Causal Relationship between Government Size and Trade Openness in Bangladesh: An Empirical Analysis

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Abstract: *Causal association between trade openness and government size has gained interest of researchers and policy makers all around the world. These two crucial macroeconomic variables are of utmost importance when it comes to attainment of economic growth via the channel of globalization. This paper examines the cointegration and causal relationship between trade openness and government size in Bangladesh economy using annual data from 1980 to 2013. We consider a multivariate model and perform the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests to check if the variables are stationary. Next, we apply the Johansen cointegration method followed by the Granger causality test to check for robustness of the relationship among the variables. Our results reveal that there is a unidirectional causality running from trade openness to government size in Bangladesh which provides support to the compensation hypothesis for Bangladesh economy.*

Keywords: *trade openness, government size, economic growth, causality, cointegration*

JEL Classification: *F15, H5, H11*

1. Introduction

Attainment of sustainable economic development seems to be a prime concern of policy makers all around the globe. Researchers worldwide have endeavoured themselves in identifying various macroeconomic indicators that attribute to achievement of those development goals. Trade openness and government size are two of the utmost imperative macroeconomic indicators since empirical studies over the past have found results in favour of causalities running from trade openness and government size to economic growth.

The causality between trade openness and government size has been evaluated in existing literatures in terms of three main hypotheses: compensation, efficiency and neutrality. In the past, most studies like those by Saeed and Hussain (2015) for Kuwait and Ayo et al.,

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(2011) for Nigeria have specifically focused on investigating the causality directions between trade openness and economic growth. A possible explanation for being motivated in examining this relationship could be the fact that as a nation opens up to international trade, its aggregate demand is likely to rise due to increase in investments and net exports, ceteris paribus, which calls for adoption and application of numerous policy actions. Similary, studies by Hajamini and Falahi (2014), Guerrero and Parker (2012), Bergh and Henrekson (2011) and Facchini and Melki (2011) have linked government size with economic growth since a public spending is synonymous to aggregate investment which eventually gets translated in the GDP generating economic growth. Therefore, we can see that in the past researchers were mainly concerned about the effects of trade openness and size of government spending on economic growth.

However, in the late 1970s we have seen that economists and policy initiators started to gather interest in examining the direction of causality between trade openness and government size since some empirical findings have revealed possible negative externalities of globalization on economic growth prospects. In addition, government spending was also found to be associated with a fall in economic growth rate due to possible crowding out of private investments. Thus, the relationship between economic openness to international trade and government expenditure became a hot topic of research analysis. This relationship was first investigated in the seminal paper of Cameron (1978).

Our initial motivation behind this research was the idea that since Bangladesh is historically opening up to engaging in bilateral and multilateral trade, such globalization moves should ideally result in wonders for its economy unless some mitigating factors restrict its growth prospects. Hence, we decided to inspect the trade openness-government size nexus under the frameworks of compensation and efficiency hypotheses. To the best of our knowledge, there had not been much work regarding this topic exclusively in context of Bangladesh. Thus, our paper fills that gap. The following questions are addressed in our paper:

1) Is there any causality between trade openness and government size in Bangladesh?
2) Is the economic growth of Bangladesh being compromised provided causality is found?

The remainder of the paper is organized as follows. The next section provides the literature review followed by the section that discusses the attributes of data and the methodology of research. Moving on, the subsequent sections provide discussions on econometric results and finally followed by concluding remarks and policy recommendations.

2. Review of Literature

Section 2 is split into two subsections: Theoretical Framework and Empirical Findings. Over the years, developing countries have strived to adopt and implement numerous policy tools with the ultimate goal of economic growth attainment. Researchers worldwide had engaged themselves in identifying different fundamentals of growth which include economic openness and government size too. Moreover, theories and empirical findings of various related studies provided mixed remarks in context of the relationships between growth and its determinants.

2.1. Theoretical Framework

Globalization seems to be the vehicle of economic growth and development. It is widely acknowledged in economic and international trade theories that trade openness is synonymous to moving towards globalization which eventually would be translated into economic welfare of the nation that has liberalized its trade barriers. Thus, trade openness is ought to have a positive impacts on economic growth. However, there had also been instances where trade openness led to opposite impacts making the economy worse-off compared to pre-trade stages. A possible reason behind this could be the fact that liberalizing barriers and opening up could actually reduce government size whereby the economy would be adversely affected. Thus, theoretical frameworks have been established to portray the causal relationship between trade openness and government size.

2.1.1.Compensation Hypothesis: The relationship between trade openness and government size first came into focus in the late 1970s and this theoretical linkage was pioneered in the seminal study by Cameron (1978). According to this hypothesis an increase in trade openness is compensated by an increase in government spending in order to counter for the adverse impacts generated from this liberalization. Thus, this hypothesis advocates for a positive relationship between these two important macroeconomic variables. The logical reasoning behind this statement is the fact that globalization via trade openness spawns some negative externalities on the economy in the form of rising income inequality and economic insecurity. Thus, the citizens would expect the government to undertake redistribution policies and compensate for the risks associated with globalization. This provides political incentives for the government to engage in public expenditures and as a result a rise in the degree of trade openness is matched with an increase in size of the government. This hypothesis was later on revisited and acknowledged in studies by Ruggie (1982) and Alesina and Wacziard (1998). Rodrick (1996), in similarity with the hypothesis put forward by Cameron (1978), stated that a positive relationship between trade openness and government size is ought to exists because open economies are more prone to external shock which calls for greater stabilization policies from the government in the form of public expenditure programs.

