Emigrant's Remittances, Dutch Disease and Capital Accumulation in Bangladesh

Hiroyuki Taguchi, Saitama University

255 Shim o-Okubo, Sakura-ku, Saitama, Japan, 338-8570,

Tel: +81-48-858-3324, Fax: +81-48-858-3696, E-mail tagusaya0710@s3.wh.qit.ne.jp

and

Rifah Tamannah Shammi, Saitama University

255 Shimo-Okubo, Sakura-ku, Saitama, Japan, 338-8570,

Tel: +81-48-858-3324, Fax: +81-48-858-3696

Abstract

This paper examines varying macroeconomic impacts of international emigrant remittances in Bangladesh since 1976 by using a vector auto-regression (VAR) framework. Bangladesh has recorded better economic performance during last two decades, 1996-2014, compared to earlier two decades, 1976-1995. The time-series analysis therefore uncovers some transition in the remittance impacts composed of the "Dutch Disease" effect and the capital accumulation effect. The empirical results reveal the existence of the Dutch Disease effect for the first period, 1976-1995, but turned to show the positive impact on capital accumulation for the second period, 1996-2014. We speculate that the recent manufacturing-oriented policies together with institutional improvements have contributed to the transformation in the remittance impact towards a positive direction between two periods.

Keyword: Bangladesh, Emigrant's remittances, Dutch Disease, Capital accumulation, Vector auto-regression estimation

JEL Classification Codes: F22; F39; O53

Note: The authors thank the anonymous referee for useful comments and suggestions which helped us improve the paper significantly. However, the authors are solely responsible for any errors in the article.

Emigrant's Remittances, Dutch Disease and Capital Accumulation in Bangladesh

1. Introduction

For a large number of developing economies, international migrant remittances have become one of the major and important sources of foreign-currency earnings. The remittances received by low and middle income economies over last few decades have increased significantly. As the World Bank data[1] shows, the total remittance to low and middle income countries increased by around 98 times, from 4.3 billion US dollars in 1976 to 421.3 billion US dollars in 2015, while their GDP grew only by 17 times during the same period. The remittance-GDP ratio averaged in their economies reached about 1.6 percent in 2015.

These rising trends in remittance flows have several micro and macro-economic implications on the recipient country. At household level, the positive impacts of remittance include increase in income, standard of living and reduction in incidence of poverty. There have been intensive studies showing positive impacts of remittances on household incomes, school attendance, poverty alleviation, entrepreneurship and so forth (Adams and Page, 2005; Acosta, et al., 2008; Acharya and Roberto, 2013). Macroeconomic implications on the recipient country include improvement external stability, capital accumulation and growth. However, remittances could cause "Dutch Disease", i.e., remittances would lead to a decline in the production of tradable sectors relative to non-tradable ones through a real exchange rate appreciation. Therefore, studying impacts of remittance on the economy has attracted lot of attention as it is useful for both academics and also policy makers to formulate appropriate policies, not only to attract remittances but also to manage remittances for positive economic implications.

This paper examines macroeconomic impacts of emigrant remittances in case of Bangladesh using time series framework, particularly vector auto-regression (VAR) estimation framework. Here the objective is to empirically find out whether remittances cause 'Dutch Disease' or contribute to capital accumulation in case of Bangladesh. Is

[1] The data of remittances and GDP are retrieved from World Bank Data: http://data.worldbank.org/

there any change in the impacts of remittance over a period of time? The reasons we focus on Bangladesh as an analytical sample of remittance recipient are as follows. First, Bangladesh is one of the largest recipients of remittances in the world. Table 1 reports that Bangladesh received 15.4 billion US dollars as the value of remittances in 2015, which accounted for 3.7 percent of the total remittances received by low and middle income group and ranked eighth among the group. It also reveals that Bangladesh had 7.9 percent of remittance-GDP ratio, which is far higher than 1.6 percent of the average ratio in the low and middle income group. According to Figure 1, it is found that the remittance-GDP ratio has been far exceeding the foreign aid-GDP ratio and inward foreign direct investment-GDP ratio in Bangladesh. Second, a long term time-series analysis for about four decades in Bangladesh enables us to have an insight on the transition in macroeconomic impacts of remittances. Bangladesh has recorded better performance of economic growth during the recent two decades than that in the previous two decades since 1976, whereas she has continued to increase the dependence on emigrant's remittances in her economy. Figure 2 tells us that Bangladesh has achieved high and stable economic growth of 5.6 percent on an average between 1995 -2015 compared to annual average growth of 4.2 percent with high fluctuation during 1976-1995. The time-series analysis of her different economic performances between two phases could uncover some transition in the remittance effects: the "Dutch Disease" effect and the capital accumulation effect.

