Nonlinear Threshold Effects of Institutional Quality on Capital Flight: Insights From Bangladesh

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ABSTRACT

Over the years, capital flight is a major concern for the countries where institutional quality is severely deficient. Almost all the literature emphasized the role of institutional quality on development. However, a possible question still remains unsettled what would be the optimum or threshold level of institutional quality that would create a milieu of least possible capital flight. The purpose of this study is to find the threshold value of institutional quality indicators and its impact on the capital flight of Bangladesh. Using the ICRG and WGI governance data over the period 1989 to 2016, the nonlinear regression proved that up to certain threshold level of institutional quality, interest rate differential reduces while economic growth stimulates net capital flight (NCF) of Bangladesh. Additionally, up to a certain threshold, level of corruption and interest rate differential lower NCF while beyond that level no effect exists. However, none of those independent variables affects NCF whenever the role of government stability threshold is considered.

KEYWORDS

Capital Flight, Economic Growth, Emerging Countries, Institutional Quality, Non-Linear Threshold

INTRODUCTION

In the simplest form, capital flight can be defined as a short-term speculative capital outflow (Cuddington, 1986). However, what entails and consist of this definition, depend on how broadly or how narrowly we want to define the term. Tracking back to the most traditional definition, where Kindleberger (1937) defined capital flight as a transfer of real resource from one country to another motivated by the economic and political uncertainty. The inevitable mobility of capital in today's global economy has forced us to make some refinement to this traditional definition. In order to consider normal component of resident international activity like- foreign trade for change in inflation rate,

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or foreign investment for change in interest rate, we define capital flight as a capital export by the private nonbank sector (Cuddington, 1986).

Many countries suffer severely from capital flight in terms of reserve shortage, low national revenue in tax and tariffs. In developing countries, capital flight is a major obstacle for long term sustainable growth. Globally \$829 billions of annual capital flight from developing countries are observed, while annual aid flow renders \$104 billion (Baker, 2005). Therefore, it will be no surprise if developing country loses as much as 10% of GDP annually due to capital flight.

While capital flight can be seen as an outcome of individual agents profit maximizing incentives, the quantitative importance of such activity cannot be ignored. In addition to illegal transaction the opportunity cost of capital flight to the society is much higher than individual return (Schneider, 2003). Capital flight is thought as an outcome of failure in economic governance (Ndikumana, Boyce & Ndiaye, 2014). For instance, Gunter (2017) implied that acceleration of capital flight might lead to reduced government revenue, capital loss and increased foreign debt. Indeed, Researchers pointed out capital flight as a trap (Beja, 2007; Ndikumana, Boyce & Ndiaye, 2014). Countries with historical capital flight are more often than not found themselves in a cycle of chronic capital flight problem. As persistent capital flight weakens and demoralizes financial regulation and accountability, it erodes institutional competence and ultimately allows capital flight to exist forever. It is also very difficult to curve the tendencies once residents become used to it (Cuddington, 1986).

Moreover, Capital flight itself certainly is not a standalone economic problem. Capital flight brings economic instability in the country (Hasnul & Masih, 2016). Ndikumana, Boyce & Ndiaye (2014) considered capital flight as a symptom of structural problem. Investment diversion theory also directs that macroeconomic uncertainty in the country coupled with simultaneous favorable qualitative and quantitative situation in foreign countries encourage the outward capital flow from the country.

The very definition of capital flight provides us an important insight about the reasons for capital flight. While the economic uncertainty or more precisely profit maximizing opportunity in foreign investment is widely studied, the political part is yet to explore. Good economic-performance discourages capital flight by instilling hope to the savers while poor economic indicators like low GDP and fluctuating inflation encourage capital flight. As political scientists and economists believe that there is significant association between economic performance and institutions (Saxena, Rishi & Cerra 2005), we assume thereby that institutional quality also have some direct linkage to the capital flight. Therefore, the main objective of this study is to test if institutional quality, i.e. good governance has any threshold effect on the level of capital flight of a country. Good governance is a measure of public institutional ability to ensure rule of law, accountability, and transparency. It also ensues political stability in the country. Good governance has been used in various studies as a prime determinant for economic growth. In our study we are improvising this idea to test whether it has any bearing in the capital flight problem. Absence of good governance represents a structural inefficiency or weakness of the government that hinders the economy to count the outflow of fund in a legal way.

