

Patterns of Current Account Imbalances: A Case Study on Iran and Turkey

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This analysis explores the current account patterns of Iran and Turkey, by applying the Seemingly Unrelated Regression [SUR] Method, during the period 1980-2012. We found that except net lending/borrowing of budget, exogenous factors that effect on both Iran and Turkey current account were not common. In Iran, the current account tends to decrease by any increase in the domestic credit/GDP, PPP per capita and net lending/borrowing of budget and tend to increase by any increase in foreign currency reserves, net oil export and net foreign asset, but Turkey's current account tend to decrease by any increase in GDP growth and net lending/borrowing of budget (twin deficit).

1. Introduction

This paper researches into the causes of current account imbalances of Iran and Turkey, by adding, management of foreign currency reserves by monetary authorities or government into the analysis. Preventing a country's currency appreciation after positive shocks to net exports by intervention in foreign exchange markets enable current accounts to remain positive indefinitely because such polices shut off the normal adjustment channel of real exchange rate appreciation. For example, in Iran with fixed exchange rate regime, government to adjust the equality rate of domestic and foreign currency with considered target, intervenes into the foreign exchange markets (by the increase or decrease of the supply of foreign currency) to prevent depreciation or appreciation of domestic currency so, effect on current account. The instrument of intervention in foreign exchange markets and current account, in other word, resources of foreign currency reserves are more oil export

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revenues than goods and service export and investment incomes, in case of Turkey, mechanism of revenues are reversely.

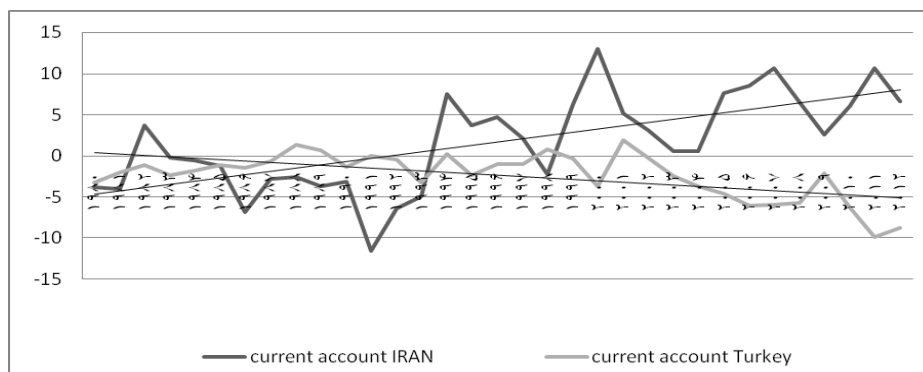
Although much research has been conducted to detect current account pattern of several advanced countries, there has been no previous research in Turkey and Iran. After recognizing the lack of research in this area for two countries, reviewing of common factors that effect on current account two countries has been determined as the main objective of this study.

First, we start by reviewing and comparison the current account patterns and polices of these two countries during last 32 years, thereafter, in literature we introduce classic and modern frameworks of current account. We then conduct an empirical analysis of the possibility that common factors account for the current account patterns of both countries, and finally conclude with an assessment of future trends.

2. Current Account Patterns of Iran and Turkey

We start by reviewing current account patterns of Iran and Turkey during last 32 years. From new inspection of data, Iran republic revolution had caused oil crisis in 1979 and repressed on oil price and effected on Iran's current account, except current account surplus in 1983 (%3.6 % of GDP, due to the increase of oil price), Iran –Iraq war between 1980-1987 and negative consequences of war had caused current account deficit until 1993 (see fig.1).

Except 1998, Iran had significant current account surplus that had increased persistently from 1994 to 2000 (12% of GDP, the peak of increase). This is due to its oil incomes, on other hand, with reviewing of current account could be observed that during this period, oil and gas export was more than non–oil export and export exceeded to import, Although with rising oil incomes, import of capital and intermediate goods increased but their share were low.

Figure 1: Current Account to GDP Ratios of Iran and Turkey

Source: International Monetary Fund.

Oil crisis in 2000 and persistent increase of oil price was important reason for Iran's current account surplus (Between 2000-2004 years). Iran's current account moved towards a balanced position during the 2004, current account surplus had an increasing trend, between 2004-2008 years, and a decreasing trend, between 2008-2009 years (financial crisis led to global recession and had negative effect on oil demand). Oil price increased in 2011 and current account surplus reached to the amount 2007 years, (10% GDP). With respect to Iran's autarky and oil dependent economy, we observe that determinant factors of Iran's current account position are more political and external factors (war, political agreement, Iranian nuclear plan in 2006, oil price, economical and political embargoes) than economical and internal factors (for example: consumption behaviors of household, firms and government effect on current account position).