The rest of the paper is structured as follows. Section 2 describes the literature review on micro- and macro-economic impacts of remittances, in particular, with a focus on their Dutch Disease effects. Section 3 represents a theoretical framework for analyzing the Dutch Disease effect and the capital accumulation effect of remittances in small open economies. Section 4 conducts the empirical analysis of remittance impacts in Bangladesh, containing the descriptions of data for key variables, methodologies for VAR estimation, and estimation outcomes with its interpretation. The last section summarizes and concludes.

2. Literature Review and Contribution

Literature on the empirical studies on the economic impacts of emigrant's remittances has so far focused on microeconomic aspects such as poverty alleviation

and household incomes. From this perspective, the favorable effects of remittances for the recipient developing economies were identified based on school attendance (e.g., Gorlich, et al., 2007), on poverty and income distribution (e.g., Adams and Page, 2005; Acosta, et al., 2008), on financial development (e.g., Aggarwal, et al., 2006; Chowdhury, 2011), and on entrepreneurship of micro enterprises (e.g., Woodruff and Zenteno, 2001; Yang, 2005).

For the macroeconomic viewpoint, the arguments have been focused on whether remittances would cause the Dutch Disease. The theoretical framework of analyzing the Dutch Disease effect of "capital inflows" in small open economies has been generally represented by the Salter-Swan-Corden-Dornbusch model, which was initially demonstrated by Corden and Neary (1982). This model has also been applied to examine the economic impacts of emigrant's remittances, since they constitute a major component of capital inflows. There have been, however, relatively few empirical studies of remittance impacts by using the Dutch Disease model.

Acosta, et al. (2009) examined the remittance effects in El Salvador by applying a dynamic stochastic general equilibrium model with a Bayesian technique, based on the Dutch Disease concept. They extended the Dutch Disease model by adding another transmission mechanism of remittances through labour supply. Their empirical results support the existence of the Dutch Disease effects of remittances, i.e., the reallocation of labour away from tradable sectors toward non-tradable sectors. However, Bourdet and Falck (2007) argued, from the viewpoint of different time-horizon, that in the longer-term, emigrants' remittances could boost capital accumulation through their domestic saving and investment, thereby resulting in an increase in the production of both tradables and non-tradables. They found, from the case study of Cape Verde, that the Dutch Disease effects of remittances was not so large, and suggested that growth- and export-oriented policies could contribute to limiting the Dutch Disease effect.

In a comprehensive empirical study, Lartey, et al. (2012) applied the Dutch Disease model to the remittance assessment for 109 developing and transition countries for the period 1990-2003. They identified their Dutch Disease effects that favored the nontradable sector sacrificing tradable goods production, accompanied with real exchange rate appreciation. Fayad (2011), on the other hand, sampled 27 countries in the 1980s and 28 countries in the 1990s, and identified a transmission channel through which remittances were conductive to the relative growth of exporting industries in the

manufacturing sector of recipient economies, contrary to what the standard Dutch Disease theory implied.

In this way, even among the limited studies on the application of the Dutch Disease model to remittance evaluation, the theoretical message has remained unsettled in the time horizons between short and long term, and the empirical evidence has also been inconclusive. In this context, this study contributes to enriching evidence on remittance impacts by analyzing different growth phases in the long-run horizon of Bangladesh's dataset so that the study can uncover some transition of remittance impacts. Another contribution of this study is to adopt a VAR estimation for the remittance analysis, which enables us to avoid the endogeneity problem of remittance variables.

3. Theoretical Framework of the Dutch Disease

This section describes the theoretical framework for analyzing the Dutch Disease effect of "capital inflows" in small open economies by the Salter-Swan-Corden-Dornbusch model. We first introduce the basic framework that is composed of "spending effect" and "resource movement effect" based on Corden and Neary (1982). Then we add "capital accumulation effect" from the longer-term perspective by following Bourdet and Falck (2006). This model could, of course, be applied to examine the effects of emigrant's remittances, since they constitute a major component of the origin of "capital inflows".

In Figure 3, the horizontal axis exhibits non-tradable while the vertical one shows tradable. The curve P-P represents the initial transformation curve between tradable and non-tradable. Point A is an initial equilibrium, where the transformation curve is tangential to the social indifference curve (not drawn) and the slope of the curves, i.e., the relative price of non-tradable to tradable, is fixed at that point.