Our study is conducted on arguably one of the fastest-growing developing country, Bangladesh. Bangladesh is not only a good representation of an emerging country; it also represents the chronic problem of high capital flight as a developing country. As figure 1 shows that the NCF in Bangladesh is not only positive in last few years, it also fluctuates significantly. From the graph it could also be observed that with arguably democratic government regime in recent past from late 2012 the capital flight of Bangladesh is significantly positive and remains much higher. The higher fluctuation specially in recent past draws our attention to delve more onto it and know the underlying reasons. This scenario of capital flight in Bangladesh have also been in focus point since the Global Financial Integrity reports severe Illicit financial outflow from Bangladesh along with many other countries in the world. In that report, many economists and policy makers state that institutional factors such as political turmoil, corruption, and improper rule of law are key factors inducing capital flight of Bangladesh. In addition to that, Bangladesh is also heavily dependent on foreign remittance. During the fiscal

Figure 1. Net capital flight. Source: (Economic Intelligence Unit, 2017).

year, 2015-2016 total remittance inflow was 14931 million US\$ in Bangladesh (Bangladesh Bank, 2017). It indicates that the net capital flight of the country should be positive, but in reality, it is not.

In figure 2, by comparing the last twenty-eight years institutional quality of Bangladesh, it has been found that institutional quality structure has been experiencing many ups and downs over the years. Even though these institutional performance measures (Government Stability, Corruption, Law and Order, Democratic Accountability, and Bureaucratic Quality) are calculated at different score level, but it is clear that over the years all these indicators more or less made collective movement toward particular direction. These all indicators collectively form an institutional environment that shape how capital flight be governed with various catalysts. Apart from that, Bangladesh has also been undergone some major transformation in its political institution in recent past. After two years of caretaker government the democratic system has been restored in the country in 2009. The country also gradually improves in corruption perception index (CPI), being in the bottom of the list in 2002-2005 now in 2016 it is in 145th positions. The country's corruption, repeated political violence, and

Figure 2. Institutional quality indicators. Source: (ICRG, 2017).

instability serves the main focal point of our study. As a representation of a developing country with low institutional development and chronic capital flight this study will try to answer whether or how this fluctuation of institutional quality variation affects the NCF of the country.

In this regard, the non-linear threshold regression enables clearly to determine the cut-off level of good governance activities where it will at least be possible to understand the desired level of institutional quality to incur minimum level of capital flight possible. Additionally, with the presence of threshold level of good governance policymaker would also be able to render a comprehensive set of institutional quality measures that may ultimately lead to lowest level of capital flight possible. An organization of the remaining of the paper is as follows. Section 2 summarizes the literature on capital flight. Section 3 provides the details of the methodology and data description. Section 4 presents empirical results. Finally, Section 5 concludes the paper with some policy alternatives to curve the problem.

LITERATURE REVIEW

Several studies reviewed thoroughly on the causes and consequences of capital flight. Ndikumana (2016) concluded that external borrowing stimulates capital flight which is primarily channeled through trade-invoice manipulation especially for naturally resourceful countries. In fact, the author also mentioned that institutional factors such as poor institution, mismanagement of public resources, tax-evasion exposure fuel capital flight. Therefore, author emphasized on the need of good institutional environment as possible solution to alleviate capital flight particularly in terms of political stability, transparency and accountability. Pepinsky (2014) concluded that countries suffer from capital flight regardless of their institutional or regulatory environment. he also argued that countries with relatively stringent regulatory environment or better governance experience less net outflow of capital (Pepinsky, 2014). Additionally, Ramiaandrisoa & Rakotomanana (2016) mentioned that capital flight is usually worsened in political transitory period. They also concluded that external borrowing and institutional deficiencies also expedite capital flight. Institutional quality and capital flight nexus also viewed in terms of motives of investors. For instance, considering the foreign investment in USA, Abdioglu, Khurshed & Stathopoulos (2013) stated that governance quality in home country affects investor's decision on any investment in USA. They also concluded that investment is more quality oriented. More precisely it is mentioned that country with poor institutional quality will experience transfer of funds to the country with better institutional quality (Chowdhury, 2017; Abdioglu, Khurshed & Stathopoulos, 2013). Therefore, it might be the question that whether poor or better institutional quality in Bangladesh is a factor leading its capital outflow to abroad.

Ding & Jinjark (2012) concluded that capital flight having non-linear threshold relationship with income level. They found that up to a certain threshold level of income capital flight usually rises, while beyond that level capital tends to decline in response to any further increase in income. Additionally, they also implied that controlling capital flight might require a wider level of consideration especially for global market conditions. However, Yalta & Yalta (2012) suggested that financial liberalization may not be the optimum solution to reduce capital flight. However, they also urged for sound macroeconomic policy including decreasing stock of debt, inflation, budget deficit and improving internal business environment within the country.

Among the macroeconomic variables economic growth, inflation, interest rate differentials, country risk and external debt financing are more prominent. External debt financing has found positively related with capital flight (Ndikumana & Boyce, 2008; Gankou, Bendoma & Sow (2016). Ndikumana, Boyce & Ndiaye, (2014) concluded that even if it is not in full but part of external borrowing facilitates capital flight through the availing opportunity to finance repayment. Efobi & Asongu (2016) concluded economic growth GDP growth rate, external debt positively affects capital flight. Ndikumana & Boyce (2008) in their study asked for better debt management by the country to have efficient fund disbursement and deployment leading to reduced or full indebtedness to

prevent capital flight. In fact, Yalta & Yalta (2012) urged for sound macroeconomic policy including decreasing stock of debt, inflation, budget deficit and improving internal business environment within the country. In case of Bangladesh, Aziz, Khayyam & Uddin (2014) found that external debt and foreign reserves are the two most significant determinants of capital flight especially in the long run.

