International Journal of Economics, Commerce and Management
United Kingdom Vol. V, Issue 8, August 2017
http://ijecm.co.uk/ ISSN 2348 0386

CAPITAL FLIGHT AFFECTING DETERMINANTS IN BANGLADESH: AN ECONOMETRIC ESTIMATION

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Abstract

The main aim of this paper is to examine the factors of capital flight from Bangladesh. For this purpose, the study period has been used ranging from 193 to 2013. The much known Ordinary Least Squares (OLS) method that is Linear in Regression has been used to estimate the determinants of flight capital. This study identifies external debt, foreign direct investment flows, foreign reserves, interest rate differentials, current account surplus are main causes of capital flight. This analysis also finds some other reasons of capital flight that include political instability, financial crimes that generated massive illegal incomes, corruption in tax administration, export under invoicing and import over invoicing, illegal financial deals in the running of state owned enterprises, defaulting nature of bank loans by the large industrial institutions, manipulation of stock exchanges, thieving nature of accumulating illegal money. This work also finds that there is strong positive correlation between interest rate differential and capital flight and between change in external debt and capital flight. The findings of this study imply that debt relief

strategies will pull long-term benefits to Bangladesh only if accompanied measures to prevent a new cycle of external borrowing and capital flight. Policy makers should focus on stabilizing political and economic environment; especially they should apply clear and appropriate policies regarding external debt management, foreign direct investment along with adaptive monetary policies affecting interest rates.

Keywords: Flight Capital, Unit Root Test, Multicollinearity Test, Heteroskedasticity, Correlation Matrix

INTRODUCTION

Capital Flight has been an important issue since early 1980s in developing countries like Bangladesh. A massive amount of capital left this country during the last three decades (Alam and Quazi, 2003). Capital flight can be defined as the movement of capital out from a resource-scarce developing country to avoid social control. It is measured as net unrecorded capital outflow or the residual between officially recorded sources and recorded uses of funds (Beja, 2006). Many developing countries concern with capital flight phenomenon because of its deleterious impact on economic growth and welfare, macroeconomic stability, income distribution, illegal activities and other social development matters. Empirically, several factors were cited as contributors to capital flight. Many scholars believe that external borrowing, short-term inflow of capital and financial aid fuel capital flight (see Cerra*et al*. 2005; Chipalkatti and Rishi, 2002; Beja, 2006**;** Ndikumana and Boyce, 2008). However, others argue that factors such as real GDP growth rate, foreign direct investment, interest rate differential, inflation rate, exchange rate, and uncertainty also have an important role (see, Hermes and Lensink 2001; Ndikumana and Boyce, 2003; Fedderke and Liu, 2002; Ljungwall and Wang, 2008). This difference in emphasis on the drivers of capital flight has not been resolved by empirical research, as each approach enjoys some empirical support (Kutan*et al.* 2009).

This study contributes to the literature by investigating the factors affecting capital flight in the BangladeshThough Capital flight is not observable directly, it is assumed to be widely prevalent in the developing countries like Bangladesh. The term capital flight is viewed as a major factor contributing to the mounting foreign debt problems and inhibiting development efforts. There is no precise definition of capital flight that has wide acceptance. Different writers have viewed the term in different ways. In this paper I have adopted World Bank Broad Approach to measure the capital flight.

Definition of Capital Flight

General Definition

It is important to say that there is no universally accepted definition of capital flight. Before presenting the various definitions, it is necessary to provide a rationale of the basis that has been used in literature to try and dichotomize domestic capital outflows as either capital flight or normal flows. Generally, capital from developing (poor) countries has been considered as a symptom of a 'sick society'. Some economists consider capital flight as a result of heavily indebted countries' inability to recover from debt problems. Other views it as a derogatory description of natural, economically rational responses to the portfolio choices that have confronted wealthy residents of some debtor poor countries (Lessard and Williamson, 1987, p 201). As has been eluded to earlier, this controversy surrounding the term is partially due to absence of a precise and generally accepted definition and partly because of the way the term has been asymmetrically applied between developed and developing countries. As a result of that some economists refer to capital outflows from developed countries as foreign direct investment while the same activity is referred to as capital flight when it is undertaken by residents of a developing country (Ajayi, 1995).

The above dichotomy is premised on the belief that investors from the developed countries are responding to better opportunities abroad, while investors from developing countries are assumed to be escaping the perceived high risk. In general, however, it is believed that all investors (both from developed and developing countries) are rational and thus will base their decisions on the relative returns and risks of investment at home and abroad.

Another subtle distinction being made in literature is between legal and illegal transactions as a means to try and distinguish between capital flight and normal capital outflow. Given the fact that illegal transactions by virtue of their activity are normally not reported to compliers of balance of payments (BOPs) statistics, it therefore becomes difficult to know the extent to which they constitute capital flight. Walter (1987) defines capital flight as 'capital which flees' involving international asset redeployments or portfolio adjustments due to significant perceived deterioration in risk–return profiles associated with assets located in a particular country. Although the legality or illegality of the activity might be debatable, the key issue is that there is a conflict between the objectives of asset holders and society. Alternately, capital outflows in response to economic or political crises are considered as capital flight.

Despite this we will try to define it from different perspectives. One of the best definitions of capital flight is the unrecorded private capital outflows which could be legal and useful to the economy or illegal and harmful to the economy.