In contrast Iran, Turkey' current account had deficit during the last 32 years, (except the years of 1988-1989, 1994, 1998, 2001), reform and stabilization programs in 1980 to liberalization the Turkish economy transformed it in to export-oriented, private-sector driven economy [see Durgut Ahmet (2002)]. During 1984-1988, Turkish lira (TL) depreciated and real wage repression continued so, cost of the labor and production decreased and led to the growth of export and improvement of current account between 1988-1989 years. Also in these years, Turkey benefitted economically from Iran-Iraq war, both Iran and Iraq were major trading partners, Turkish business supplied both combatants

and increased export. In addition to, with limited access Iraq to Persian Gulf, Turkey receipt pipeline fees from Iraq that this was another main reason for the improvement of current account [see Evren Altinkas (2004)]. In addition to trade account, with the expansion of tourist receipt, service account had positive effect on improvement of current account.

After 1983 tariffs lowered. Between 1988-1989 years, capital account liberalization was completed and led to capital flow and appreciation of lira (20%). After 1989 both of decrease of import tariffs and appreciation lira created boom import and had negative effect on current account. Government expenditure increased, public sector borrowing in 1993 and early 1994 combined major policy error in financing deficit led to turkey currency crash in 1994 [see Celasun-Oya (1999)].

Nutshell: growth of rapid economic, surge in gross domestic investment, the increase of consumption and government spending, growth of export and extremity dependency of export to import, devaluation of Turkish lira, growth of financial integration and etc, caused current account crisis. IMF help to reduce current deficit was effective. Turkey' currency crisis in 2001 (abrupt reversal of capital inflow) and global crisis 2008 had negative effect on Turkey's current account deficit. Generally determinant factors of Turkey's current account position are more economical and internal factors than political and external factors.

3. Literature Review of Model and Estimation Techniques

3.1. The Classic Elasticities Framework

The classic workhorse model for current account has been used since at least the 1940s (Adler, 1945, 1946, and Chang, 1945, 46). It relates the volume of exports or imports to real foreign and domestic income and relative prices (in log form):

$$\ln \text{Trade}_{it} = \alpha + \beta_1 \ln \text{Real Foreign and Domestic Income}_{it} + \beta_2 \ln \text{Relative Price}_{it} + u_{it}. \quad (1)$$

The model assumes that domestic and foreign tradable goods are imperfect substitutes, that price homogeneity holds (e.g., that an estimated coefficient on the trade price and domestic price are equal,

thus allowing for a single relative price term) and that the elasticities with respect to economic activity (e.g., income) and relative prices are constant over time [see Hooper, Johnson, and Marquez (2000) for a concise summary of the model]. The trade balance that is one of element of current account responds positively to foreign income, negatively to domestic income, and negatively to the ratio of domestic to foreign prices.

The theoretical backdrop in conjunction with the empirical research to date gives conflicting hypotheses. In the global supply shifts story, new trading countries increase global supply, which reduce prices, and thus increase demand for their exports, this is contradiction with assumption that estimated coefficient on the trade and domestic prices are equal. Also, according to Paul Krugman's (1989) "45-degree rule" fast-growing countries will not experience a deterioration of their trade balance and therefore face steady depreciation of their currency because as they grow, they produce more varieties with increasing returns to scale. Since consumers love varieties, given income, the apparent demand curve for the varieties shifts out and there is no deterioration in the terms of trade.

This framework long has been a workhorse for policymakers and short-term forecasters Krugman (1989). However, the elasticities approach is not helpful in answering the question of what causes current account imbalances over a sustained period of time. The estimated income elasticities are not constant over time or across countries (Chinn and Prasad (2003), Gruber and Kamin (2007, 2009), Chinn and Ito (2008) and Cheung, Furceri, and Rusticelli (2010). Important factors such as natural resources, productivity growth, demographic changes, and barriers to trade are not included in the elasticities framework.

