

The Calculation of Capital Flight and its Effect on Macroeconomic Variables in Iran

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ABSTRACT

Capital flight is one of the fundamental problems of developing countries. Although, most of these countries need capital - as the engine of economic growth – but due to the economic - political bottlenecks, not only foreign investment in these countries is scanty, but also most of these countries encounter with capital flight problem. In economic literature, capital flight is considered as an abnormal phenomenon, so it is usually mentioned as an economic illness. This study aims to measure the amount of capital flight and its effect on macroeconomic variables such as growth, foreign debt, and inflation in Iran. Estimation results of VAR model and Johansen convergence test during 1979 to 2010 shows that, capital flight has a negative and significant effect on economic growth, while its effect on foreign debt and inflation is not significant.

KEYWORDS: capital flight, private capital exit, economic growth, foreign debt, inflation, VAR model, Granger causality, Johansen convergence

1. INTRODUCTION

Capital factor has major role in the economic growth and economists consider it as development and growth engine and regard capital difference as the reason of countries development and growth difference. Although most developing countries face with shortage of capital and in order to fill the gap of domestic deposit-investment, borrow from other countries and international organizations, occurrence of some various events in recent decades has caused transferring of considerable amount of their capital to industrial and developed countries and the emerging the concept of "capital flight" in economic literature.

Capital flight from developing countries not only had reduced their economic growth, but also caused to erosion of tax base, increasing foreign debts and inflation, and worsening economic instability in these countries. During the years after the Islamic Revolution of Iran, capital flight economy phenomenon is also emerged in Iran and left adverse effects on economic performance of the country. This study aims to investigate the concept of capital flight, its effect, and its measurement. For this purpose, we first present the general concept of capital flight in first section followed by its causes and capital flight measurement methods along with literature review in section two. In section three, we will present methodology and statistical analysis methods. In section four, we will calculate amount of capital flight and analyze its procedure in Iran and finally in section five, we will investigate mutual effects of capital flight and other macroeconomic variables using VAR model and Granger causality.

In economic literature, while the withdrawal of capital from developed countries is called foreign investment, but the withdrawal of capital from developing countries and third world refers to so-called "capital flight". This naming is due to the unusualness of capital withdrawal from developing countries to industrialized and developed countries, because most developing countries have urgent need to capital and to address this need, attract foreign capital and take loans. Capital flight from developing countries on one hand, due to lower ability of import capital and intermediary goods cause investment decrease and consequently decreased production and employment in these countries and from the other hand, due to the erosion of tax base and consequently, decreased tax revenues cause to foreign debt and inflation increase and finally, worsening dysfunctional economic situation of these countries.

Since 1980, followed by reimbursement of debts crisis in Latin American countries, capital flight from developing countries was intensified and encountered economic performance of these countries with numerous problems. One of the effects of capital flight from developing countries, is unprecedented and severe increase of foreign debts of these countries, so that, during 1980s crisis, foreign debt of these countries rose to 1200 billion dollars in 1987. Increasing foreign debts in developing countries not only jeopardizes political – economic independence but also, facilitates capital flight and reduces economic growth. The incidence of severe economic and political changes in Iran during the years after Islamic Revolution exacerbated capital flight phenomenon so that, since 1980, capital flight from country always had significant amount. Concerning problems such as high rates of

inflation and unemployment in the Iran's economy, the country's control on capital withdrawal can improve economic conditions and facilitate contribution to economic development objectives and country's 20-year perspective. Since capital flight is an economic illness and recognizing its causes can help recognize its treatment, this study aims to investigate mutual effects of capital flight and other macroeconomic variables.

In this regard, research hypotheses are as follows:

1. Capital flight has a negative effect on economic growth of Iran.
2. Capital flight has a negative effect on foreign debts of Iran.
3. Capital flight has a negative effect on Inflation in Iran.