Wikipedia defines capital flight as: “Capital flight occurs when assets or money rapidly flow out of a country, due to an event of economic consequence. Such events could be an increase in taxes on capital or capital holders or government of the country defaulting on its debt that disturbs investors and causes them to lower their valuation of the assets in that country or otherwise to lose confidence in its economic strength.”

Lessard and Williamson (1987) contend that capital flight is caused by the fear of capital loss domestically due to risks of expropriation, exchange rate depreciation, capital controls, taxation and financial repression. If capital is leaving the country for better risk- return opportunities then it will not be classified as capital flight, but a rational outflow of funds.

Beja (2007) emphasizes that short term inflows of capital and external borrowing in developing countries are the main causes of capital flight. Capital flight is defined as the private sector's outflow of capital from developing countries with scarce reserves of foreign exchange. Outflow of capital follows a revolving fashion in that external borrowing is transformed into capital flight due the increased debt service and therefore increased default risk.

Cuddington (1986,p.2) refers to capital flight as short-term capital outflows involving hot money that response to political or financial crises, burdensome taxes, a prospective tightening of capital controls or a major domestic currency devaluation as well as actual or developing hyperinflation. On the other hand, Morgan Guaranty Trust Company (1986, p. 13) defines capital flight to constitute the reported and unreported acquisition of foreign assets by the non-bank private sector and elements of the public sector.

Deppler and Williamson (1987) considers that capital flight to be motivated by residents’ fears of capital loss which tend to arise from risks of expropriation, debt repudiation or exchange rate depreciation, and from market distortions such as capital control, taxation and financial repression that would reduce the value of an asset as compared with its value if invested abroad. Conversely they also stressed that the non-flight capital outflows are generally not motivated by the intention to avoid large losses, but are prompted by attempts at maximizing returns through international portfolio diversification. Thus in their definition, for an outflow to be categorized as capital flight, the transfer of capital must be a response to losses and risks that are considered to be ‘large’ in relation to capital deployed.

In Khan and Haque (1985) defined capital flight in terms of domestic and foreign investors’ response to an asymmetric risk of expropriation. Assuming that there is no cost related to foreign investment, a two-way capital flow is observed where domestic projects may exceed private domestic returns; (3) increases in a country’s gross borrowing needs due to capital flight might raise the marginal cost of foreign debt; and (4) capital might never return

resulting in lower domestic investment and lower tax base. Investors invest abroad in order to avoid higher risk of expropriation while using foreign funds to finance domestic investment.

The above discussion on capital flight testifies to the fact that there are different views amongst economists regarding the concept and definition of capital flight. Nevertheless, it can be generally agreed that capital flight refers to capital that is running away from the domestic financial market in order to avoid losses and is in conflict with the interests, goals and objectives of the domestic society (Harrigan, 2007).

To this end, it can be argued that normal capital outflows are the ones that take place in order to maximize economic returns and opportunities between countries. Normal portfolio diversification takes place on the basis of differentials in economic returns. Capital flight on the other hand as seen from this analysis is that subset of capital Outflows that are propelled by source country policies.

The broad definition

The most widely used concept of the term capital flight links the loss of capital through domestic capital outflows to a lowering of national utility. This definition of capital flight is based on the assumption that all outflows of capital by the domestic resident sector if domestically invested would yield a higher rate of social return. This definition includes measured acquisitions of foreign assets by banks and individuals plus errors and omissions in the balance of payments. This approach leads to a very broad definition of capital flight since it includes all reported and unreported increases in foreign assets of the public and private sector. Some economists prefer to work with a narrow version of this definition where capital flight is confined to short term capital of the private sector and errors and omissions in the balance of payments. It is often referred to as the 'hot money' measure. However, both the broad and narrow version are based on the assumption that the magnitude captured in the estimate leads to loss of national utility or welfare.2 This belief is reflected in the restrictive assumptions on which the broad and the narrow measure of capital are based and assumes that the social rate of return on domestic investments is higher than the private rate of return. Presumably if capital did not leave the country domestic invisible resources would have gone up by that amount. This is, of course, assuming that no leakage into conspicuous consumption or consumption of foreign goods would take place.

Research Gap

From the above literatures it is clear that the analysis of the determinants of capital flight is still a controversial issue in empirical world and theoretical field. For this reasons this paper tries to re-examine the determinants of capital flight.

Rationale of the Study

Capital flight can be defined as the movement of capital out from a resource-scarce developing country to avoid social control. It is measured as net unrecorded capital outflow or the residual between officially recorded sources and recorded uses of funds. It has become a common phenomenon in Bangladesh. Bangladesh as a developing country concerned with capital flight phenomenon because of its deleterious impact on economic growth and welfare, macroeconomic stability, income distribution, illegal activities and other social development matters. In addition policy makers will be benefitted by the policy prescription provided by this study.

Objectives of the study

(1) To examine the size of capital flight from Bangladesh for the period 1973-2013 using the residual method.

(2) To determinants of capital flight analyzed within the context of economic socio-economic and other factors.

(3) To investigate the mechanisms of capital flight, that is, the different ways through which money is shipped abroad. and the possible measurable assets in which money is held once it arrives abroad.