3.2. A Modern Framework

With respect to restriction of classic elasticities framework that was mentioned above, a series of recent papers has examined the medium-term and long-term, structural factors that are exogenous drivers of current account balances, (Chinn and Prasad (2003), Gruber and Kamin 2007, Ca'Zorzi et al., (2009), Decrassin and Stavrev (2009), Cheung, Furceri and Rusticelli (2010), Jaumotte and Sodsriwiboon (2010) and

Gagnon(2012)). These studies provide fairly robust and consistent estimates (Table 1) of the role played by:

-Country's net foreign asset position (NFA), government budget balance, demographic factors (old and young dependency ratios), domestic credit to GDP ratio (to proxy for domestic financial depth), world and domestic GDP growth rates, net oil export, official Flow, PPP Per capita and etc, that all of variables expressed as a ratio to GDP.

Table 1: Summary of Selected Studies of Current Account Balance Determinants

Studies	Countries and Sample	Variable
Chinn & Prased (2003)	89 ad & dev (1971-1995)	GDP per capita (+), net foreign assets (+), Fiscal balance (+)
Ca Zorzi & et al (2009)	63ad & dev (1980-2006)	Age dependency (-), GDP per capita (+), net foreign assets (+), Oil price (+), Trade openness (+), Financial deepening (-), institutional quality (+)
Gruber & Kaminn (2007)	59ad & dev (1982-2003)	Age dependency (-), Oil price (+), GDP per Capita (+), GDP growth rate (-), Trade openness (+), Institutional quality (+), Fiscal balance (+), Institutional quality (-)
Desressin & Stavrev (2009)	11 Euro (1970-2007)	Age dependency (-), Population growth (-), Oil price (+), GDP per capita (+), GDP growth rate (+), net foreign assets (+), Fiscal balance (+)
Cheung & et al (2010)	30 OECD (1194-2008)	Age dependency (-), Oil price(+), GDP per capital (+), net foreign assets (+)
Jaumotte & Sodsriwiboon (2010)	49ad & dev (1973-2008)	Age dependency(-), Population growth (-),oil price (+), GDP per capita (+), net foreign assets (+), Fiscal balance (+), financial deepening (-), EMU membership (-/+)
Koske (2010)	97ad & dev (1994-2008)	Age dependency (-), Population growth (-), Structural Rigidity (-)
Aizenman & Sengupta(2011)	Chinn & Germany (1970-2009)	Age dependency (-), GDP growth rate (-), net foreign asset (+), Fiscal balance (-), Trade openness (-/+), Domestic credit/GDP (-)
Gagnon (2012)	G-20 (1984-2008)	GDP growth rate (-), net foreign assets (+) Fiscal balance (+), PPP per capita (+), Official Flow (+), Age dependency(-)

Note :(+/-) are effects of variable on current account.

First we examine modern framework of current account, then we evaluate the pattern of current account of Iran and Turkey by applying the Seemingly Unrelated Regression [SUR]⁴ Model, for 1980–2012.

In this research a set of exogenous variables effect on current account are mostly from studying of Chinn and Prasad (2003), Gruber and Kamin (2007) and Aizenman and Sengupta (2011).

Independent variables are

- Country's net foreign asset position (NFA), expressed as a ratio to GDP: Higher Country's NFA position increases its net investment income, and therefore tends to improve its current account balance.
- Government budget balance: Higher fiscal surplus (or lower fiscal deficit) tends to improve current account balance.
- Demographic factors (old and young dependency ratios): To recall, the life-cycle theory of consumption and saving implies that young households borrow, middle-age households save for retirement, and households in retirement dissave. Therefore relatively young and relatively old countries are more likely to run current account deficits [see Obstfeld and Rogoff (1996, Chapter 3)]. These effects may be captured empirically by controlling for youth dependency ratio (the ratio of the population ages 0–14 to the working age population, ages 15–64), and old-age dependency ratio (the ratio of the population 65 and older to the working age population).
- Domestic credit to GDP ratio (to proxy for domestic financial depth), and trade openness: Lack of financial development and lack of trade openness limit investment opportunities and hence encourage capital outflows.
- World and domestic GDP growth rates: An increase in the growth rate relative to other countries should be associated with a more negative current account balance, as it tends to be correlated with higher return on capital, increase in investment and the potential for higher future income, and decreases savings.

⁴ SUR is appropriate when all the right-hand side regressors are assumed to be exogenous, and the errors are heteroskedastic and contemporaneously correlated.

- Net exports of oil: Economies can take many years to adjust to changes in oil prices, which tend to be large and persistent. Oil exporters typically run surplus for several years after an increase in oil prices. Oil prices and oil production are clearly exogenous to current account balances.
- Management of foreign currency reserves: Generally, along with the increase of revenues of goods and service export and investment, the increment of foreign currency reserves and the decrease of foreign currency value relative to domestic currency value is expected, this process have negative effect on current account, but monetary authorities or government by intervention in foreign exchange market can prevent its currency appreciation and positively affect current account position.