2. LITERATURE REVIEW

Schneider (2003) calculated capital flight in 116 countries between 1971 and 1998. Altin (1995) calculated capital flight from Turkey via two methods of money burning and remaining. His estimation results show that, the remaining method always shows higher capital flight.

Boyce and Ndikuman(2001) using debts adjustments, evaluated capital flight from African countries.

Onwioduokit (2001) using Nigeria data between 1970 and 1996 estimated capital flight (by OLS method) from this country. According to his results, while the increase in domestic interest rates and economic growth will reduce capital flight but, inflation increase, exchange rate premium, and foreign interest rates increase capital flight. Cervena (2006) in his MA thesis examined the effect of capital flight on economic growth rate of 75 different countries. He used panel data model to estimate a growth model following the approach obtained by Solow - Swan and concluded that, the capital flight from one country means the lower level of country in terms of economic growth. Chipalkatti and Rishi (2001) in a study for India between 1971 and 1997 showed that, capital flight has a significant and positive effect on the country's foreign debt. Menbere (2003) investigated the effect of foreign debt and capital flight on economic growth in 60 developing countries between 1982 and 1999. The results showed that, capital flight has a negative effect on economic growth of developing countries in Africa, Asia, and Latin America. Moreover, according to the results of this study, negative effect of capital flight in countries where foreign debt is high is much higher. Rajan (2005) analyzed the effects of financial crisis in East Asia during 1997-1998 in Indonesia, Korea, Malaysia, and Thailand, showed that, this crisis caused by the massive withdrawal of capital, has increased liquidity, created high inflation, and has created spiraling prices - wages in these countries.

3. METHODOLOGY AND DATA

This study is analytical - applied which is performed by library procedure. Research period of this study was from 1979 to 2010 and its statistical population is Iran. In order to analyze the data, vector auto regressive (VAR) model, Granger causality test and Johansen convergence were used.

In this study, to investigate the interaction between capital flight variable and other research variables, vector auto regressive (VAR) model was used, and given that, this model requires much high number of observations, so to investigate the relation of each variable with capital flight, a distinct model is explained as follows.

Model No. 1: To investigate the relationship between growth and capital flight, following pattern was used:

$$G_t = \alpha_0 + \alpha_{1i} \sum_{i=1}^P G_{t-i} + \alpha_{2i} \sum_{i=1}^P CF_{t-i} + U_{1t} \quad , \quad CF_t = \lambda_0 + \lambda_{1i} \sum_{i=1}^P G_{t-i} + \lambda_{2i} \sum_{i=1}^P CF_{t-i} + U_{2t} \quad [1]$$

Where,

G_t is growth rate of GDP per capita in 2000 prices

CF_t is ratio of capital flight on GDP multiplied by 100

Model No. 2: To investigate the relationship between capital flight and foreign debt, following pattern was used:

$$ED_t = \beta_0 + \beta_{1i} \sum_{i=1}^P ED_{t-i} + \beta_{2i} \sum_{i=1}^P CF_{t-i} + U_1 \quad , \quad CF_t = \theta_0 + \theta_{1i} \sum_{i=1}^P ED_{t-i} + \theta_{2i} \sum_{i=1}^P CF_{t-i} + U_{2t} \quad [2]$$

Where,

ED_t is ratio of foreign debt on GDP multiplied by 100

Model No. 3: To investigate the relationship between inflation and capital flight, following pattern was used:

$$INF_t = \gamma_0 + \gamma_{1i} \sum_{i=1}^P INF_{t-i} + \gamma_{2i} \sum_{i=1}^P CF_{t-i} + U_{1t} \quad , \quad CF_t = \phi_0 + \phi_{1i} \sum_{i=1}^P INF_{t-i} + \phi_{2i} \sum_{i=1}^P CF_{t-i} + U_{2t} \quad [3]$$

Where,

INF_t is inflation rate (consumer price index)

$\theta, \phi, \gamma, \beta, \lambda$ are coefficients

P is the order of VAR model

U_{it} is disruption component of i th equation

4. RESULTS

After determining the optimal number of lags, it is time to estimate VAR model.