METHODS OF MEASURING CAPITAL FLIGHT

Since there are a large number of definitions of capital flight, the same is true with regards to its measurement. As such literature on the subject matter is abounding with several capital flight measures. Not surprisingly, this leads to differences in capital flight estimates for the same country. Some authors dichotomize between direct and indirect approaches to the measurement of capital flight. The direct approach chooses certain variables that constitute capital flight and attains data directly for the variables. The indirect approach measures capital flight indirectly using a residual of some other variables. In general the indirect measure defines capital flight more broadly than the direct measure. In general, the following measures of capital flight can be distinguished in the literature (Claessens and Naudé 1993: 2-9): (i) the residual (or broad) method; (ii) the Morgan Guaranty; (iii) the Dooley method; (iv) the hot money method; (v) the trade misinvoicing method. Arellano and Ramos (1987) and Bank of England (1989) employed the direct approach of measuring capital flight. The indirect approach was used by World Bank (1985). Morgan Guaranty Trust Company (1986) and Cline (1987) put forward a variation of the World Bank's indirect measure. Cumby and Levich (1987) concluded that significant differences in results of capital flight studies may be attributed to differences in data

used and differences in the definition and measurement of capital flight adopted by various researchers. We will briefly explain these different methods of measurement in below.

i. Residual Method

The World Bank's (1985) broad approach measures capital flight indirectly by comparing the sources of capital inflows (i.e., net increases in external debt and the net inflow of foreign investment) with the uses of these inflows (i.e., the current account deficit and additions to foreign reserves).

Algebraically, this method expresses capital flight as follows:

Capital flight= f (Change External debt, Foreign direct investment, Current account deficit, Change in Foreign Reserve)

KFr = ΔED + FDI – CAD – ΔFR……. (1)

Where *KFr*is capital flight according to the residual method, Δ denotes change, *ED* is stock of gross external debt reported in the World Bank or IMF data, *FDI* is the net foreign investment inflows, *CAD* is the current account deficit/surplus and *FR* is the stock of official foreign reserves.

This broadest definition of capital flight has the advantage of that it incorporates all the reported as well as unreported build-up of foreign assets for both public and

private sectors (World Bank 1985; Erbe 1985) and thus would seem to be appropriate if one thinks that most of the funds used for capital flight would have been utilized for more productive and beneficial domestic investment activities. Therefore, this definition postulates that foreign asset increase is highly associated with national disutility due to capital flight.

ii. The Morgan Guaranty Method

Morgan Guaranty (1986) takes into account an additional item, i.e. the change in the short-term foreign assets of the domestic banking system (ΔB). This modification is introduced to focus on non-bank capital flight. Therefore, this method implies that the banking system is not involved in capital flight. Thus, we can express capital flight as a function of following

Capital flight=f(Change in external debt Foreign direct investment, Current account deficit, Change in Foreign Reserve, change in the short-term foreign assets of the domestic banking system)

Capital flight according to the Morgan Guaranty variant of the residual method (KFm) can be calculated as:

KFm = ΔED + FDI – CAD – ΔFR – ΔB …… (2)

iii. The Dooley method

This method aims at separating normal or legal from abnormal or illegal capital flows. Dooley (1986) sees capital flight all capital outflows based on the desire to place wealth beyond the

control of the domestic authorities. In this scenario, capital flight outflows refer to the increase in that part of the foreign stock that does not yield a recorded investment income.

Capital flight=f(Foreign borrowing, Foreign direct investment, Current account deficit, Change in Foreign Reserve, net errors and omissions, change in foreign reserve, the change in the stock of external debt)

Following Hermes et al (2002, p. 2), the Dooley method of measuring capital flight can be derived as follows:

TKO = FB + FDI – CAD – ΔFR – EO – ΔWBIMF …….. (3)

where *TKO* is total capital outflows, *FB* is foreign borrowing as reported in the balance of payments statistics, *EO* is net errors and omissions (debit entry), and *WBIMF* is the difference between the change in the stock of external debt reported by the World Bank and foreign borrowing reported in the balance of payments statistics published by the IMF.

External assets=f (US deposit rate, Interest earnings)

The stock of external assets corresponding to reported interest earnings is:

ES = INTEAR / rus…… (4)

Where *ES* is external assets, *rus*is the US deposit rate (assumed to be a representative international market interest rate), and *INTEAR* is reported interest earnings. Capital flight according to the Dooley method is then measured as:

KFd = TKO – ΔES ……. (5)

iv. The hot money method

Cuddington's (1986) narrow (or Balance of Payments) measure assumes that the typical meaning of capital flight is the running away of short-term capital rather than all private sector acquisition of external claims. This method proposes that capital flight goes unrecorded due to the illegal nature of these capital movements. It is defined as the sum of net short-term capital outflows of the non-bank private sector plus recorded errors and omissions (statistical discrepancy) in the balance of payment statistics. We can express this method as

Capital flight = f (short term capital outflow, Errors and omissions)

Cuddington's capital flight is calculated by adding the errors and omissions to selected short-term capital items and can be written as:

KFh = SKONB + EO……..(6)

Where *SKONB is* short-term capital outflows by the non-bank public; *EO* are errors and omissions, representing unrecorded capital outflow.

v. Trade misinvoicing method:

Capital flight under this methodology is estimated by comparing trade data from both the importing and exporting country. The assumption is that importers are assumed to be involved

in capital flight when they report higher values of imported goods as compared to the reported value of the same goods by exporters. In turn, exporters are involved in capital flight when they report lower values of exported goods as compared to the reported value of the same goods by importers. According to Hermes et al (2002) proponents of this measure stress the fact that abnormal capital outflows of residents may be included in export under invoicing and/or import over invoicing.

LITERATURE REVIEW

A large number of research papers studied the determinants of capital flight in developing countries. Most of these studies present evidence that macroeconomic variables such as external borrowing, foreign direct investment, interest rate differential, inflation rates and taxes are important determinates of capital flight.