Beja (2006, 2007) in his studies found that, in Asian countries capital control does stem the flow of illicit capital outside the countries. Beja (2006) found economic growth is inversely related with capital flight. This finding is contradicted by Ndikumana, Boyce & Ndiaye, (2014) where it was concluded that economic growth is a better performance predictor both for savers and investors while the lagged growth demoralizes savers and investors resulting significant inverse relationship with the capital flight. Maski & Wahyudi (2012) concluded that capital flight is not subject to exchange rate movements. Ndikumana, Boyce & Ndiaye (2014) also in his study point out that inflation rate or its variability does not hold any significant impact on African capital flight, which is also consistent with other studies by Collier, Hoeffler & Pattillo (2001) and Kar (2010). In another study, Collier, Hoeffler & Pattillo (2004) found that capital flight increases with the diminishing returns within the country. It is found that interest rate differential between a country and the rest of the world does have very little impact over capital flight in Asian countries (Beja, 2006, 2007).

The uninsurable sources of risk in developing countries also demoralize investors and incite them to take money outside from the country (Le & Zak, 2006). Capital flight is also high when the foreign capital inflows occur in terms of FDI (Aziz, Khayyam & Uddin, 2014)). However, Collier, Hoeffler & Pattillo (2004) and Saxena, Rishi & Cerra, (2005) found significant inverse relationship between capital flight and foreign aid. In fact, Collier, Hoeffler & Pattillo (2004) concluded that direct effect of aid does bring significant reduction in the capital flight. Aside from these economic factors a large number of literatures points out some other factors related to the institutional spheres where political factor and quality of governance are considered playing a significant role in inducing capital flight in a country. Loungani & Mauro (2001) concluded that capital flight is the outcome of three main causes which are political instability, corruption, uneven record of reforms and institutional weakness. Le & Rishi (2006) in their study concluded if all other things remain constant then corruption is the single most determinant of capital flight that has significant positive relationship with the level of capital flight. This positive impact of corruption on capital flight is further confirmed by Osei-Assibey, Domfeh & Danquah (2018). If a country attempts to staunch the unwanted flow, then it must emphasize on good governmental issues. Le & Rishi, (2006) and Gankou, Bendoma & Sow (2016) also found that in addition to the corruption check, political and institutional stability would reduce the capital flight. Furthermore, Gunter (2017) along with transaction cost and migration concluded that corruption and rising income inequality might be possible explanations for recent acceleration in capital flight of China.

Le & Zak (2006) found that political, risk, financial risk, policy risk are the main drivers of capital flight. Moreover, they also found that political risk is the single most quantitative contributor to capital flight. Gibson & Tsakalotos (1993) found that political risk is the significant determinant of capital flight. Fatehi (1994) also made similar inference between political instability and capital flight through FDI. They also mentioned that the forces that drive capital flight are not necessarily purely economic. In another study Hasnul and Masih (2016) found that political risk drives capital flight. They also found that both capital flight and exchange rate variables are endogenous. As a possible policy implication, they urged to maintain the political and exchange rate stability.

Asongu & Nwachukwu (2017) attempted similar to our study, where they tried to explore the effect of governance on capital flight by bundling good governance indicators into three contexts like political governance, economic governance, and institutional governance. They found that economic governance is positively association with capital flight and institutional governance and corruption, one of its constituents has negative impact on capital flight. Finally considering all situations it was concluded that corruption-control is the most important tool to fight capital flight (Asongu & Nwachukwu, 2017). In order to determine the economic and non-economic factors of capital flight,

one comprehensive econometric study was undertaken by Alam & Quazi (2003) on Bangladesh for the period from 1973-1999. In that study, they identified political instability is the single most important driver of capital flight from Bangladesh. Also, they deduced that it may be political turmoil that inflames the fear and anxiety of uncertain future which results capital flight. So overall it implies to the institutional ability of government as body to check and balance capital inflow-outflow with comprehensive qualitative and quantitative measures.

DATA AND METHODOLOGY

Data Description

In this study the dependent variable is capital flight which is denoted in terms of NCF out of the country. Capital flight is the large-scale outward flow of money from a country especially in the period of unfavorable situation perceived by both domestic and foreign investors. Our usage of capital flight as a dependent variable also justified as most of the similar kind of studies use capital flight as dependent variable (Le & Zak, 2006; Le & Rishi, 2006; Forgha, 2008; Ndikumana, Boyce & Ndiaye, 2014; Collier, Hoeffler & Pattillo, 2004; Hasnul & Masih, 2016; Asongu & Nwachukwu, 2017).