We apply earlier literature to estimate of model that is defined by:

$$\mathbf{CAB}_{i,t}/\mathbf{GDP}_{i,t} = \alpha + \mathbf{B}\mathbf{X}_{i,t} + \varepsilon_{i,t} \quad (2)$$

$i=1,2,\dots,n$ and $t=1,2,\dots,T$

Where CAB is the current account balance (deficit/surplus), GDP is nominal GDP, α is a constant, β a vector of coefficients on the exogenous variables X, ε is an error term, i and t are respectively the country and time.

SUR model of equation 2 can be written (Wooldridge, 2002, 144):

$$\mathbf{CAB}_{1,t}/\mathbf{GDP}_{1,t} = \mathbf{B}_1 \mathbf{X}_{1,t} + \varepsilon_{1,t} \quad (3)$$

$$\mathbf{CAB}_{2,t}/\mathbf{GDP}_{2,t} = \mathbf{B}_2 \mathbf{X}_{2,t} + \varepsilon_{2,t}$$

Where:

$i=1,2$ (Iran and Turkey).

$t=1,2,\dots,32$.

In most application of SUR model it is reasonable to assume that $E(x_{i,t}, \varepsilon_{i,t})=0$ and $\varepsilon_{i,t}$ is assumed to be serially independent, but possibly correlated contemporaneously across equation.

System (3) generally can be represented:

$$\text{CAB}_{i,t}/\text{GDP}_{i,t} = \beta_{10} + \beta_{11}\text{Foreign Currency Reserves}_{i,t} + \beta_{12}\text{Net Foreign Asset}_{i,t} + \beta_{13}\text{Net Oil Export}_{i,t} + \beta_{14}\text{Eldery Ratio}_{i,t} + \beta_{15}\text{Youth Ratio}_{i,t} + \beta_{16}\text{PPP Per Capita}_{i,t} + \beta_{17}\text{GDP Growth}_{i,t} + \beta_{18}\text{Domestic Credit}_{i,t}/\text{GDP}_{i,t} + \beta_{19}\text{Trade Openness}_{i,t}/\text{GDP}_{i,t} + \beta_{110}\text{Fiscal Balance}_{i,t} + \varepsilon_{i,t} \quad (4)$$

Table 4 presents regression results for model, with the target of finding of common factors and comparison of current account patterns of Iran and Turkey, countries that are neighbor, but their implemented policies are economically and politically different during last 32 years. We estimate the current account patterns two country by [SUR] Method, for 1980–2012. Most data are obtained from the IMF International Financial Statistics (IFS), World Bank (World Development Indicators databases) and Central Bank of Iran. Independent variables are all expressed in percent of GDP. Also data for Iran's foreign currency reserves was obtained from CIA central Intelligence Agency (between 2004-2012) and data for 2004 before was from Central Bank and Statistical Center of Iran.

We conduct a family of unit root and stationary tests on all the series first on their level and then on their first differences. Overwhelmingly, all the testing procedures suggest presence of unit root in level I(1) for all the variables, for preventing of spurious regression, by use of Engle-Granger (1987) cointegration test, remaining of equations estimation examine, the result obtained from them show that linear combination of variables are stationary and there are long-run equilibrium relationship among the variables, so series are cointegrated (Tables 2-3).

Table 2: Resulting of Augmented Dickey-Fuller (ADF), and Phillips-Perron (PP) Unit Root Test for Iran Series

Variable	ADF Test Statistic H0:Series has a unit root	Prob	PP Test Statistic H0: Series has a unit root	prob
Current Account	2.55	0.11	2.51	0.12
PPP GDP per Capita	0.03	0.99	1.40	0.99
GDP Growth Rate	-2.84*	0.08	-2.72*	0.073
Trade Openness	-0.14	0.96	-1.39	0.57
Net oil Export	2.31	0.60	2.34	0.67
Foreign currency reserves	-2.39	0.15	2.33	0.16
Net Foreign Asset	-1.20	0.99	-1.70	0.41
Domestic credit/GDP	-0.62	0.84	-1.17	0.67
Fiscal Balance	-2.012	0.15	-2.44	0.59
Dependency Ratio(old)	-1.56	0.48	-1.55	0.49
Dependency Ratio (young)	-4.08	0.44	0.63	0.98
ADF and PP Test critical values	%1 Level			-3.67
	%5 Level			-2.96
	%10 Level			-2.62
Engle-Granger Cointegration Test	ADF Test Statistic H0: linear combination of variable is not stationary			
E: Remaining of Equations Estimation	-4.52		prob (0.0012)	
ADF Test critical values				
	%1 Level -3.67			
	%5 Level -2.96			
	%10 Level -2.63			