Results of many empirical studies like those by Khalid (2005) for Saudi Arabia, Shahbaz et al. (2010) for Pakistan, and Ibrahim and Arebeyen (2014) for Nigeria have found validity of the compensation hypothesis.

2.1.2. Efficiency Hypothesis: In contrast to the compensation hypothesis, Petrou (2014) came up with the theory that a rise in trade openness in quest for rapid globalization would actually lead to a fall in the amount of government expenditure. Thus, trade openness is likely to be negatively correlated to government size. According to this hypothesis, government expenditure tends to reduce the power of domestic wages in international markets. Moreover, globalization provides better opportunities for labour and capital movements in international markets where the expected rate of returns are relatively higher. Thus, in order to counteract these adversities of globalization, government expenditures have to be cut down in order to restore efficiency in the economy.This inverse causality between trade openness and size of government was also recognized in studies by Garen and Trask (2005), Ram (2009) and Liberati (2013).

2.1.3.Neutrality Hypothesis[1]: This hypothesis is more like a non-causal hypothesis whereby there is no relationship between trade openness and government size which corroborates the findings in the study by Benarroch and Pandey (2012) incorporating a panel of 199 low and high economic growth experiencing nations.

Apart from these some studies have concluded that there exists uni-directional causality between the two variables. However, the direction of causality varies from nation to nation.

2.2. Empirical Findings

Al-Qudair (2015) used Saudi Arabian annual time series data from 1970 to 2001 in order to investigate the causal relationship between trade openness and government size. His used a two-variate Vector Error Correction Model (VECM) with the variables being trade openness, measured as a ratio of real total trade and real GDP, and government size, measured as ratio of real government consumption and natural logarithm real GDP. He basically resorted to the use of the Granger causality test to determine the direction of their causality relationship. In addition, unit root tests and cointegration tests preceded the test of causality. The findings from the tests revealed that although there was no supporting evidence of a short run relationship, there was a long run association between the two variables in the form of a uni-directional causality chain running from trade openness to government size.

Senar et al. (2015) also examined the association between trade openness and government size under the theoretical frameworks of the compensation and efficiency

[1] It is a standard practice to refer a relationship in terms of neutrality hypothesis when there is no causality from any direction between two variables.

hypotheses. They resorted to the use of annual time series data in context of Turkey between 1975 and 2013.Their regression model was a bi-variate model where government size, measured as government expenditure as a percentage of GDP, was expressed as a function of trade openness, measured in terms of the sum of exports and imports as a percentage of GDP. With regard to methodologies, Phillips-Perron (PP) unit root test, Johansen-Juselius cointegration test and Vector Auto Regressive (VAR) Granger causality test were used to draw conclusions. The results revealed that there was no relationship between the concerned variables proving both the hypotheses wrong. The conclusions regarding the association were in line with that by Shelton (2007) while in contradiction to those byEpifani and Gancia (2009) and Rodrik (1998).

Liberati (2013) closely examined the tri-variate nexus between trade openness, financial openness and government size using a cross-sectional time series framework. The results showed that trade openness and financial openness, in general, were negatively correlated to government size which implied clear disagreement to the validity of the compensation hypothesis proposed in seminal papers by Rodrik (1998) and Cameron (1978). He incorporated data from 16 European countries between 1970 and 2001 and performed a cross-sectional analysis due to unavailability of data at certain periods in context of certain countries. A multi-variate random and fixed effect models have been used where government size was held to be the dependent variable while trade openness, foreign direct investment and portfolio investment were considered to be the independent variables. Panel regression techniques were mainly applied all throughout the study. Prais-Winsten panel corrected standard error estimator was applied for the panel data.Finally, Granger causality test was chosen to be applied in order to comment on the nature of causality between trade openness and size of governments.

An investigation of causality and cointegration between government size and trade openness was executed by Aydogus and Topco (2013). They pooled annual time series Turkish data ranging from the year 1974 to 2011 using a residual based cointegration approach. They aimed to test the compensation hypothesisand investigate whether or not a long run relationship exists between the two concerned variables.They used ZA unit root test proposed by Zivot and Andrews (1992) followed by the cointegration test put forward by Engle and Granger (1987) and finally Granger causality test was tapped throughout the study. According to the results obtained, there was no evidence for long run relationship but uni-directional causality was found to run from government size to trade openness. Thus, the compensation hypothesis was rejected with regard to results obtained from Turkey's perspective.