In capital flight literature various factors were used as a catalyst of capital flight. Among them some of the factors such as political instability, corruption, policy risk, and other governance factors- were selected from the institutional point of view. Rationale behind choosing such factors was mostly because of their hypothetical efficiency and effectiveness that shape the overall ability of a government in a country to check capital flight there. Whereas some other factors such as external debt, exchange rate, inflation, interest rate differentials and many more macroeconomic factors- were considered as catalysts characterized as unanticipated and less controllable facets existing both in domestic and foreign contexts. Based on the concurrent literature and study inferences discussed in last section, in this study mainly two sets of independent variables have been used along with the NCF and ICRG index. The five variables from ICRG index; government stability, corruption, law and order, democratic accountability, and bureaucracy quality are used in this study to explore if there is any threshold consequence on NCF is present. Therefore, these institutional quality factors are studied collectively and separately, as indicator of good governance of the country that affects overall NCF of the country. ICRG index score for a year is measured in terms of the division of sum of actual score obtained by Bangladesh with the sum of potential score of the country.

Additionally, considering the macroeconomic aspects inflation, economic growth, and interest rate differentials have been used as other independent variables. In this study inflation is used as a proxy for macroeconomic stability. In previous studies of capital flight Quazi (2004), Le & Rishi (2006), Ndikumana, Boyce & Ndiaye (2014) and Asongu & Nwachukwu (2017) used inflation as independent catalyst of capital flight. Economic growth (real GDP growth rate) is used as a proxy of macroeconomic development indicator that will have impact on capital flight. In addition, interest rate differential is used as earnings catalyst affecting capital flight and is measured as the difference between domestic interest rate and the similar rate of any foreign country. In this study it is measured in terms of the real interest rate in Bangladesh and US bond rate, which is also used by Quazi (2004); Alam & Quazi (2003), Ndikumana & Boyce (2008).

To confirm the robustness of the model, WGI also been used in this study. Similar to ICRG index a corresponding Good Governance index (GG) has been formed, besides two key indicators of institutional quality measure each of the collective indicators is also been used to investigate threshold effect separately. They are Government Stability (GS), Government Effectiveness (GE), Control of Corruption (CC). The details of ICRG index, GG index, interest rate differential calculations are included in the appendix.

Total 28 years (1989-2016) of observations for each of the variables have been used in this study. Because of the unavailability of data for robustness check, only data from 1996-2016 is used.

ICRG data are collected from International Country Risk Guide website. Data for economic growth, inflation, real interest rate, and WGI indicators are collected from World Bank's website. NCF data have been obtained from Economic Intelligence Unit website..

Methodology

The previous studies on this subject used both both symmetric (Osei-Assibey, Domfeh & Danquah, 2018; Asongu & Nwachukwu, 2017; Ramiandrisoa & Rakotomanana, 2016; Efobi & Asongu, 2016; Hasnul & Masih, 2016; Gankou, Bendoma & Sow 2016; Yalta & Yalta 2012; Alam & Quazi, 2003;) and asymmetric (Ding & Jinjark, 2012) approaches on the relationship between independent and dependent variables. For this paper, in order to capture the appropriate threshold effect, the relationship among variables is observed from an asymmetric point of view. This study is completely based on quantitative observations; the model used in this study is a Non-Linear Threshold Regression model. Non-Linear Threshold Regression technique gives more insights regarding each independent variable and their corresponding benchmark on specified level of impact on the independent variable (Hansen and Seo, 2002). In addition to that, traditional ordinary least square approach has also been applied. To highlight the existence of threshold effect of institutional quality variables on NCF of the country, both equations for two regimes which results from threshold regression analysis have been derived in accordance with the principle of Hansen (2000). In simplest sense after the estimation using this method it would be possible to demonstrate the level of good governance activities or standard which would differentiate the effect of independent variables on NCF. So, capital flight would be a non-linear function of all the independent variables such as ICRG index and five ICRG constituents separately along with the three macroeconomic factors such as inflation, economic growth, and interest rate differentials. Interest rate differential is included as a possible catalyst considering the possible earnings motives affecting people in domestic countries to reap up the probable net positive earnings in abroad. It was also used in prior studies in capital flight investigation by Ndikumana & Boyce (2008), Alam & Quazi (2003), Quazi (2004). Economic growth is usually thought as a possible indicator of strength in domestic economy. Therefore, it is usually perceived as a possible signals to bring funds from abroad rather than funds to abroad. On the other hand, it may also be possible that robust and sustainable economic development somehow leads capital flight as a possible safeguard by investors or savers in order to hedge against unexpected future shock in economy. So, economic growth should certainly work as catalyst to capital flight. Economic growth is also used in different studies of capital flight by Alam & Quazi (2003), Quazi (2004), Beja (2006), Forgha, (2008), Ndikumana, Boyce & Ndiaye (2014). Inflation is another indicator of the perceived trust in domestic economy considering the stability in price level in consumable goods by domestic residents. In fact, it is usually believed that persistent increase in inflation will lower the net values received by the residents, therefore they might transfer their funds to some other countries where larger value in terms of less expensive and larger quantities of product and services possible. Inflation rate is also used in prior studies by Collier, Hoeffler & Pattillo (2001), Kar (2010), and Ndikumana, Boyce & Ndiaye (2014).