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 3: Resulting of Augmented Dickey-Fuller (ADF), and Phillips-Perron (PP) Unit Root Test for Turkey Series

Variable	ADF Test Statistic H0:Series has a unit root	Prob	PP Test Statistic H0: Series has a unit root	prob
Current Account	2.66*	0.09	2.72*	0.08
PPP GDP per Capita	-4.49	0.99	3.53	0.99
GDP Growth Rate	-2.86*	0.09*	-2.74*	0.082
Trade Openness	-2.35	0.16	-2.39	0.15
Net oil Export	-1.35	0.59	-1.28	0.62
Foreign currency reserves	-1.44	0.54	-1.45	0.15
Net Foreign Asset	-1.77	0.38	-1.82	0.36
Domestic credit/GDP	-1.20	0.99	-1.17	0.99
Fiscal Balance	-2.012	0.15	-2.44	0.59
Dependency Ratio(old)	-0.34	0.90	-0.33	0.90
Dependency Ratio (young)	-0.54	0.86	0.52	0.89
ADF and PP Test critical values	%1 Level %5 Level %10 Level		-3.67 -2.96 -2.62	
Engle-Granger Cointegration Test	ADF Test Statistic H0: linear combination of variable is not stationary			
E: Remaining of Equations Estimation	-4.52		prob (0.0012)	
ADF Test critical values				
%1 Level	-3.67			
%5 Level	-2.96			
%10 Level	-2.63			

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

After estimation of system by Ordinary Least Squares method, we observed heteroskedasticity and contemporaneous correlation in the

errors across equations through (Breusch-Pagan-Godfrey and White test, for Heteroskedasticity test, Breusch-Godfrey Serial Correlation LM test, Luing-Box test, for autocorrelation, this tests is for any equation separately and System Residual Portmanteau tests for system autocorrelations and test for Equality of Variances Between Series)⁵. Thereafter, we selected SUR method.

Table 4: Results of Model of Current Account Balances, 1980–2012

Independent Variables	Current Account/GDP of Iran (in%)	Current Account/GDP Of Turkey (in%)
PPP GDP per Capita	-0.00427 (2.95)	-0.00072 (0.54)
GDP Growth Rate	0.00021 (0.13)	-0.11745 (3.02) **
Trade Openness	-0.0087 (0.65)	0.04508 (1.12)
Net Oil Export	0.6263 (5.56) *	0.0636 (1.75)
Foreign Currency Reserves	0.3265 (4.21) *	0.25 (0.85)
Net Foreign Asset	0.0274 (4.29)**	0.06407 (0.73)
Domestic credit/GDP	-0.4520 (4.09) *	-0.00754 (0.046)
Fiscal Balance (net lending/borrowing of budget)	-0.3751 (2.74)	-0.001245 (2.32) *
Dependency Ratio(old)	-0.3021 (0.72)	-0.12498 (0.26)
Dependency Ratio (young)	0.5633 (1.54)	-0.004 (0.065)
R-squared	0.87	0.81
Adjusted R-squared	0.80	0.73
(F-statistic)	4.46	4.23

Note: The dependent variable is current account balance scaled by GDP of Iran and Turkey. The table shows time-series estimation results from Seemingly Unrelated Regression over the period from 1980 to 2012, annual values of all explanatory variables. Data in parentheses are t-Statistic, * and ** denote significance at 5 and 10 percent levels, respectively.

At 5% and 10% confidence level for Iran, PPP per Capita, GDP growth, net oil export, foreign currency reserves, net foreign asset, domestic

⁵ These results are not reported here to conserve space but are made available upon request.

credit/GDP and fiscal balance are significant. The Iran's current account tends to decrease by about 0.45 percent (or more) of any increase in the domestic credit/GDP, 0.37 percent and 0.0042 percent of any increase in fiscal balance and PPP per capita respectively. Also net oil export, foreign currency reserves and net foreign asset had a strong positive effect on current account Iran relative to Turkey. The current account tends to increase by about 0.32 percent of any increase in the foreign currency reserves, 0.62 percent and 0.027 percent of any increase in net oil export and net foreign asset respectively.