Oyeleke and Akinlo (2016) precisely examined the relationship between trade openness and government expenditure, a proxy for government size, in context of the African nation, Nigeria. They tapped annual time series Nigerian data from 1980 up to 2013 in

order to test this association using a Bound test cointegration approach. The multi-variate model in this study was put forward using Auto Regressive Distribute Lag (ARDL) approachby Pesaran et al., (1996).[2] Augmented Dickey Fuller (ADF) and Kwiatkowski, Phillips, Schmidt and Shin (1992) (KPSS) tests were used to test the data set for stationarity and their results conformed the absence of unit root. It is to be noted that in this paper government expenditure was disintegrated into capital and recurrent expenditures. Bound test results revealed that there was negative and significant relationship between government expenditure and trade openness which once again was in contradiction to the compensation hypothesis.

Ibrahim (2015) considered five large economies of Africa and carried out an investigation to test the causality between trade openness and size of government using the commonly used compensation hypothesis framework. Annual time series data was pooled from al the five nations for a period of forty-one years starting from 1970 up to 2010. With regard to the empirical model used in this study, he followed Ibrahim and Arebeyen(2014) and augmented it with per capita GDP. The different tests used in this study were unit root test followed by cointegration test proposed by Johansen and Jeselius (1990). Finally, causality test was performed based on Error Correction Model (ECM) framework. There was no general result across all the nations rather the results varied across countries corroborating the findings by Islam (2004) on six OCED countries. A positive linkage between trade openness government size was found for Nigeria and Algeria while the finding was opposite for South Africa which coincided with the findings by Shahbaz et al. (2010) for Pakistan. Moreover, no causality was found in context of Angola and Egypt which is in line with the results found by Molana et al. (2004).

Benarroch and Pandey (2012), extending on their earlier study Benarroch and Pandey (2008)re-examined the causal association between trade openness and government size using both aggregate and disaggregated government expenditure data of 119 countries covering the time period 1972 to 2000. The countries considered were classified into high and low economic growth nations, respectively. They used dynamic panel estimation method. The results from the fixed effects model showed there was no positive causal relationship for aggregate government expendituresto trade openness which assert the invalidity of the compensation hypothesis. Similar results were obtained using disaggregated data.

The trade openness-government size nexus with respect to the compensation hypothesis was also intimately probed by Argebeyen and Ibrahim (2014) using annual time series

[2]ARDL cointegration method, developed by Pesaran and Shin (1999), is used to see cointegration between variables in the long run and is applicable irrespective of whether the regressor variables are I(0), I(1) or mutually cointegrated. For more information see Khalil and Dombrecht (2011).

Nigerian data from 1970 to 2012. This investigation was tested using the bounds testing approach to cointegration within an ARDL framework proposed by Pesaran et al. (2001). Government size was measured by disaggregating government expenditure in capital andrecurrent expenditures in order to capture their separate associations with trade openness. The findings revealed that in the long run, recurrent expenditure based government size significantly affected trade openness which is the opposite in the case of capital expenditure based government size. However, in the short run all the measures of government size generated significant effects on trade openness. Thus, the compensation hypothesis was proved to be valid in context of Nigeria.

3. Empirical Model And Data Description

Following Senar et al., (2015), our model comprised of the two main variables in which we expressed trade openness as a function of government size. In addition, we augmented that model with controlled variables such as gross domestic product, foreign direct investment, and remittance since these variables have are empirically proven to influence these two main variables. Our model:

$$TO = \alpha o + \alpha 1(GOVS) + \alpha 2(GDP) + \alpha 3(FDI) + \alpha 4(REMIT) \quad (1)$$

where TO refers to Trade Openness measured as ratio of the sum of total imports and exports to the economy's gross domestic product. This measure of trade openness is in line with that of Al-Qudair (2015) in context of Saudi Arabia. Moreover, according to Cameron (1978), this measure of trade openness is believed to be the best in capturing its true effects on other macroeconomic variables. In our model, GOVS is referred to as Government Size which is measured in terms of government's consumption expenditure on tradable and non-tradable sectors as percentages of GDP. GDP refers to Gross Domestic Product, measured in constant prices, and is used as a proxy for economic growth. Inclusion of this variable in our model is theoretically justified since terms of trade liberalization is most likely to raise net exports, ceteris paribus. FDI denotes foreign direct investment and its inclusion is validated with the reasoning that globalization policies encourage foreign investment in the form of FDI, portfolio investments, foreign aid and so on. Finally, REMIT refers to personal remittances received in terms of US dollars. This variable was included with the underlying intention of capturing the effect of globalization since it is believed that economic openness to trade stimulates mobility of labourand capital across national boundaries and also facilitates income transfer mechanisms. Relevant data of all these variables were pooled from the World Development Indicators (WDI), 2015 website of the World Bank. The data set used in this study has been provided in Table A 1 (see appendix) while graphical trends of the variables are shown in fig. A1 (see appendix).