Initially ICRG index is used as the collective indicator of good governance activities the regression models are as follows:

Regression Model under Ordinary Least Square (OLS) Method

$$NCF = c + \beta_1 EG + \beta_2 In + \beta_3 InDi + e \quad (1)$$

Where, NCF is the dependent variable of the model; c is the intercept; β_1, β_2 and β_3 is the coefficient of the independent variables Economic Growth (EG), Inflation (IN) and Interest Rate Differential (InDi) respectively. e is the error term.

For Non-Linear Threshold Regression Model for Regime 1

$$NCF = c + \beta_1 EG + \beta_2 In + \beta_3 InDi + e, \dots \text{if } ICRG \leq \gamma \quad (2)$$

For Non-Linear Threshold Regression Model for Regime 2

$$NCF = c + \beta_1 EG + \beta_2 In + \beta_3 InDi + e, \dots \text{if } ICRG > \gamma \quad (3)$$

For equation 2 and 3 γ is the threshold value for threshold variable ICRG, and z_n is the resulting coefficient for the various values of ICRG.

In addition to that, ICRG index factors is also considered as individually separate indicator of good governance activities or measures, say I_1 for government stability, I_2 for corruption and so on. The Non-Linear Threshold Regression Model for Regime 1 becomes:

$$NCF = c + \beta_1 EG + \beta_2 IN + \beta_3 InDi + e, \dots \text{if } I_n \leq \gamma \quad (4)$$

and Non-Linear Threshold Regression Model for Regime 2 becomes:

$$NCF = c + \beta_1 EG + \beta_2 IN + \beta_3 InDi + e, \dots \text{if } I_n > \gamma \quad (5)$$

EMPIRICAL RESULTS AND DISCUSSION

Descriptive Statistics

Table 1 summarizes the descriptive statistics of all the data with ICRG measures. The average NCF over the period was 408.94. In that period Bangladesh experienced both positive and negative NCF. It is also noticeable that the deviation of the NCF value was bit high. For threshold variable ICRG index, it is observed that average institutional quality measured in ICRG index also was close to the 50% of the maximum possible score of 34 (details in appendix). However, it has also experienced the best case of ICRG with 64.22 and worst case of ICRG with 15.44. And standard deviation for this variable was 13.26. For other threshold variables such as corruption and government stability the average scores were 1.95 and 7.42 respectively. Their standard deviations were 0.87 and 1.09 respectively. In fact, for this particular set of years both economic growth and inflation is found to be stable as the values were positive. Interest rate differential had negative mean value of -3.07 while standard deviation was 3.71. Therefore, it suggests that the net interest earnings were greater in Bangladesh than abroad.

Table 2 summarizes the correlation matrix of the variables with ICRG measures. It is found that NCF was positively correlated with all the variables in the table except interest rate differential and inflation. ICRG as institutional quality indicator is positively correlated with independent variables such as interest rate differential, inflation, and economic growth. It is also noticeable that ICRG is positively correlated with NCF and corruption and government stability. On the other hand, both government stability and corruption are positively correlated with all the variables studied in this paper, except that government stability is negatively correlated with Inflation. Interest rate differential is positively correlated with all independent variables and threshold variables.

Table 1. Descriptive statistics

	C	EG	GS	ICRG	IN	IrDi	NCF
Mean	1.9508	5.3485	7.4271	48.2405	6.1464	-3.06614	408.9357
Median	2.0000	5.2650	8.2084	53.1862	6.1500	-3.2849	255.2500
Maximum	3.0000	7.1100	11.0833	64.2157	10.7000	10.6465	3130.2000
Minimum	0.0000	2.8400	2.0000	15.4411	2.0000	-11.2848	-3096.3000
Std. Dev.	0.8686	1.0863	2.5452	13.2639	2.3016	3.7069	1386.3841
Skewness	-0.5089	-0.3152	-0.6765	-1.3002	-0.0598	1.3622	0.1466
Kurtosis	2.6361	2.5468	2.4748	3.7165	2.5369	8.4502	3.3714
No of Obs.	28	28	28	28	28	28	28

Table 2. Correlation matrix

	C	EG	GS	ICRG	IN	IrDi	NCF
C	1						
EG	0.562	1					
GS	0.2744	0.2812	1				
ICRG	0.6154	0.3829	0.8794	1			
IN	0.2362	0.3877	-0.0436	0.0436	1		
IrDi	0.0229	0.0819	0.0045	0.1592	0.0916	1	
NCF	0.3031	0.2052	0.0798	0.0958	-0.1963	-0.1972	1