Estimating model No. 1: In this model, first, the equation of economic growth is estimated. The results of this estimation are as follows.

$$\{G_t = 1.7345 + 0.35 G_{t-1} - 0.9CF_{t-1}$$

$$(t = 1.19) \quad (t = 2.17) \quad (t = -1.98) \quad R^2 = 0.29 \quad D.W = 2.17 \quad F = 5.46[0.010]$$

As it can be seen, the value of capital flight with lag has a significant and negative effect on economic growth, but economic growth lag has a positive and significant effect on itself. The determination coefficient (R^2) is equal to 0.29 that given the small numbers of explanatory variables is acceptable. Durbin-Watson statistic indicates the absence of serial autocorrelation and based on F statistics, coefficients are simultaneously significant.

The equation of capital flight has been estimated in pattern No. 2 and the obtained results are as follows.

$$\{CF_t = 0.45 + 0.06 G_{t-1} + 0.72CF_{t-1}$$

$$(t = 0.998) \quad (t = 1.21) \quad (t = 5.14) \quad R^2 = 0.49 \quad D.W = 2.28 \quad F = 13.214[0.000]$$

According to the above results, economic growth lag has no significant effect on capital flight. While, the capital flight lag has a remarkable positive and significant effect on capital flight. According to F statistics, coefficients are simultaneously significant and determination coefficient is equal to 0.51.

Estimating model No.2: In this model, first, equation to foreign debt is estimated as follows:

$$\{ED_t = 3.23 + 0.7 ED_{t-1} - 0.28CF_{t-1}$$

$$(t = 1.74) \quad (t = 5.32) \quad (t = -0.63) \quad R^2 = 0.53 \quad D.W = 1.75 \quad F = 15.2714[0.000]$$

As it can be seen, the amount of foreign debt is not affected by capital flight and is related only to its lag. The value of Durbin-Watson in this estimation reflects the absence of serial autocorrelation and F statistics indicate that, coefficients are simultaneously significant.

The capital flight model estimated as follows:

$$\{CF_t = 1.075 - 0.059 ED_{t-1} + 0.65CF_{t-1}$$

$$(t = 1.88) \quad (t = -1.47) \quad (t = 4.76) \quad R^2 = 0.51 \quad D.W = 1.92 \quad F = 13.8819[0.000]$$

Estimation results show that, the amount of foreign debt has negative and nearly significant effect on capital flight ratio. In addition, Durbin-Watson statistic indicate the absence of serial autocorrelation and according to F statistics, coefficients are simultaneously significant.

Estimating model No. 3: In this model, first, equation to inflation is estimated as follows:

$$\{INF_t = 10.049 + 0.46 INF_{t-1} + 0.19CF_{t-1}$$

$$(t = 2.51) \quad (t = 2.63) \quad (t = 0.34) \quad R^2 = 0.20 \quad D.W = 1.72 \quad F = 3.48[0.045]$$

As it can be seen, the amount of capital flight with lag has no significant effect on inflation but, according to F statistics, coefficients are simultaneously significant. The value of Durbin-Watson indicates the absence of serial autocorrelation is indicative. Equation of capital flight is estimated as follows:

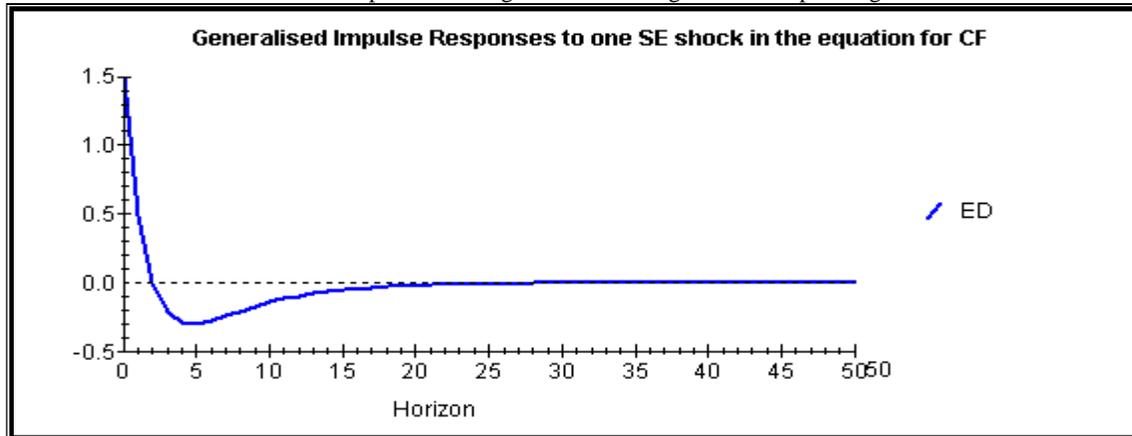
$$\{CF_t = 0.217 + 0.0156 INF_{t-1} + 0.6923CF_{t-1}$$

$$(t = 0.2153) \quad (t = 0.355) \quad (t = 4.86) \quad R^2 = 0.47 \quad D.W = 1.91 \quad F = 11.97[0.000]$$

As it can be seen, capital flight is not affected by inflation, too.

In the following, the response of each economic growth variables, foreign debt, and inflation to entering a positive shock on capital flight are described by charts.

Chart. 1: Response of foreign debt to entering shock on capital flight



According to chart 1, when a shock enters to capital flight, economic growth rate will drop immediately and it takes about five periods to be compensate this loss.

Chart. 2: Response of economic growth to entering shock on capital flight

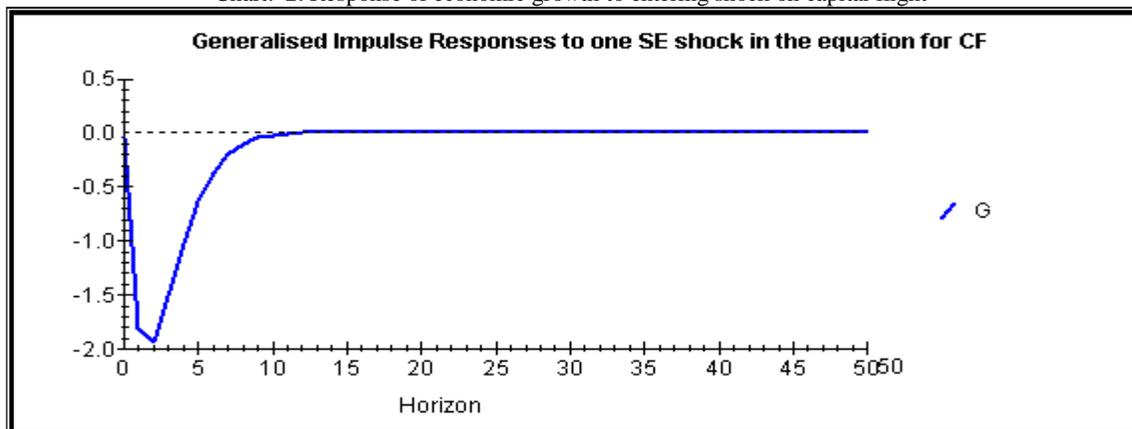
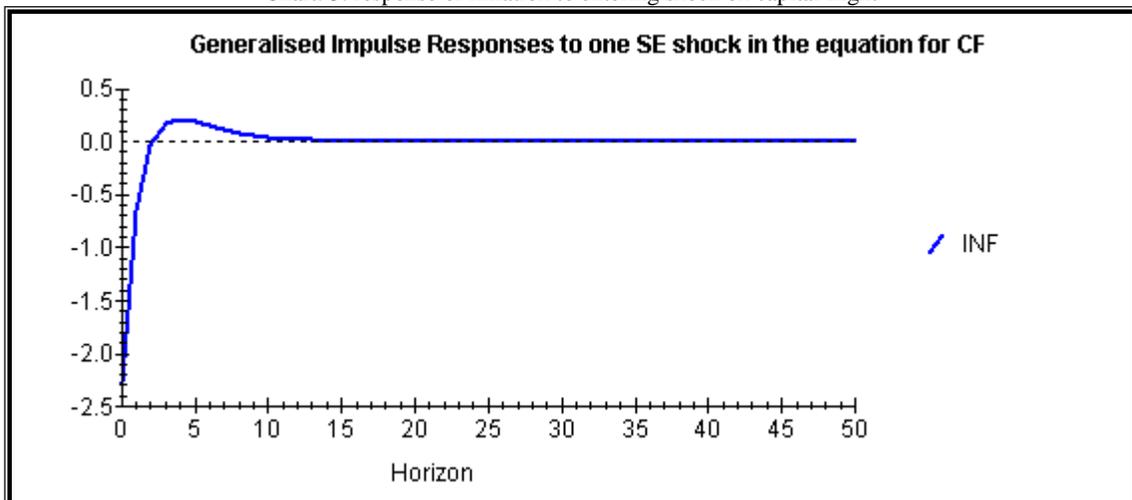