4. Methodology

At first, data of all the variables were tested for unit root in order to determine the stationarity of the variables that were considered in our study. We used the ADF and PP unit root tests to detect possible existence of unit roots, if any, in our data set. Once the variables were found to be stationary, cointegration test was run to find possible linear combinations of the variables which could be considered stationary. Moreover, following confirmation of cointegration between the concerned variables we finally used the Granger Causality tools for determining the direction of causalities between the variables. It is important to test data, especially time series data, for stationarity since non stationarity of time series data leads to spurious regression unless there is the existence of at least one cointegrating relationship. It is important to mention that unit root tests tend to have non-standard and non-normal asymptotic distributions, which are highly affected as the deterministic terms such as constant, time trend etc. are included. A time trend is considered as an extraneous regressor and the power of the test could be reduced by its inclusion. However, if the true data generating process were trend stationary, then failing to include a time trend could also result in a reduction in power of the test. Moreover, this loss of power due to the exclusion of a time trend when it should be present is more severe than the reduction in power associated with the inclusion of a time trend when it is extraneous (Lopez et al., 2005). While conducting the unit root test, it is important to choose the optimum lag length. The software EViews 7.1 used in our paper automatically chooses the appropriate lag length based on the Schwartz Information Criterion (SIC).

Furthermore, the Johansen procedure was applied to test for cointegration, which is known to provide a unified framework for estimation and testing of cointegration relations in the context of VAR error correction models. We estimated an Unrestricted Vector of Autocorrelation of the following form for this purpose:

$$\Delta x_t = \alpha + \theta_1 \Delta x_{t-1} + \theta_2 \Delta x_{t-2} + \theta_3 \Delta x_{t-3} + \cdots\cdots + \theta_{k-1} \Delta x_{t-k+1} + \theta_k \Delta x_{t-k} + u_t$$

where Δ is the difference operator; xt is a (n x 1) vector of non-stationary variables (in levels); and Ut is the (n x 1) vector of random errors. The matrix θk contains the information on long run relationship between variables, for instance, if the rank of θk = 0, the variables are not cointegrated. On the other hand if rank (usually denoted by r) is equal to 1, there exists one cointegrating vector and finally if 1 < r < n, there are multiple cointegrating vectors. Johansen (1990) derive two tests for cointegration, namely the trace test and the maximum Eigen value test. The trace statistic test evaluates the null hypothesis that there are at most r cointegrating vectors whereas the maximal eigen value test, evaluates the null hypothesis that there are exactly r cointegrating vectors in xt.

According to cointegration analysis, when two variables are cointegrated then there exist at least one direction of causality. Granger-causality, introduced by Granger (1969, 1980,

1988), is one of the important matters that has been much studied in empirical macroeconomics and empirical finance. The presence of non stationarity can lead to ambiguous or misleading conclusions in the Granger causality tests (Engel and Granger, 1987). Only when the variables are cointegrated, it is possible to deduce that a long run relationship exists between the non-stationary time series.

When we take y and x as our variables of interest, then the Granger causality test (Granger, 1969) determines whether past values of y add to the explanation of current values of x as provided by information in past values of x itself. If previous changes in y do not help explain current changes in x, then y does not Granger cause x. In a similar way, we can examine if x Ganger causes y just be interchanging them and carrying out this process again. There could be four probable outcomes: (i) x Granger causes y (ii) y Granger causes (iii) Both x and y granger causes the other and (iv) neither of the variables Granger causes the other.

In this paper, the causality tests among all the concerned variables are conducted. For this the following two sets of equation are estimated:

$$x_t = \alpha_0 + \alpha_1 x_{t-1} + \cdots\cdots + \alpha_l x_{t-l} + \beta_1 y_{t-1} + \cdots\cdots + \beta_l y_{t-l} + u_t$$

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \cdots\cdots + \alpha_l y_{t-l} + \beta_1 x_{t-1} + \cdots\cdots + \beta_l x_{t-l} + v_t$$

We consider the above sets of equation for all possible pairs of (x, y) series in the group. The reported F-statistics are the Wald statistics for the joint hypothesis

We resorted to use of the Eviews 7.1 software for carrying out all econometric tests in our study.

5. Results

We first carried out tests to check the stationarity of data set using ADF[3]and PP unit root tests, if required, for variables that are found to be non-stationary under ADF test. Our motive is to find out whether our variables are stationary or not at their first level. In order to do so we assumed a hypothesis considering the data series to be non-stationary and integrated. If there is clear proof of rejection, it is only then we could reject our hypothesis. Table 1a shows the ADF statistics and corresponding p-values of all the variables in their level and first difference forms. From the table we can see that all our variables, except Foreign Direct Investment (FDI), are either stationary at level or at first difference level using the ADF test. Confirmation of stationarity of FDI data was revealed from the findings of the PP test as shown in table 1B.

[3]For ADF test our hypothesis was that unit root exists or the data is non-stationary. We can reject this hypothesis only if our t-statistic is less than the test critical value at 10% level of significance. On the other hand, if probability value (p-value) is less than 10% then the hypothesis under Phillips-Perron (PP) test can be rejected.