Regression Models and Discussion

Table 3 summarizes the statistical analysis of capital flight and its determinants from both OLS and Threshold point of view considering the chances of ICRG index, measure of institutional quality whether being a catalyst in independent and dependent variables nexus. From simple OLS analysis it is found that none of the independent variables such as inflation, economic growth, and interest rate differentials determines the level of capital flight in Bangladesh. The OLS result is consistent with Collier, Hoeffler & Pattillo (2001), Kar (2010), and Ndikumana, Boyce & Ndiaye (2014) on inflation rate-capital flight nexus and also consistent with Beja (2006, 2007) regarding interest rate differential-capital flight nexus, but contradicts the findings drawn by Beja (2006) and Ndikumana, Boyce & Ndiaye, (2014) on economic growth-inflation nexus.

The statistical significance of the threshold estimate is evaluated by P-value calculated using the bootstrap method. From the analysis it is found that the test for no threshold effect is rejected as the Bootstrap P-value is found 0.01. By statistically acknowledging the existence of ICRG threshold (demonstrated in figure 3), the samples are divided into two sections with ICRG threshold value of 50.1225. Any value up to 50.1225 is considered as low-institutional quality regime 1 while any value beyond that point considered as high-institutional quality regime 2. The coefficients of interest rate differential and economic growth are statistically insignificant, when institutional quality in Bangladesh lies above anywhere beyond threshold point in regime 2. But institutional quality has role in determining the effect of both economic growth and interest rate differential on capital flight when country's institutional quality (ICRG) score lies in regime 1. In regime 1, higher economic growth will increase capital flight which confirms Quazi's (2004) findings but contradicts with Alam

Table 3. General OLS and Threshold Regression with ICRG measures

		Institutional quality as ICRG index		Government Stability		Corruption	
	OLS model without Threshold	ICRG ≤ 50.1225	ICRG > 50.1225	GS ≤ 6.625	GS > 6.625	C ≤ 2.7916	C > 2.7916
C	9.1221*** (1.3699)	7.5431*** (0.2945)	11.9984*** (3.4853)	11.3711*** (2.4094)	7.2284*** (0.5422)	8.0193*** (0.2389)	35.6164*** (1.7315)
IN	-0.2317 (0.1812)	-0.0223 (0.0343)	-0.4292 (.2758)	-0.4042 (0.2627)	-0.0186 (0.0347)	-0.0103 (0.0176)	-1.6943*** (0.0336)
InDi	0.0025 (0.0454)	-0.0235*** (0.0070)	0.4289 (0.3751)	-0.0255 (0.0508)	-0.0555 (0.0417)	-0.0207*** (0.0044)	-0.0237 (0.0846)
EG	0.0399 (0.1130)	0.1385** (0.0539)	-0.0560 (0.2659)	-0.2900 (0.3458)	0.1538* (0.0921)	0.0073 (0.0507)	-2.5077*** (0.2426)
Obs.	28	11	17	11	17	21	7
R^2	0.1510	0.4770	0.3492	0.3502	0.1359	0.1378	0.9807
LM-test for no threshold		4.2851		3.2836		6.67	
Boot strap P-value		0.0107		0.076		0.034	

• Standard errors are in parenthesis

• (*), (**) and (***) indicate significant at 10%, 5%, and 1% level of significance respectively.

& Quazi (2003), Beja (2006), Forgha, (2008), Ndikumana, Boyce & Ndiaye (2014). Similarly, larger interest rate differential will narrow the level of NCF in Bangladesh, consistent with Ndikumana & Boyce (2008) but contradicts with Alam & Quazi (2003), Quazi (2004). Additionally, considering the existence of institutional quality threshold, the effect of inflation on capital flight in Bangladesh is nonexistent.

Table 4 also summarizes the statistical analysis of capital flight and its determinants from threshold point of view. The statistical significance of the threshold estimate is evaluated by P-value calculated using the bootstrap method. From the analysis it is found that the test for no threshold effect is rejected for both institutional quality indicators of government effectiveness and corruption as the Boot strap P-value is found 0.076 and 0.034 respectively. By statistically acknowledging the existence of government effectiveness and corruption threshold (demonstrated in figure 3), the samples are divided into two sections with the corresponding threshold value of 6.625 and 2.7916 respectively. It is found that interest rate differential significantly lowers capital flight in Bangladesh when corruption measure lies in regime 1 while in regime 2 its effect is statistically found nonexistent. Similarly, both economic growth and inflation significantly reduces country's capital flight when it experiences corruption of any level beyond threshold value of 2.7916. This positive casualty between economic growth-capital flight nexus is also bolstered by Alam and Quazi (2003), Beja (2006), Forgha (2008), and Ndikumana, Boyce & Ndiaye (2014). Similarly, the positive casualty between economic growth-capital flight nexus also confirms the findings by Alam & Quazi (2003) and Quazi (2004). But their effect does not exist for any corruption level up to that threshold value. On the other hand, it is found that government effectiveness has no role in determining the effect of inflation, interest rate differential and economic growth on capital flight. Only economic growth is found to increase capital flight with 10% accuracy when government effectiveness remains in regime 2.