Chart 2 shows that, the entering a shock on capital flight will reduce foreign debt and after about ten periods an insignificant amount of this loss will be compensated. Decreasing foreign debt due to increasing capital flight can be justified as following: when economic conditions are deteriorated while, capital flight has been intensified, due to simultaneously reduced trust and increased risk, foreign investors decline to lend and consequently, external debt is decreased.

Chart. 3: response of inflation to entering shock on capital flight



According to chart 3, entering shock on capital flight, increases inflation rapidly and strongly and inflation never returns to its original level.

5. Conclusion

Capital factor has major role in the economic growth and economists consider it as development and growth engine and regard capital difference as the reason of countries development and growth difference. Although most developing countries face with shortage of capital and in order to fill the gap of domestic deposit-investment, borrow from other countries and international organizations, occurrence of some various events in recent decades has caused transferring of considerable amount of their capital to industrial and developed countries and the emerging the concept of "capital flight" in economic literature.

In this study, capital flight in Iran has been calculated via six different methods. The analysis of capital flight trend shows that, during the years of increased political tensions and imposed war, capital flight in Iran has been accelerated so that, via private capital withdrawal in years 1355 to 1368 i.e. from the beginning of unrests related to the Islamic Revolution to the end of the imposed war, 29.771 billion of capital has left the country. After calculating capital flight in fifth section of this study, we estimates three VAR models in which, the relationships between capital flight and three variables of growth, inflation, and foreign debt, was explained.

Due to negative and considerable effect of capital flight on economic growth, adoption of methods to control the capital flight appears to be highly essential. Some methods to control capital flight can be outlined as follows:

- Creating confidence in the national economy
- Due to the capital flight trend in the Iran, the most important factor in increasing capital flight is unrested and ill-trusted environment that caused by external and internal factors. Therefore, providing a stable source of economic financing is a convenient way to reduce uncertainty in the domestic economy, because Iran's dependence on oil has caused severe consequences of constantly economic fluctuations and lack of confidence by external political issues.
- Diversity in domestic financial assets
- Diversity of assets within a country can make its residents able to reduce risk levels through a variety of assets in their portfolio. Therefore, developing financial and capital markets can be effective in controlling capital flight arose from non-trusty situation.
- Other methods of controlling capital flight can be mentioned as following:
 - Setting up proper currency controls
 - Setting up proper capital controls
 - Reforming tax system
 - adopting credible fiscal and monetary policies
 - Ensuring private ownership and increasing the range of private sector activity

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