Table 1a. Augmented Dickey Fuller (ADF) Unit Root Test					
Panel 1: Levels - I(0)					
Variables	**ADF Statistics (only constant)**	**Prob. Value**	**ADF Statistics (constant and trend)**	**Prob. Value**	**Decision on stationarity**
TO	0.160	0.966	-3.072	0.130	Non-stationary considering both constant & constant and trend
GOVS	-1.230	0.649	-2.130	0.510	Non-stationary considering both constant & constant and trend
GDP	7.035	1.000	2.768	1.000	Non-stationary considering both constant & constant and trend
FDI	-1.554	0.491	-3.135	0.115	Non-stationary considering both constant & constant and trend
REMIT	-2.559	0.1124	-3.418	0.068	Non-stationary considering constant &stationary considering constant and trend
Panel 2: First Difference - I(1)					
Variables	**ADF Statistics (only constant)**	**Prob. Value**	**ADF Statistics (constant and trend)**	**Prob. Value**	**Decision on stationarity**
TO	-3.381	0.022	-4.314	0.012	Stationary in both constant & constant and trend
GOVS	-4.265	0.002	-4.168	0.013	Stationary in both constant & constant and trend
GDP	-1.667	0.438	-3.687	0.038	Non-stationary in constant & stationary in constant and trend
FDI	-1.609	0.463	-3.171	0.114	Non-stationary considering both constant &constant and trend
REMIT	-1.421	0.558	-2.102	0.523	Non-stationary considering both constant &constant and trend

Table 1b. Phillips – Perron (PP) Unit Root Test					
Panel 1: Levels - I(0)					
Variable	**PP Statistics (only constant)**	**Prob. Value**	**PP Statistics (constant and trend)**	**Prob. Value**	**Decision on Stationarity**
FDI	-0.468	0.885	-2.980	0.153	Non-stationary considering both constant & constant and trend
Panel 2: First Difference					
Variable	**PP Statistics (only constant)**	**Prob. Value**	**PP Statistics (constant and trend)**	**Prob. Value**	**Decision on Stationarity**
FDI	-9.326	0.000	-23.700	0.000	Stationary in both constant & constant and trend

Following the ADF test we then ran the Johansen cointegration test to see whether the variables were cointegrated or not. Details of findings from Johansen cointegration test are shown in table A.2 (see Appendix). The results reveal that there are at least two long run cointegrating relationships between the variables considered in our model.

Finally, after checking all our variables for stationarity and cointegrity, we then went on to run Granger Causality Test to understand the direction of causalities between our variables. Results from this test are shown below in table 2.

Table. 2. Granger Causality Test Results (Lag = 1)

Null Hypothesis	**F-Statistics**	**Prob. Value**	**Granger Causality**
GOVS does not Granger cause TO	0.041	0.840	Unidirectional Causality TO $\longrightarrow$ GOVS
TO does not Granger cause GOVS	14.450	0.001	
GDP does not Granger cause TO	10.330	0.003	Unidirectional Causality GDP $\longrightarrow$ TO
TO does not Granger cause GDP	0.282	0.599	
FDI does not Granger cause TO	7.413	0.011	Bi-directional Causality FDI $\rightleftarrows$ TO
TO does not Granger cause FDI	6.930	0.013	
REMIT does not Granger cause TO	1.565	0.221	Bi-directional Causality REMIT $\rightleftarrows$ TO
TO does not Granger cause REMIT	6.566	0.016	

GDP does not Granger cause GOVS	13.951	0.001	Unidirectional Causality GDP ⟶ GOVS
GOVS does not Granger cause GDP	0.102	0.752	
FDI does not Granger cause GOVS	9.884	0.004	Unidirectional Causality FDI ⟶ GOVS
GOVS does not Granger cause FDI	1.950	0.173	
REMIT does not Granger cause GOVS	5.853	0.022	Unidirectional Causality REMIT ⟶ GOVS
GOVS does not Granger cause REMIT	2.714	0.110	
FDI does not Granger cause GDP	0.102	0.752	Unidirectional Causality GDP ⟶ FDI
GDP does not Granger cause FDI	12.224	0.002	
REMIT does not Granger cause GDP	8.952	0.001	Unidirectional Causality REMIT ⟶ GDP
GDP does not Granger cause REMIT	2.740	0.108	
REMIT does not Granger cause FDI	6.529	0.016	Bi-directional Causality REMIT ⇄ FDI
FDI does not Granger cause REMIT	5.794	0.022	

The Granger causality test results clearly point out that there is unidirectional causality running from trade openness to government size which implies positive correlation between trade openness and size of government spending. Moreover, unidirectional causalities were found to be running from GDP to TO, GOVS, and FDI while bi-directional causalities were associated between FDI and TO, REMIT and TO and between REMIT and FDI. All these causalities have different policy implications which need to be considered carefully.

6. Conclusions And Policy Recommendations

On the basis of our research findings, we can conclude that the unidirectional causality running from trade openness to government size is in line with the compensation hypothesis put forward in the seminal paper of Cameron (1978) and later on acknowledged in the subsequent study by Rodrik (1996). This implies that Bangladesh, until 2013, had not faced and externality arising from engagement in globalization drives. This could be attributed to the effective and proper public policy movements of the government whereby any negative impact of economic openness to international trade could have been off-set through public spending programs. As part of future policy recommendation, Bangladesh government can further enhance its expenditure budgets in

the form of expansionary fiscal policies in order to translate trade openness moves into economic growth attainment. Moreover, since trade openness is associated with certain risks whereby people look up to the government for support, it is an ideal platform for the government to retain popularity and power through income redistribution policies. The main limitation of this paper was unavailability of relevant data whereby our sample size was relatively small compared to other time series studies in other countries. In addition, our variables could not be disintegrated in terms of their units of measure for similar limitations. It is important to breakdown data variables into different forms for better results. For instance, empirical literatures suggest that different measures of government size could result in variety regarding its association with trade openness and other macroeconomic variables. Hence, in order to check the robustness of our findings, we would like to expand our time series data and also disaggregate our variables to discover new causal dimensions in future.

