*Δ*Y	-1.2530*** [0.0000]	-1.2650*** [0.0000]	-1.3100*** [0.0000]	-1.2960*** [0.0000]
ΔBudget deficit	-2.8260 [0.1190]	-3.0860* [0.0880]	-3.4710* [0.0530]	-
ΔTOT	1.3730*** [0.0000]	1.3880*** [0.0000]	1.4490*** [0.0000]	1.4800*** [0.0000]
Constant	0.0710** [0.0150]	0.0810*** [0.0040]	0.0740*** [0.0080]	0.0650** [0.0280]
R-squared	0.3900	0.3800	0.3800	0.3500
Durbin-Watson	2.2900	2.2600	2.2000	2.2100
Observations	151	150	151	150
Method	OLS	OLS	OLS	OLS

Notes: Rise in REER indicates appreciation. The p-values are reported in parentheses, and coefficients are significant at ***: 0.01, **: 0.05, and *: 0.10 levels.

There is negative and significant relationship between the FA and the CA in all specifications. It is noteworthy that the real ER continues remaining significant and has high coefficient in all specifications. This validates important implication: higher NKIs are associated with higher external deficits but theoretically, these deficits should take place as a result of real ER appreciation and increase in imports. Significant and negative coefficient of the REER variable supports this mechanism. High coefficient of the REER reveals that impact of the inflows on the CA can be considerably stronger through their effects on the adjustment of the ER. The results highlight on the importance of the macroeconomic prudential policies in monitoring net financial inflows and consequently, avoiding high fluctuations in the real exchange rates to maintain the stability of the external account.

We can't find significant relationship between banks' foreign liabilities and the CA; of course in practice, the link might be at best indirect. Interest rate also came out to be insignificant in all specifications. There is negative and significant relationship between domestic production growth and the CA balance. This explains that Turkey experiences CA deficits during the time of high growth as its external borrowing rises.

The TOT is positively and significantly related to the CA with coefficient of 1.20%. Such significant coefficient in every specification shows that, as an alternative to macroeconomic adjustments, policies aimed at increasing export levels can significantly improve worsening external balance of Turkey. The significance of the negative inter-relation of the budget deficits to the CA varies over the conducted specifications. Nevertheless, it can be concluded that the changes in budget balance can alter the CA balance that makes keeping fiscal discipline one of important issues aimed at CAD reduction.

4.5. Testing for Serial Correlation

One of the assumptions of regression analyses is that error terms should be uncorrelated or independent from one another ($E(\varepsilon_i\varepsilon_j) = 0$ for all $i \neq j$). If this assumption is violated, alternative estimation model should be employed compromising on the efficiency of the estimates. Existence of the serial correlation in series may violate this assumption. In this case, the error in current period has an effect on the error in a later period.

We used Breusch-Godfrey serial correlation LM Test to check for the autocorrelation of the error terms. Table 6 provides estimation results. The value of the observed R-square and the corresponding P-value do not reject the null hypothesis of no serial correlation between error terms for its both 2 lags and 4 lags.

Table 6. Breusch-Godfrey Serial Correlation LM Test

Lags	Obs*R-squared	Prob. Chi-Square
2	5.970735	0.1130
4	6.751197	0.1496

4.6. Testing for Heteroskedasticity

Although presence of the heteroskedasticity problem in the estimations does not cause biased coefficient estimates in the ordinary least squares, it may lead to biased estimates of its variance. Hence, the variance and standard errors of the

OLS estimates will possibly be above or below the population variance. Even if the regression analysis of heteroskedastic data gives unbiased estimates for correlation between the dependent and independent variable, the biased standard errors may lead to inaccurate inferences and thus wrong final results (Gujarati, 2004).

First, we employed White test to determine whether the model has a heteroskedasticity problem. The null hypothesis is that the estimation is homoskedastic (and alternative hypothesis tells that the estimation is heteroskedastic). Observed R-square is equal to 31.34 and corresponding P-value is 0.00. Hence, we can reject the null hypothesis of no heteroskedasticity in the estimation.

The second test conducted for checking heteroskedasticity is the Breusch-Pagan test. The results show observed R-square to be 21.48 and the corresponding P-value is 0.0015. In this case we again, reject the null hypothesis of the homoskedasticity of the estimated variances. The results of the two tests imply that although our estimations of coefficients are not biased, there is bias in standard errors that may lead to wrong inferences.

4.7. Implementing Robust Standard Errors

In order to account for the heteroskedasticity problems that we found in the estimations, we used robust standard error estimation (also known as White's heteroskedasticity-consistent variances and standard errors). Applying this method produces more accurate estimations with heteroskedasticity-corrected variances and standard errors along with the usual OLS variances and standard errors. Estimation results with robust standards errors (using specification 1) are given on Table 7.