In their seminal paper, Ndikumana and Boyce (2003) investigate the determinants of capital flight from 30 sub-Saharan African countries, including 24 countries classified as severely indebted low-income countries, for 1970–96. Their econometric analysis shows that external borrowing is positively and significantly related to capital flight, indicating that to a large extent capital flight is debt-fueled. Capital flight also exhibits a high degree of persistence in the sense that past capital flight is correlated with current and future capital flight. Beja (2007) examines the effect of external borrowing on capital flight in Indonesia, Malaysia and Thailand. The results show that large capital inflows and outflows follow a revolving door mechanism. This implies that external borrowing provides fuel and motive for capital flight. More debt increases debt service and risk and therefore causes capital flight. Capital left those countries may return in the form of foreign investment or debts, and hence follow a revolving mechanism. The results also indicate that good indicators of economic growth and sufficient international reserves discourage external borrowings and capital flight.

The importance of external borrowing in explaining changes of capital flight is also found in Ljungwall and Wang (2008). Using balance of payments data over the period 1993-2003 in China, the authors study several factors believed to be contributors to capital flight. The result obtained from China is similar to the Latin American experience in that external borrowing fuels capital flight (Cuddington 1986, Mckinnon 1991).The insignificant factors are the exchange rate and the interest rate. Both are not market determined in china.

Another strand of the literature in this area focused on measuring the magnitude of capital flight. For example, Ndikumana and Boyce (2001) present estimates of capital flight from 25 low-income sub-Saharan African countries in the period 1970 to 1996. Taking capital flight as a measure of private external assets, and estimating net external assets as private external

assets minus public external debts, sub-Saharan Africa thus appears to be a net creditor vis-à-vis the rest of the world. Moghadam *et al.* (2003) examine definitions and different approaches to measuring capital flight and develops a refined residual approach to the measurement of capital flight. Estimates of capital flight from the East Asian emerging countries for the 1987 through 1997 period are then calculated and reported. The authors conclude that greater openness of both private and public sector accounting practices is required to mitigate the disruptive impact of capital flight on the emerging economies. Zheng and Tang (2009) applied an improved measure of capital flight in contrast to the traditional measure. Capital flight is measured against money aggregates rather than against GDP because capital is a financial resource not a real resource. The result is that capital flight is more serious in financially less developed Asian countries than has been suggested by previous research papers.

Finally, it is worth noting that a number of papers attempt to bring up more robust results regard the determinants of capital flight by applying different econometrics techniques. For example, Chipalkatti and Rishi, (2002) Utilized a simultaneous equation model to examine the association between capital flight and external debt in the Indian economy during the period 1971-1997. The paper ensures the existence of a financial revolving door relationship between the two endogenous variables.

Alam and Quazi (2003) study the determinants of capital flight in Bangladesh during 1973-1999 by applying the bounds testing and autoregressive distrubted lag, a new cointegration technique developed by Pesaran *et al.* in (2001). Findings indicate that political instability is the most important factor affecting capital flight. Other factors that are proved to be significant include corporate income taxes, higher real interest rate differentials and lower GDP growth rates. The exceptional importance of macroeconomic fundamentals is also reported by Harrigan *et al.* (2002) for Malaysia during 1970-1996. Results reveal that real GDP growth and foreign direct investments are associated with a decrease in capital flight while currency depreciation and external borrowing are associated with an increase in capital flight. Cheung and Qian (2010) examine the empirical determinants of China's capital flight during the period 1999-2008. In addition to the covered interest differential, their empirical exercise includes a rather exhaustive list of macroeconomic variables and a few institutional factors. Overall, the regression analysis shows that China's capital flight is quite well explained by its own history and covered interest differentials. The other possible determinants offer relatively small additional explanatory power. A recent study by Rojas-Suarez (1991) covers Argentina, Bolivia, Chile, Columbia, Ecuador, Gabon, Jamaica, Mexico, Nigeria, Peru, the Philippines, Venezuela and Yugoslavia. These various studies differ from one another in terms of the methodological approaches of measurement, country coverage and time span. The most significant of these