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APPENDICES

Table a.1. The Data Set (1980-2013)

Year	TO	GOVS	GDP	FDI	REMIT
1980	23.377	6.141041	1.81E+10	0.046918	3.39E+08
1981	19.247	4.391320	2.02E+10	0.026470	3.81E+08
1982	20.607	4.432335	1.85E+10	0.037570	5.26E+08
1983	20.317	4.309127	1.76E+10	0.002294	6.42E+08
1984	16.812	4.344627	1.89E+10	-0.002920	5.01E+08
1985	18.222	4.030633	2.23E+10	-0.029890	5.02E+08
1986	17.019	4.201182	2.18E+10	0.011190	5.76E+08
1987	16.688	4.143174	2.43E+10	0.013191	7.48E+08
1988	17.678	4.165375	2.66E+10	0.006916	7.64E+08
1989	18.325	4.153944	2.88E+10	0.000861	7.58E+08
1990	18.967	4.053250	3.16E+10	0.010250	7.79E+08
1991	18.890	4.136332	3.10E+10	0.004491	7.69E+08
1992	19.934	4.451222	3.17E+10	0.011738	9.12E+08
1993	23.122	4.953839	3.32E+10	0.042362	1.01E+09
1994	22.866	4.883159	3.38E+10	0.033012	1.15E+09
1995	28.209	4.629886	3.79E+10	0.004998	1.20E+09
1996	26.076	4.727499	4.64E+10	0.029135	1.34E+09
1997	26.326	4.902982	4.82E+10	0.288897	1.53E+09
1998	27.880	5.125680	5.00E+10	0.380236	1.61E+09
1999	28.388	5.039615	5.13E+10	0.350421	1.81E+09
2000	29.322	4.973121	5.34E+10	0.525362	1.97E+09
2001	32.098	4.845660	5.40E+10	0.145444	2.10E+09
2002	28.967	5.022649	5.47E+10	0.095642	2.86E+09
2003	27.658	5.128299	6.02E+10	0.445961	3.19E+09
2004	26.858	5.174383	6.51E+10	0.689472	3.58E+09
2005	34.397	5.180225	6.94E+10	1.095150	4.64E+09
2006	38.112	5.440079	7.18E+10	0.635657	5.43E+09
2007	39.942	5.359456	7.96E+10	0.817754	6.56E+09
2008	42.621	5.178277	9.16E+10	1.449748	8.94E+09
2009	40.093	5.093745	1.02E+11	0.879495	1.05E+10
2010	37.803	5.075326	1.15E+11	1.068935	1.09E+10
2011	47.421	5.097447	1.29E+11	0.983167	1.21E+10
2012	48.111	5.039343	1.33E+11	1.188103	1.41E+10
2013	46.296	5.116132	1.50E+11	1.270616	1.39E+10

Source: WDI (2015)