To check the robustness of the original capital flight-ICRG model, Table 4 summarizes the analysis of NCF with WGI good governance measures. Like as the original capital flight-ICRG model in OLS, capital flight-good governance model in OLS concludes that the independent variables

Table 4. General OLS and Threshold Regression with WGI measures

		Good Governance		Government Effectiveness (GE)		Control of corruption (CC)	
	OLS model without Threshold	$GG \leq 21.9783$	$GG > 21.9783$	$GE \leq 24.6399$	$GE > 24.6399$	$CC \leq 14.7600$	$CC > 14.7600$
C	8.6982*** (1.3130)	7.300*** (0.6861)	11.7781* (6.2834)	14.3034*** (3.1292)	7.2482*** (.3989)	25.2104*** (9.2690)	9.1740*** (0.9278)
IN	-0.4193 (0.3051)	-0.0653 (0.0575)	-0.5204 (0.3318)	-1.4437*** (0.2857)	-0.0467 (0.0408)	-0.0660 (0.3588)	-0.1648*** (0.0509)
InDi	-0.0551 (0.0541)	-0.1020** (0.0430)	-0.0582 (0.1484)	-0.2444 (0.1967)	-0.0138 (0.0126)	1.5166* (0.7853)	-0.0919*** (0.0299)
EG	0.3042 (0.2410)	0.1810* (0.1118)	-0.2836 (1.0917)	0.4321 (0.4809)	0.1956** (0.0928)	-2.2737 (1.5544)	0.0229 (0.1160)
Obs.	18	12	6	10	8	10	8
R^2	0.2271	0.2171	0.3969	0.8050	0.4087	0.5876	0.8283
LM-test for no threshold		2.8916		2.9649		3.1646	
Boot strap P-value		0.0167		0.0018		0.0252	

• Standard errors are in parenthesis

• (*), (**) and (***) indicate significant at 10%, 5%, and 1% level of significance respectively.

Figure 3. Graphical representation of threshold for ICRG index

statistically do not explain the capital flight in Bangladesh with relation to good governance. On the other hand, the statistical significance of the threshold estimate is evaluated by P-value calculated using the bootstrap method. From the analysis it is found that the test for no threshold effect is rejected as the Boot strap P-value is found 0.01. By statistically acknowledging the existence good

governance threshold (demonstrated in figure 3), the samples are divided into two sections with GG threshold value of 21.9783.

Like as capital flight-ICRG threshold model, it is found that when the role of good governance is considered, the effect of inflation on capital flight is nonexistent. Similar to original capital flight-ICRG threshold model interest rate differential reduces capital flight while economic growth increases capital flight to some extent whenever the institutional quality reflected through GG, is on or within threshold level. It is also found that the effects of those two independent variables are nonexistent beyond threshold level of institutional quality. This table also summarizes the two corresponding key capital flight-ICRG factor threshold models in terms of government effectiveness and control of corruption. As the original capital flight-government stability threshold model, the effect of economic growth on capital flight exists only and when country's government stability is beyond the threshold level. Additionally, inflation will reduce capital flight when government effectiveness is within the threshold value. Similarly, both inflation and interest rate differential significantly lower capital flight of Bangladesh whenever country manages to improvise control of corruption beyond the threshold level. Statistical appropriateness for both of this threshold model is justified considering the test for no threshold effect, which is to be rejected 5 percent significant level as the Boot strap P-value is found 0.001 and 0.02 respectively.

Graphical Interpretation of Threshold Existence

The following figure shows the graphical evidences of the threshold existence for various hypothetically assumed threshold variables. The first graph in the figure shows how ICRG index is critically defines the sample years between two regimes with threshold value of 50.1225 while the average ICRG score of Bangladesh within the period studied is 48.2405. The second graph similarly illustrates the threshold existence of government stability with corresponding threshold value of 6.625, higher than the average score for Bangladesh 7.4270. The third graph in the upper row reflects corruption threshold existence with threshold value of 2.7916 which is again higher than the average score of 1.9508. Additionally, in order to assure robustness confirmation, similar measures such as good governance, government effectiveness, and control of corruption are also graphically demonstrated where each of them is observed with corresponding threshold value of 21.9783, 24.6399, and 14.7600 respectively. But over the years it is found that average score of good governance and control of corruption is lower than the threshold score. However, threshold value of government effectiveness is found higher than its average score of 25.5561.