The coefficients and significance of the variables did not change much from the earlier estimations with OLS variances, except that interest rate variable became significant at 5% level. This fact underlines the role of the interest rate in adjusting the CA balance; higher interest rates can be associated with higher capital inflows that seek arbitrage opportunities in higher-yield-offering economies. We still find the coefficient of NKI to be negatively and significantly related to the CA balance.

Table 7. Estimation Results of the CA and Determining Factors with Robust Standard Errors.

Variables	Coefficient	P-value
ΔLagged FA	-0.300***	0.000
ΔLagged FL	-0.501	0.112
ΔInterest	-0.517**	0.048
ΔREER	-4.858*	0.052
ΔY	-1.265***	0.000
ΔBudget deficit	-3.086	0.241
ΔTOT	1.388***	0.000
Constant	0.081**	0.038

Notes: Rise in REER indicates appreciation. The coefficients are significant at ***: 0.01, **: 0.05, and *: 0.10 levels.

5. Concluding Remarks

This work investigates the relationship between net capital inflows and the current account balance in Turkey. Viewing the current account deficit as a capital inflow helps to analyze it beyond the framework of standard "pull" factors that are typically limited to the trade characteristics and domestic economic structure. We analyze this relationship under the different model specifications with a number of control variables that capture both domestic and external factors. We include two alternative measures of the NKI – the financial account and foreign liabilities of the banks in Turkey. We find that change in the FA is negatively and significantly related to the changes in the CA balance. We also show that the current account is very sensitively and highly related to the fluctuations in the real exchange rates that are usually associated with the changes in capital flows.

The Granger causality test reveals that there is a causal link from the FA to the CA balance but the reverse link is not supported. Given exogenous character of the global financial flows and developments, high inflows to Turkey have been creating high exposure and unsustainability of its external account. Moreover, developments in the financial account, with the exception of foreign direct investment, are likely to be more random in nature and, therefore, can be reversed quickly. Our findings highlight on the significance of the macro-prudential policies to monitor short-term inflows and on minimization of destabilizing effects of the real exchange rate fluctuations on the external account in Turkey.

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Appendix A. Capital (financial) Account in Turkey 2002-2013 (bn. USD)[8]

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Capital Account	1.1	7.1	17.7	42.7	42.7	49.2	34.8	9.9	59.5	66.9	70.3	72.7
FDI abroad	-0.1	-0.5	-0.8	-1	-0.9	-2.1	-2.5	-1.6	-1.5	-2.3	-4	-3.1
FDI in Turkey	1.1	1.7	2.8	10	20.2	22	19.8	8.6	9	16.1	13.2	12.9
Portfolio I. Assets	-2.1	-1.4	-1.4	-1.2	-4	-1.9	-1.2	-2.7	-3.5	2.7	2.7	2.6
Portfolio I. Liabilities	1.5	3.9	9.4	14.7	11.4	2.7	-3.8	2.9	19.6	19.3	38.1	27
Other I. Assets	-0.8	-1	-6.9	-0.6	-14	-5	-12	10.9	7	11.2	-0.7	1.8
Other I. Liabilities	1.6	4.5	14.7	20.8	29.5	33.5	34.6	-8.4	28.9	19.9	21	37.4
Net Errors &Omissions	-0.7	4.4	0.8	1.9	-0.2	0.5	2.9	3.1	0.9	9.1	1	3.1
Reserve Assets	0.2	-4	-4.3	-23	-11	-12	2.8	-0.8	-15	-1	-23	-11

Source: CBRT, 2013 Statistics.

[8] Note: Capital outflow out of country is credit and inflow into the country is debit in the BOP accounts.

Appendix B. Data Description and Sources

Variable	Descriptor	Units	Source
ΔFA	Financial account *balance*	Mln $, monthly log difference	CBRT*
ΔFL	Foreign liabilities of banks	Converted to $ using official ERs from the CBRT, in Mln, monthly log difference	CBRT*
ΔCA	*CA balance*	Mln $, monthly log difference	CBRT*
ΔINTEREST	Overnight interest rate	(%) monthly log difference	CBRT
ΔREER	Real effective exchange rate	Index 2010=100, log dif.	BIS*
ΔY	Domestic industrial production (seasonally adjusted)	Index 2010=100, log dif.	TURKSTAT*
ΔBUDGET	Government *budget deficit*	TL, deflated using CPI., log dif.	CBRT
ΔTOT	Terms of trade	Exports/imports, log dif.	CBRT

Notes: The * denotes CBRT - Central Bank of the Republic of Turkey; BIS – Bank for International Settlements; TURKSTAT – Turkish Statistical Institute.