Fig. A1. Graphical Trends of all the Variables Consdered

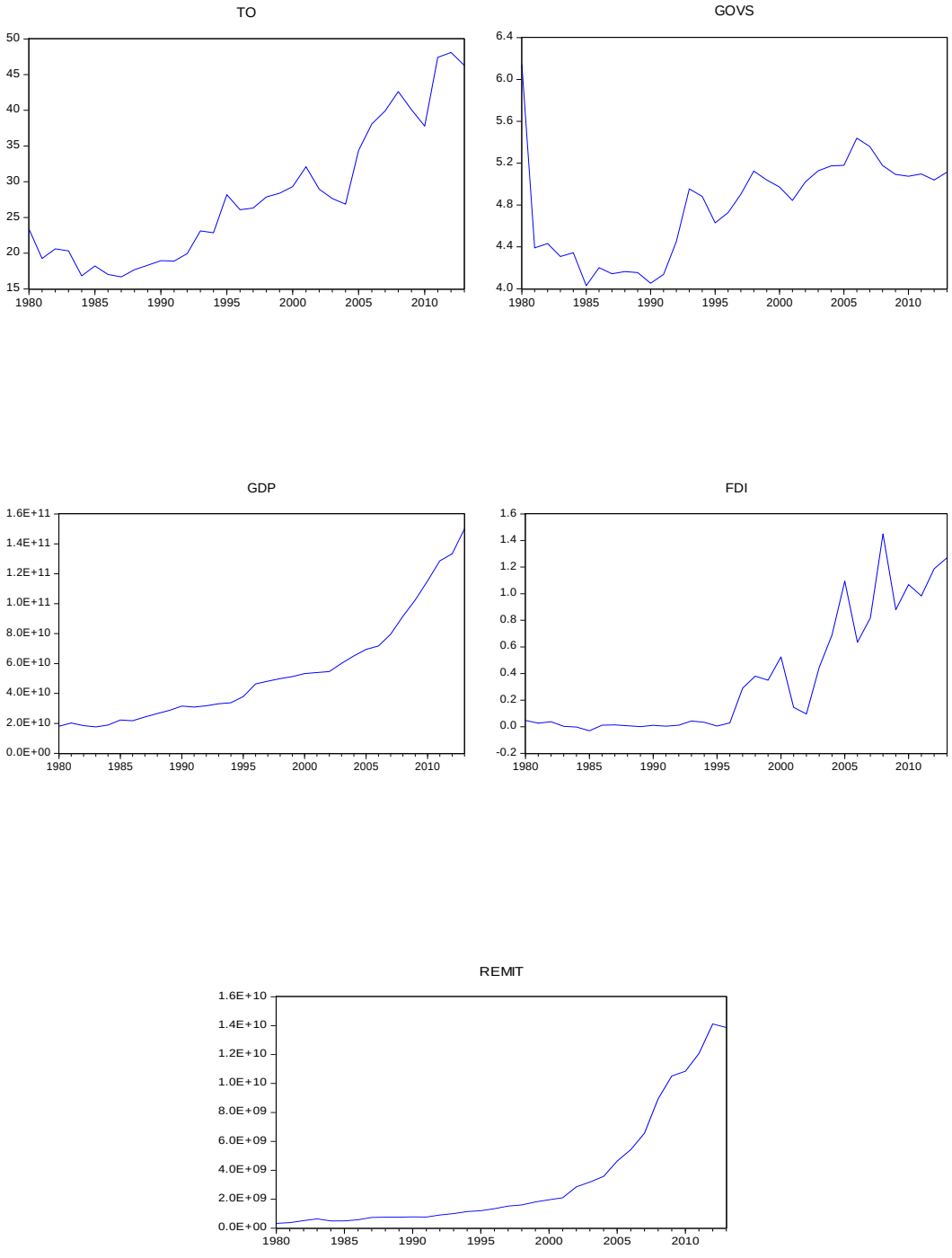

Table A.2: Johansen Cointegration Test Results for Cointegration Between Variables

Sample (adjusted): 1982 2013
Included observations: 32 after adjustments
Trend assumption: Linear deterministic trend
Series: FDI GDP GOVS REMIT TO
Lags interval (in first differences): 1 to 1
Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Eigenvalue	Trace	0.05	Prob.**	
No. of CE(s)		Statistic	Critical Value		
None *	0.5833009610359246	79.62240584940134	69.81888745126442	0.006725449770784388	
At most 1 *	0.5417556230007357	51.60989234994201	47.85612715777864	0.02128960255567714	
At most 2	0.3958050134268336	26.6386071360583	29.79707334049303	0.1107851303132502	
At most 3	0.2085535646463796	10.5151412899148	15.4947128759347	0.2431683213471469	
At most 4	0.09035884145130517	3.03056283217377	3.841465500940406	0.0817066933061476	

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
*denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**	
None	0.5833009610359246	28.01251349945933	33.87686661829449	0.2129269727702286	
At most 1	0.5417556230007357	24.97128521388372	27.5843377897976	0.1042065657121859	
At most 2	0.3958050134268336	16.1234658461435	21.13161629676148	0.2177135133001287	
At most 3	0.2085535646463796	7.48457845774103	14.2646001532375	0.4335173540564054	
At most 4	0.09035884145130517	3.03056283217377	3.841465500940406	0.0817066933061476	

Max-eigenvalue test indicates no cointegration at the 0.05 level					
* denotes rejection of the hypothesis at the 0.05 level					
**MacKinnon-Haug-Michelis (1999) p-values					
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):					
FDI	GDP	GOVS	REMIT	TO	
-2.249641567547298	-5.569005211553579e-11	-3.628993396223048	-3.264899301566101e-10	0.4771587212732754	
-4.710201973049856	2.140434355298474e-10	1.169263056288847	-8.721092389690256e-10	-0.4660728289382996	
6.592636280040651	5.708561257944231e-11	-2.638660720065149	-1.075549694372469e-09	-0.06961810680381438	
2.251038816945624	4.201652220633289e-11	-4.320835106227244	-1.371949903566414e-10	0.1254898687733292	
1.780621135071097	9.65820367366828e-11	-2.35705212345925	-1.167377553588369e-09	0.2724615290850469	
Unrestricted Adjustment Coefficients (alpha):					
D(FDI)	-0.002451724719036014	0.053918587971413176	-0.08648996404246579	-0.04505945699697404	0.02223577428218419
D(GDP)	-222485393.5014865	-918340814.4453659	-1238131229.20519	482810368.9399104	88313717.98097683
D(GOVS)	0.01976271368589514	0.06624647528866989	0.02194666207676115	0.03908728634539139	0.02828391456163406
D(REMIT)	-62054670.69371784	-125846157.3179782	-5542304.217708286	-125724756.6653156	79464674.6083584
D(TO)	-1.7858296456389	-0.2485003161474872	-0.06173365312221462	0.02186472949926943	0.1801516001801797