MANAGERIAL IMPLICATION AND RESEARCH DIRECTION

This paper investigates the role of institutional or governance quality indicators on the relationship of capital flight. This study concludes on the existence of threshold effect of aggregate institutional or governance measure and also of its individual indicators such as corruption and government stability. Therefore, in order to decide on the possible policy alteration, policy makers should consider the role of institutional or governance quality. Precisely, in terms of policy implication of the study, since the effects of interest rate differential and economic growth exist up to threshold level of institutional quality, policymakers should maintain that level of institutional quality in order to utilize inverse effect of interest rate differential. On the other hand, it may restructure its quality measures so that economic development could stimulate least amount of capital flight. Additionally, as capital flight tends to decrease with increase in interest rate differential up to threshold level of corruption suggesting possible existence of far better earnings opportunity domestically, therefore government should check measures to address that issue. Government should consider the net benefit through critical examination of tradeoff between decrease in capital flight due to increase inflation and economic

growth beyond threshold corruption and repercussions of excess level of corruption. Future research opportunities on this issue could be in terms of introduction of new set of independent variables with investigation of individual institutional quality factors threshold. Furthermore, investigation could be made on each quality factors proportion in the overall portfolio of institutional quality, so that the best mixture of institutional quality is assured to counter capital flight problem.

CONCLUSION

Using data from 1989-2016, this study examines whether there is any threshold effect of institutional quality exists or not on the capital flight along with a set of independent variables including inflation, economic growth, and interest rate differential. Applying threshold regression models, the empirical findings of the study suggest that institutional quality or good governance threshold exists among the relationship between each of the independent variables with capital flight in Bangladesh. The statistical result concludes that up to a certain threshold level of institutional quality, interest rate differential lowers capital flight while economic growth increases capital flight in Bangladesh. It may be because of the fact that at lower institutional quality more people are far more interested to take the money away from the country with higher economic development. Additionally, they might tend to be more defensive to their funds even though they have chances of better earnings in abroad. The perceived risk of poor institutional structure as hindrance to skim the earnings from abroad also may be a reason. At any level of institutional quality beyond that, the effect of both of these variables is nonexistent. Inflation does not determine capital flight in Bangladesh, even though institutional quality threshold is found significant in relation to it. Considering government stability and corruption as two key factors of ICRG, it is found that both of these measures have threshold effect between dependent and independent variables nexuses. But only after a certain threshold level of corruption, both inflation and economic growth reduces capital flight of the country. This may be because of the motive that even if corruption is high, people will try to reap the benefit of ill environment by keeping more of their money in Bangladesh which will result an overall reduction of capital flight. On the other hand, up to 2.8 threshold level of corruption, interest rate differential reduces capital flight of the country. This may lead to the confirmation of hypothesis that effective corruption measures hinder people to send the money abroad even if net earnings opportunity in abroad is appealing.

To confirm the robustness of the findings of original capital flight model, WGI measures are used as an alternative institutional quality. Similar result confirmed the existence of good governance as an institutional quality threshold and its role up to threshold level to which interest rate differential lowers net capital flight of Bangladesh. Similar findings were observed on inflation-capital flight and economic growth-capital flight nexus when corruption control and government effectiveness lie beyond the threshold value. Additionally, it is found that above threshold level of corruption control, interest rate differential will reduce capital flight conforming the result of original model.

The findings and their uniqueness of this study could be summarized in that there are threshold effects of aggregate institutional or governance measure and also of its individual indicators such as corruption and government stability. In fact, with each of those threshold variables and their corresponding threshold values, the sign of the independent variables alters. Therefore, it cannot be generalized that any independent variables will have unique effect on capital flight regardless of the institutional quality environment of the country. At least in context of Bangladesh with various institutional quality environments, it will mislead or misrepresent considering the independent variables such as inflation, economic growth, and interest rate differential. Hence, it could be concluded that role of institutional or governance quality environment should not be ignored in capital flight investigation.

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APPENDIX 1

ICRG index calculation for particular year:

$$ICRG\ index = \frac{GS + C + LD + DA + BQ}{34} * 100$$

ICRG Components Points (*max.*)

Government Stability (GS) 12

Corruption(C) 6

Law and Order (LD) 6

Democratic Accountability (DA) 6

Bureaucracy Quality (BQ) 4

Total 34

Interest Rate Differential calculation:

$$Interest\ Rate\ Differential = Real\ interest\ rate\ in\ USA - Real\ interest\ rate\ in\ Bangladesh$$

Good Governance Index calculation for particular year:

$$GG\ index = \frac{VA + PS + GE + RQ + RL + CC}{600} * 100$$

Good Governance Components:

- Voice and Accountability (VA)
- Political Stability and Absence of Violence (VA)
- Government Effectiveness (PS)
- Regulatory Quality (RQ)
- Rule of Law (RL)
- Control of Corruption (CC)

Nirmol Chandra Das-This work is based on one of the projects that I completed in my undergrad. My coauthors and I tried to explore insights on capital flight in Bangladesh. As a very first project intended to get published in the early stage of my academic career might have some limitations in comprehensiveness and contribution. Still, it can provide some insights on capital flight and institutional quality in the context of Bangladesh.

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