studies which have made impact on capital flight estimates include the studies by Dooley (1986,1988), Dooley et al. (1986), World Bank (1985), Morgan Guaranty Trust Company (1987), Cline (1986), Cuddington (1986), Cumby and Levich (1987), Gulati (1987), Lessard and Williamson (1987), Khan and UlHaque (1987), Gajdeczka (1990), Khan (1989), Vema (1989),and Vema-Schneider(1991). The World Bank(1985) study covered Argentina, Brazil, Mexico, Portugal, South Korea, Turkey, Uruguay. Meyer and Bastos Marquesin 'A Fuga De Capital No Brasil' concludes that 'the accumulation of huge foreign debts allowed fiscal deficit, expansive monetary policy, and appreciated currency were the determinant causes of capital flight in Brazil.' Israel Pinheiro concludes that 'capital flight is a response to increases in country risks affecting both international and domestic capital. The method that international investors and part of the residents use to put their money abroad when the fear of financial crisis takes over their minds can vary from country to country depending upon the level of controls that are adopted. The more tightened and strict is the control, the more is the possibility of illegal transactions'. PrakashLoungani and Paolo Mauro summarized that 'the root causes of capital flight include political uncertainty, an uneven record of reforms, and institutional weaknesses, particularly corruption. After reviewing the capital flight case of Russia, they suggested that 'the medium-term post-election strategy ought to include a timetable for the gradual phasing out of controls, combined with a package of measures to improve governance and macroeconomic performance and to strengthen the banking system.' Highlighting the Nobel Lauriate Economist Amartya Sen's entitlement approach, Akhtar Hossain argues that 'Although Sen was correct to raise a valid theoretical point, he did not go into depths to find out if there were any other reasons behind the smuggling of food grains, raw jute, and other essential products. To begin, it is to be noted that the smuggling of essential products from Bangladesh to India was not necessarily a normal commercial transaction based on the price differentials of those products. In all intents and purposes smuggling was a conduit of capital flight from Bangladesh to India'. He quoted Rahim's views in this regard. Rahim provided an interpretation of capital flight from Bangladesh (1973) in this way: 'in a two-way flow of smuggling, the composition of goods availability may change without altering the total availability. However, the form of smuggling that we have been experiencing in Bangladesh is not really in the form of illegal trade rather in capital flight. It is suggested that huge Bangladesh currency notes are being smuggled to foreign countries and sold at a discount. These currency notes are subsequently used for purchasing goods from Bangladesh resulting in a one-way outflow of goods from Bangladesh to abroad'. The various aspects and extents of hidden economy of Bangladesh have been analyzed and examined by Reza (1989),Barakat (1991), Hasan (1997) and Asaduzzaman (1998**)**. These researchers estimated the size of the hidden economy at about 20% to 23% of

GDP. These studies identified smuggling, under- and over-invoicing, and hundi business as major sectors, and suppression of gross receipts, and pseudonymous business as common methods for generating tax evaded income. They also identified pseudonymous financial investment as the most important form in which hidden wealth is held. It is envisaged in a study that 'holding other things constant, if Bangladesh were able to reduce its corruption level to those of the least corrupt countries in the world (i.e., Canada, Denmark, Finland, Iceland, Netherlands and Sweden) its annual average per capita growth rate during 1975-2013 could have increased by between 2.12 and 2.88 percentage points.

RESEARCH METHOD

Data Sources and Description of the Variables

The data that is used in this study is annual time series data for the period 1975-2013. Being independent in 1971 Bangladesh has to suffer due to legacy of war. After independence, her economy has to suffer due to legacy of the war. Immediately after independence, this study considers three years as transitional, hence abnormal period. Thus, the data from 1972-73 to 1974-75 considering as transitional period has been drooped. Though we wanted to study from the date of birth of Bangladesh, we ended up starting our investigation from 1975.

Date in the study has been used extensively from the secondary sources i.e. monthly Economic Trends of Bangladesh Bank, Statistical Year Book of Bangladesh, World Bank Data Base, Annual Report of Bangladesh Bank Quarterly. We have also consulted published books, journals and research works that are relevant to the study. All data sets are transformed to make the data series stationary. We use the econometric software E-Views (Version 7.0) We use the following variables which are defined as follows:

1. Capital Flight (KF) (In Million and current U.S. dollar).
2. Change in current Account surplus (In Million and current U.S. dollar).
3. Change in foreign reserve (In Million and current U.S. dollar).
4. Change in external debt (In Million and current U.S. dollar).
5. Net Foreign direct investment (In Million and current U.S. dollar).
6. Inflation rate (expressed as a percentage value)
7. Interest rate differential between taka and dollar deposit.

Econometric methodology

The Unit Root test

Macroeconomic time series data are generally characterized by a stochastic trend which can be removed by differencing. Some variables are stationary on levels, others become stationary

after first difference , and some may become stationary after second difference . To test for the stationary of the variables, the Augmented Dickey-Fuller (ADF) technique was utilized.

It is assumed that the series has a unit root; hence failure to reject the null hypothesis implied the time series is non-stationary. If a time series is non-stationary but becomes stationary after first differencing, then it is said to be integrated of the order one i.e. I (1). When the variables are found to have the same order of integration, then cointegration test is used to identify the number of cointegrating vectors and cointegrating equation among the variables. But if any variable doesn't have the same order of integration, it has not been incorporated in this investigation.

Breusch-Pagan-Godfrey Test

if all observations come from probability density functions with the different variances, we say that heteroskedasticity exists, and y and e are heteroskedastic. To test the presence of heteroskedasticity the well known method is BPG test.

The Breusch-Godfrey (BG) Test

Autocorrelation can be defined as correlation between members of series of observations ordered in time as in time-series data or space as in cross-section data. To avoid some limitations of the Durbin-Watson d test of autocorrelation, statistician Breusch and Godfrey have developed a test of autocorrelation that is general in the sense that it allows for (1) nonstochastic regressors, such as the lagged values of the regress and; (2)higher-order autoregressive scheme, such as AR(1), AR(2) etc. and (3) simple or higher-order moving averages of white noise error terms. It is also known as the LM test.

Correlation matrix

Multicollinearity refers to the situation where there is either an exact or approximately exact relationship among the regressors. The well known method of detecting multicollinearity is correlation matrix.

Variance Inflation Factor (VIF)

The VIF shows the variance of an estimator is inflated by the presence of multicollinearity. As r approaches 1, the VIF approaches infinity. That is, as the extent of collinearity increases, and in the limit it can become infinite. So VIF can be defined as $VIF=1/(1-R^2_{23})$

Where, R_{23} measures the coefficient of correlation between two regressors.

EMPIRICAL RESULT

Summary of Descriptive Statistics

Table 1 exhibits the descriptive statistics for the selected variables under study. we have examined 36 yearly observations of all the variables to estimate the following statistics.