GDP growth and fiscal balance are effective factors that have negative effect on current account of Turkey. Current account tends to decrease by about 0.11percent (or more) of any increase in GDP growth and 0.0012 percent of any increase in fiscal balance (net lending/borrowing). Also, just fiscal balance was common factor that affect on current account two countries.

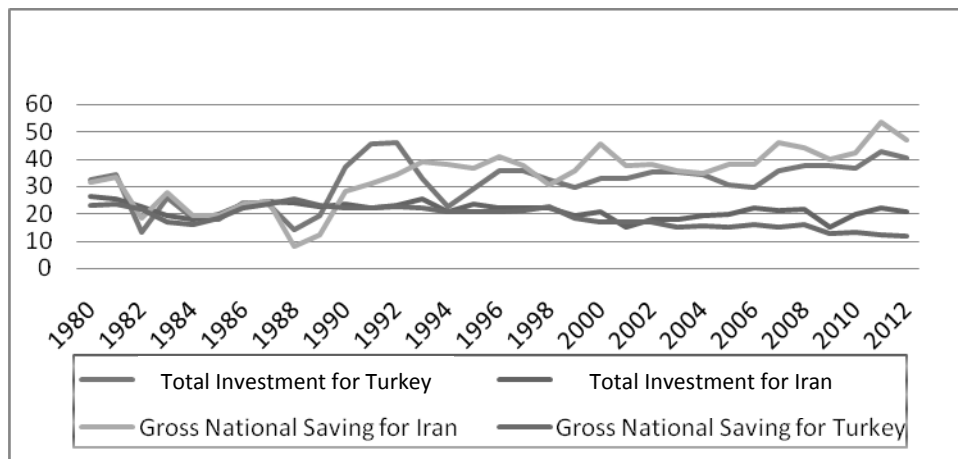
Overall, the regression model provides a good explanation of the data, as implied by the high R^2 . But the fit is notably better for the Iran than for Turkey.

4. Conclusion and Further Work

This paper documents statistically robust and economically important effects of exogenous variables on current account balances of Iran and Turkey. A key advance is that the model captures the effect of management of foreign currency reserves. We showed that in Iran's economy of autarky and oil dependence, crucial factors that increased current account surplus were foreign currency reserves, net oil export and net foreign asset. Respectively, also domestic credit/GDP, PPP per capita and fiscal balance had negative effect, In Iran with the increment of foreign currency reserves, domestic currency appreciate and led to negative effects on current account, but monetary authorities or government by intervention in foreign exchange markets prevents appreciation of domestic currency and effect on current account position positively. The instrument of intervention in foreign exchange markets are foreign currency reserves that caused by more oil export revenues than good and service and investment incomes, in case of Turkey mechanism these revenues are reversely. We expect without oil –gas export, Iran is moving toward the decrease of current account surplus,

but this decrease will not be similar to Turkey due to surge in investment that is created by rapid growth (See fig 2).

Figure 2: Comparing of Total Investment and Gross National Saving and Household Final Consumption Iran and Turkey



Source: World Bank

[(Growth of rapid economic, consequence, surge in gross domestic investment rose spending, causing total domestic spending to exceed domestic production in the short run. To cover the excess of domestic spending over production, the country imports more goods and services than it exports. In particular, the surge in investment may increase the demand for imported capital goods and caused deficit boosting the return on domestic assets relative to foreign assets. The increase in the return on domestic assets attracts the foreign funds necessary to finance the current account deficit and result in a net capital inflow (corresponding to the current account deficit) and an appreciation of the country's currency (See Mishkin (2001)]. This theory is right, for developed countries or developing counties with rapid growth, for example in Turkey, we observed that GDP growth had negative effect on current account.

In Iran, based on IMF and World Bank data, we expect that moving of current account toward the decrease of surplus is created by increase of household consumption, but increasing trend of Iran's household consumption relative to Turkey is lower (see fig 3).

Figure 3: Comparing of Total Investment and Gross National Saving and Household Final Consumption Iran and Turkey



Source: World Bank

[(If a country increases its demand for imports due to increasing of consumption or government expenditure, basic economic theory predicts that the country's current account deficit should widen and its currency depreciate. Holding all else constant [see Mishkin (2001)].

Also increment of government expenditure, mismanagement of fiscal and monetary or external polices and the increase of embargoes (the decrease of oil incomes) caused by political factors will have negative effect on current account.

Rapid growth has cost, its cost is current account deficit, in Turkey with continuing of growth and increase of investment, government and household consumption expenditure and growth of export and dependence of export to import we expect that current account deficit will continue.

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