1 Cointegrating Equation(s)

Normalized cointegrating coefficients (standard error in parentheses)					
FDI	GDP	GOVS	REMIT	TO	
1	2.475507783946797e-11	1.613142932889354	1.451297552758891e-10	-0.2121043317107198	
	1.879124885265648e-11	0.4465621143097196	1.330104061135041e-10	0.05386219664546631	

Adjustment coefficients (standard error in parentheses)					
D(FDI)	0.005515501840126807				
	0.08939581579446503				
D(GDP)	500512389.3930559				
	1161925539.274121				
D(GOVS)	-0.04445902219532553				
	0.07223520806398965				

D(REMIT)	139600766.6530473				
	189685112.640716				
D(TO)	4.017476603387531				
	0.747934025237334				
2 Cointegrating Equation(s):		Log likelihood	-1439.060140057303		
Normalized cointegrating coefficients (standard error in parentheses)					
FDI	GDP	GOVS	REMIT	TO	
1	0	0.9567288147928206	1.592439839652912e-10	-0.102411607151335	
		0.2978582755344321	5.136366975530999e-11	0.03080985846362363	
0	1	26516342317.85716	-0.5701548902786884	-4431120163.33463	
		7107590238.169651	1.225656453876867	735194779.6734143	
Adjustment coefficients (standard error in parentheses)					
D(FDI)	-0.2484519376068889	1.167745648569581e-11			
	0.1996418622840007	8.458989741797552e-12			
D(GDP)	4826083105.525842	-0.1841745997521218			
	2519799275.735011	0.1067659657197034			
D(GOVS)	-0.3564933008076183	1.307903660741821e-11			
	0.1526739371447692	6.468920162196591e-12			
D(REMIT)	732361585.152932	-0.02348071601562422			
	420061272.3453419	0.01779834125490641			
D(TO)	5.187963282808941	4.626308463663828e-11			
	1.715935105135742	7.27055803120345e-11			
3 Cointegrating Equation(s):		Log likelihood	-1430.998407134231		
Normalized cointegrating coefficients (standard error in parentheses)					
FDI	GDP	GOVS	REMIT	TO	
1	0	0	-3.218357205571756e-11	-0.023886676707266679	
			2.273494416819572e-11	0.008907503110672359	

0	1	0	-5.875690300146159	-2254752206.243535	
			0.7782299237258129	304908840.5549462	
0	0	1	2.000854924208197e-10	-0.0820764768761279	
			3.594022707653876e-11	0.01408130506563486	
Adjustment coefficients (standard error in parentheses)					
D(FDI)	-0.8186488124126577	6.740123906357741e-12	0.3001599765756734		
	0.2868391918986978	7.79164242400588e-12	0.1581652297842293		
D(GDP)	-3336465755.583578	-0.2548540794250373	3000624277.149491		
	3484505172.167141	0.0946524013905112	1921381654.968515		
D(GOVS)	-0.2118069401745714	1.433187525614411e-11	-0.05216899645165926		
	0.2431643064645596	6.605266573622052e-12	0.1340825783000835		
D(REMIT)	695823189.2922436	-0.0237971018469938	92672988.06239298		
	676632107.5111851	0.01837989920216545	373099896.3408381		
D(TO)	4.780975761535976	4.273898123138961e-11	6.353095917255286		
	2.762329527696907	7.503536666177961e-11	1.523168719016066		
4 Cointegrating Equation(s):		Log likelihood	-1427.256117905361		
Normalized cointegrating coefficients (standard error in parentheses)					
FDI	GDP	GOVS	REMIT	TO	
1	0	0	0	-0.026366325990940 28	
				0.007301768459840205	
0	1	0	0	-2707456810.276334	
				610673192.2409979	
0	0	1	0	-0.06666047994776332	

				0.0193472522423 1839	
0	0	0	1	- 77047049.947737 64	
				108289807.96799	
Adjustment coefficients (standard error in parentheses)					
D(FDI)	-0.9200793991833376	4.846882230839102 e-12	0.4948544602357347	5.2983750870581 44e-11	
	0.2863889760066449	7.640887724954681 e-12	0.208512876491815	4.7021960267638 06e-11	
D(GDP)	-2249640873.876003	- 0.234568066837025 5	914480285.3834024	2.1389652506391 53	
	3507893114.313829	0.093590953853585 71	2554012008.040549	0.5759579608977 643	
D(GOVS)	-0.1238199413620267	1.59741870908605e -11	-0.2210587154999825	- 9.3193795721774 55e-11	
	0.2423535118592229	6.46601695248852e -12	0.1764517216769099	3.9791815188802 89e-11	
D(REMIT)	412811881.7875766	- 0.029079618877307 74	635908930.383764	0.1532216519722 065	
	665378510.8968455	0.017752368010989 27	484445976.9279759	0.1092479268531 821	
D(TO)	4.830194116360851	4.36576611239313e -11	6.258622026446678	8.6317269827048 29e-10	
	2.859340293872021	7.628749701737165 e-11	2.081816408779552	4.6947262972506 03e-10	