Table 1. Descriptive Statistics

	D(CAS)	D(CED)	D(CFR)	GDPG	IDIF	INF	D(KF)	NFDI
Mean	42.26178	-49.32165	140.3462	4.788459	1.608541	7.562162	-191.4911	289.8452
Median	14.40600	-110.9010	127.1840	4.803000	3.461000	7.145000	101.7010	13.53000
Maximum	1341.215	2867.390	5579.550	7.234000	14.09600	25.61900	5509.849	1501.647
Minimum	-2284.341	-2770.510	-3720.905	0.819000	-13.53900	-3.210000	-8425.516	-8.010000
Std. Dev.	610.6191	1120.271	1506.059	1.481593	6.625349	5.464448	2083.498	446.4436
Skewness	-0.981744	0.183949	1.110054	-0.474892	-0.669329	1.313027	-1.504619	1.467213
Kurtosis	7.634663	4.321766	7.933499	3.015330	2.854001	5.400336	9.683842	3.945165

From table 1, Std. Dev. measures the dispersion or spread of the series. the maximum and minimum statistics measure the upper and lower bounds of the variable under study. The skewness measures whether the distribution of all the data is symmetrical or asymmetrical. Calculations indicate that all the variables are not normally distributed.

Breusch-Pagan-Godfrey Test

Table 2. Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.196533	Prob. F(5,31)	0.9615
Obs*R-squared	1.136820	Prob. Chi-Square(5)	0.9508
Scaled explained SS	4.150206	Prob. Chi-Square(5)	0.5280

From result we see that the F-value and χ^2-value are insignificant which indicates the absence of heteroscedasticity.

The Breusch-Godfrey (BG) Test

Table 3. Breusch-Godfrey Serial Correlation LM Test

F-statistic	4.265081	Prob. F(2,29)	0.0238
Obs*R-squared	8.409663	Prob. Chi-Square(2)	0.0149

From result we see that the F-value and χ^2-value are significant at 5% level of significance which indicates the presence of autocorrelation.

Test of stationary

A time series is stationary if its characteristics (e.g., mean, variance, covariance) are time invariant; that is they do not change overtime. Table 3 displays the estimates of the Augmented Dickey-Fuller (ADF) test in levels and in first differences and in second differences of the data with an intercept. The tests have been performed using the Mackinnon Critical Values (Mackinnon, 1996) and assumed the identical null hypothesis of unit root in the data series. The lag length was determined using Akaike Information Criterion (AIC) (Akaike, 1974).

Table 3. Augmented Dickey-Fuller (ADF) test

Variables	Null Hypothesis	Level	First Differences
KF	KF has a unit root	0.910259	-8.158454**
CAS	CAS has a unit root	0.681633	-8.496041**
CFR	CFR has a unit root	-0.924553	-10.49228**
NFDI	NFDI has a unit root	1.633195	-5.895617**
CED	CED has a unit root	-4.693387*	
GDPG	GDPG has a unit root	-8.484574*	
INF	INF has a unit root	-5.409242*	
IDIF	IDIF has a unit root	-5.091126*	
Critical values at 1%		-3.615588	
Critical values at 5%		-2.941145	
Critical values at 10%		-2.609066	

*indicates Change in external debt and GDP growth rate are stationary at their levels

** indicates the variables becomes stationary at their first differences at 1%, level of significance.

The results indicate that all the variables are not stationary in their levels. On the other hand, all data are stationary at their first differences at 1%, level of significance and therefore indicating that all variables are integrated of order 1. i.e., I(1).

Correlation matrix

The result of the correlation matrix for selected variables is given in the table 4.

Table 4. Correlation Matrix

	D(KF)	D(CAS)	D(CFR)	D(NFDI)	CED	GDPG	INF	IDIF
D(KF)	1.000000	-0.428081	-0.839673	-0.065025	0.428812	-0.146511	0.001920	-0.047376
D(CAS)	-0.428081	1.000000	0.266132	0.216001	0.082058	0.098804	0.007776	0.060202
D(CFR)	-0.839673	0.266132	1.000000	-0.143433	-0.175586	0.078204	0.008536	0.037035
D(NFDI)	-0.065025	0.216001	-0.143433	1.000000	-0.108234	0.273856	-0.046225	0.152274
CED	0.428812	0.082058	-0.175586	-0.108234	1.000000	-0.122306	-0.000256	0.068436
GDPG	-0.146511	0.098804	0.078204	0.273856	-0.122306	1.000000	-0.019795	0.128657
INF	0.001920	0.007776	0.008536	-0.046225	-0.000256	-0.019795	1.000000	-0.917288
IDIF	-0.047376	0.060202	0.037035	0.152274	0.068436	0.128657	-0.917288	1.000000

Table 4 displays the correlation among Change in external debt, Current account surplus, Capital flight, Change in foreign reserve, Net foreign direct investment, GDP growth rate, Inflation rate, and Interest rate differential . This Correlation Matrix measures the two-way relation between the mentioned variables. From table, we observe that there is low correlation between variables pair wise. The highest negative correlation is between inflation and Interest rate differential. There is positive correlation between interest rate differential and capital flight and between change in external debt and capital flight. Negative correlation exists between capital flight and all other remaining variables. The degree of correlation is relatively low.

Variance Inflation Factor (VIF)

Table 5. Variance Inflation Factors

Date: 10/30/15 Time: 21:55

Sample: 1975 2014

Included observations: 37

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1585.629	1.451734	NA
D(CAS)	0.003287	1.097118	1.091743
D(CED)	0.000949	1.063381	1.061266
D(CFR)	0.000562	1.145154	1.135024
IDIF	27.71816	1.149510	1.083848
NFDI	0.006775	1.724005	1.202898

We know that when the value of VIF is one, it indicates no multicollinearity. Since in our result VIF values are close to one, so we can conclude that there is very low multicillinearity in our model.

Estimated Equation

Consider the following model and results found using Eviews:

$$\mathbf{KF=\beta_1+ \beta_2 CAS+ \beta_3 CED+ \beta_4 CFR+ \beta_5 GDPG+ \beta_6 IDIF+ \beta_7 INF+ \beta_8 NFDI+ Ui}$$

KF=Capital Flight, CAS=Current Account Surplus, CED=Change in External Debt , CFR= Change in Foreign Reserve , GDPG=GDP Growth , IDIF=Interest rate Differential (on taka Deposit and dollar deposit), INF=Inflation, NFDI=Net Foreign Direct Investment, Ui= Error Term

Table 6. Model estimation

Variable	Coefficient in First Model	Coefficient in Second Model	Coefficient in Third Model
C	4.412612	5.170730	5.621827
	(184.8372)	(39.81996)	(39.16605)
	(0.02387)*	(0.129853)*	(0.143538)*
D(CAS)	-0.920092	-0.919076	-0.918603
	(0.059436)	(0.057332)	(0.056428)
	(-15.48035)*	(-16.03079)*	(-16.27925)*
D(CED)	0.926443	0.928075	0.928271
	(0.031756)	(0.030810)	(0.030334)
	(29.17414)*	(30.12224)*	(30.60191)*
D(CFR)	-1.035233	-1.034333	-1.034532
	(0.031756)	(0.023701)	(0.023327)
	(-42.40860)*	(-43.64081)*	(-44.34982)*
GDPG	-14.30702		-------
	(0.031756)		
	(-0.513302)*	---------	
IDIF	6.966334	1.121774	-------
	(14.72043)	(5.264804)	
	(0.473242)*	(0.213070)*	
INF	7.465754	---------	-------
	(17.26859)		
	(0.432332)*		

Table 6...

NFDI	0.120104	0.108038	0.112768
	(0.103407)	(0.082310)	(0.078069)
	(1.161467)*	(1.312574)*	(1.444467)*
R^2	0.992099	0.991983	0.991972
F	520.2225	767.1967	988.4719
P-value	0.000000	0.000000	0.000000

Values in the parentheses indicate standard error

* Indicates t-value

From above table it is clear that the coefficients of the variables Current Account Surplus, Change in External Debt and Change in Foreign Reserve are significant at even 1% level of significance in all of the three models which indicate that these variables significantly affect capital flight. The coefficients of other variables are insignificant. In all the three models the F-statistics is highly significant which indicates the overall significance of the model is high. The R^2 value is .99 which indicates that 99% variation in capital flight can be explained by the independent variables. That is, the regression model fits the data well.

CONCLUSION AND POLICY IMPLICATIONS

Capital flight is a part of underground economy. Proper policy making and its strict implementation might check the illegal flight of capital from Bangladesh. If the financial system is developed, capital account is liberalized, tax evasion and hidden economic activities can be reduced effectively, and the growth rate of GDP will increase to a great extent. The government will also be able to mobilize more resources from local sources and reduce its dependence on foreign aid. Government should improve the services sectors, ensure the transparency and accountability in administration, and enlarge the scope and opportunity for social justice and security, so that the people will pay taxes willingly and refrain from illegal activities.

In this study we investigated the causes of capital flight from Bangladesh for the selected period of 1975 to 2013. This empirical study found Change External Debt, Current Account Surplus and Change Foreign Reserve to be the most important determinant of capital flight. The significance and importance of external debt provides the fuel for capital flight that has been presence in Bangladesh. Foreign reserves and FDI are the other determinants of capital flight and for Foreign Reserve it is significant in the long run. These findings imply that debt relief strategies will bring long-term benefits to Bangladesh only if accompanied by measures to prevent a new cycle of external borrowing and capital flight. This will require substantial reforms on the part of both creditors and debtors to promote responsible lending and accountable debt

management. The results of this study have clear policy implications. In order to reduce capital flight, policy makers in Bangladesh should focus on stabilizing economic and political environment. In particular, they should apply clear and accurate policies regard their external debt and foreign direct investment, as well as with respect to monetary policies, affecting interest rates. Such clear and stable policies reduce uncertainty over their policies and their impact on the real GDP growth and real value of wealth as perceived by different agencies, which will positively contribute to reducing the outflow of domestic capital (see Hermes and Lensink, 2001)

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APPENDICES

APPENDIX-1

Null Hypothesis: CAS has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.681633	0.9901
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(CAS) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.496041	0.0000
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: CED has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.693387	0.0005
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: GDPG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.484574	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.409242	0.0001

Test critical values:	1% level	-3.605593
	5% level	-2.936942
	10% level	-2.606857

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: KF has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.910259	0.9946
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(KF) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.158454	0.0000
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: IDIF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.091126	0.0002
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(CFR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-10.49228	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: NFDI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.633195	0.9994
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(NFDI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.895617	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

APPENDIX-2

FIRST MODEL

Dependent Variable: D(KF) Method: Least Squares
Date: 10/30/15 Time: 21:25 Sample (adjusted): 1976 2012
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.412612	184.8372	0.023873	0.9811
D(CAS)	-0.920092	0.059436	-15.48035	0.0000
D(CED)	0.926443	0.031756	29.17414	0.0000
D(CFR)	-1.035233	0.031756	-42.40860	0.0000
GDPG	-14.30702	0.031756	-0.513302	0.6116
IDIF	6.966334	14.72043	0.473242	0.6396
INF	7.465754	17.26859	0.432332	0.6687
NFDI	0.120104	0.103407	1.161467	0.2549

R-squared	0.992099	Mean dependent var	-191.4911
Adjusted R-squared	0.990192	S.D. dependent var	2083.498
S.E. of regression	206.3375	Akaike info criterion	13.68571
Sum squared resid	1234680.	Schwarz criterion	14.03402
Log likelihood	-245.1857	Hannan-Quinn criter.	13.80851
F-statistic	520.2225	Durbin-Watson stat	2.791553
Prob(F-statistic)	0.000000		

APPENDIX-3

SECOND MODEL

Dependent Variable: D(KF) Method: Least Squares
Date: 10/30/15 Time: 21:29 Sample (adjusted): 1976 2012
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.170730	39.81996	0.129853	0.8975
D(CAS)	-0.919076	0.057332	-16.03079	0.0000
D(CED)	0.928075	0.030810	30.12224	0.0000
D(CFR)	-1.034333	0.023701	-43.64081	0.0000
IDIF	1.121774	5.264804	0.213070	0.8327
NFDI	0.108038	0.082310	1.312574	0.1990

R-squared	0.991983	Mean dependent var	-191.4911
Adjusted R-squared	0.990690	S.D. dependent var	2083.498
S.E. of regression	201.0287	Akaike info criterion	13.59217
Sum squared resid	1252789.	Schwarz criterion	13.85340
Log likelihood	-245.4551	Hannan-Quinn criter.	13.68426
F-statistic	767.1967	Durbin-Watson stat	2.782329
Prob(F-statistic)	0.000000		

APPENDIX-4

THIRD MODEL

Dependent Variable: D(KF)
Method: Least Squares
Date: 10/30/15 Time: 21:31
Sample (adjusted): 1976 2012
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.621827	39.16605	0.143538	0.8868
D(CAS)	-0.918603	0.056428	-16.27925	0.0000
D(CED)	0.928271	0.030334	30.60191	0.0000
D(CFR)	-1.034532	0.023327	-44.34982	0.0000
NFDI	0.112768	0.078069	1.444467	0.1583

R-squared	0.991972	Mean dependent var	-191.4911
Adjusted R-squared	0.990968	S.D. dependent var	2083.498
S.E. of regression	198.0075	Akaike info criterion	13.53958
Sum squared resid	1254624.	Schwarz criterion	13.75727
Log likelihood	-245.4821	Hannan-Quinn criter.	13.61632
F-statistic	988.4719	Durbin-Watson stat	2.794966
Prob(F-statistic)	0.000000		

Null Hypothesis: CFR has a unit root

APPENDIX-5

Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.196533	Prob. F(5,31)	0.9615
Obs*R-squared	1.136820	Prob. Chi-Square(5)	0.9508
Scaled explained SS	4.150206	Prob. Chi-Square(5)	0.5280

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/30/15 Time: 21:55
Sample: 1976 2012
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	35992.42	23265.18	1.547051	0.1320
D(CAS)	8.664968	33.49673	0.258681	0.7976
D(CED)	9.065683	18.00120	0.503615	0.6181
D(CFR)	5.561965	13.84755	0.401657	0.6907
IDIF	1721.415	3076.011	0.559626	0.5798
NFDI	-19.32718	48.09061	-0.401891	0.6905

R-squared	0.030725	Mean dependent var	33859.16
Adjusted R-squared	-0.125610	S.D. dependent var	110705.7
S.E. of regression	117452.9	Akaike info criterion	26.33286
Sum squared resid	4.28E+11	Schwarz criterion	26.59409
Log likelihood	-481.1578	Hannan-Quinn criter.	26.42495
F-statistic	0.196533	Durbin-Watson stat	1.380543
Prob(F-statistic)	0.961489		

APPENDIX-6

Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	4.265081	Prob. F(2,29)	0.0238
Obs*R-squared	8.409663	Prob. Chi-Square(2)	0.0149

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 10/30/15 Time: 21:56
Sample: 1976 2012
Included observations: 37
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.197799	36.19031	-0.005466	0.9957
D(CAS)	-0.002759	0.052128	-0.052931	0.9581
D(CED)	0.009322	0.028184	0.330747	0.7432
D(CFR)	0.009869	0.022250	0.443537	0.6607
IDIF	-0.458399	4.795563	-0.095588	0.9245
NFDI	0.001157	0.074870	0.015454	0.9878
RESID(-1)	-0.522788	0.181793	-2.875730	0.0075
RESID(-2)	-0.275263	0.179672	-1.532026	0.1364

R-squared	0.227288	Mean dependent var	2.52E-14
Adjusted R-squared	0.040772	S.D. dependent var	186.5468
S.E. of regression	182.7043	Akaike info criterion	13.44243
Sum squared resid	968044.8	Schwarz criterion	13.79073
Log likelihood	-240.6849	Hannan-Quinn criter.	13.56522
F-statistic	1.218595	Durbin-Watson stat	2.022322
Prob(F-statistic)	0.324462		