The transformation curve shifts upwards to P-PF with the introduction of the capital inflows (emigrant's remittances in this study) shown at point F, since the supply of non-tradable is constant and the availability of tradable expands with higher disposal income. There would be excess demand for non-tradable with unchanged relative price of non-tradable to tradable shown at point A', if we assume positive income elasticity of non-tradable. The price of non-tradable, therefore, has to go up to clear the market, and the relative price of non-tradable to tradable also rises, since the price of tradable is

determined in the world market. This effect is referred to as an appreciation of real exchange rate (spending effect). The rise of relative price, then, encourages the movement of production factors from the tradable sector to the non-tradable sector, and leads to an expansion in the output of non-tradable and a decline in that of tradable from point A' to point B (resource movement effect).

Bourdet and Falck (2006) added the following story from the longer-term perspective. They considered the role of capital accumulation, and argued that the transformation curve could shift further towards P'-P' when an economy utilized capital inflows for domestic capital accumulation. As a consequence, the relative price of non-tradable may be expected to fall from point B to point C, thereby facilitating the recovery of tradable sector. Thus, the "capital accumulation effect" may offset or mitigate the economic damages caused by original Dutch Disease effect.

To sum up, the basic theory tells us that capital inflows reduce the production of tradable through real currency appreciation by the sectoral resource movement. In the longer-term, however, capital inflows would lead to the increase in the outputs of both tradable and non-tradable due to capital accumulation, i.e., the intertemporal resource movement. In short, capital inflows are not compatible with economic growth under the Dutch Disease, but could be friendly with growth under the capital accumulation in the longer-term.

4. Empirics

This section represents an empirical analysis of macroeconomic impacts of emigrant's remittance inflows in Bangladesh. In the first place, we discuss what kinds of theoretical models could be applied for studying the case of Bangladesh. In fact, it should be noted that there would be the variation in remittance effects between small open economies and large economies. We assume that Bangladesh belongs to a group of small open economies, since her economic size is not large and she is classified into Least Developed Countries category.[2] Even under this assumption, there could be several theoretical approaches to examine capital-inflow effects. Brecher and Alejandro (1977), for instance, argued that for a small tariff-imposing country the capital inflow

[2] See the United Nations Classification: http://data.worldbank.org/region/least-developed-countries:-un-classification.

must cause the reduction of host-country welfare, namely, immiserizing growth, assuming that the foreign capital receives the full value of its marginal product. This study, however, focuses on the impacts of remittance revenues on the resource allocation between tradable and non-tradable through a change in their relative price, i.e., real exchange rate. We thus apply the Salter-Swan-Corden-Dornbusch model (described in Section 3) to examine the Dutch Disease effect of remittances in Bangladesh, one of the small open economies. In this analysis, the relative price between tradable and non-tradable, namely, real exchange rate is a key variable to be examined. The following empirical study thus focuses on the interaction of sectoral variables with a price index. This section will be followed by data for key variables, methodologies for a VAR model estimation, and the estimation outcomes with its interpretation.

4.1 Data for Key Variables

At the beginning, we identify economic variables for a VAR model estimation in Bangladesh. For all the variables, we sample the time-series data for the maximum data-available period, i.e., 1976 - 2014. Since the purpose of analysis is to examine the economic impact of emigrant's remittances based on the theoretical framework in Section 3, we pick up the following four variables: remittances-GDP ratio (*roy*), GDP deflator (*def*), manufacturing-services ratio (*mos*), and investment-consumption ratio (*ioc*). Regarding their data sources, remittances-GDP ratio is retrieved from World Development Indicators (WDI) of the World Bank[3], and GDP deflator is taken from International Financial Statistics of the International Monetary Fund [4]. Manufacturing-services ratio is derived by dividing "manufacturing in value-added term" by "services in value-added one", and investment-consumption ratio is produced by dividing "gross fixed capital formation" by "final consumption expenditure", in the dataset of UNCTAD Stat.[5]

GDP deflator and manufacturing-services ratio are used for examining the Dutch Disease effect. GDP deflator is used as a proxy for real exchange rate. The reason for using a price index of GDP deflator instead of calculating real exchange rate is that

[3] See the website: http://data.worldbank.org/
[4] See the website: http://www.imf.org/en/data
[5] See the website: http://unctadstat.unctad.org/EN/.

Bangladesh has adopted “De-facto peg to the US dollar”, namely, a fixed exchange rate arrangement, as her currency regime during the sample period, according to Ilzetzki et al. (2011). Using a price index is justified since we follow the argument of Frankel (2010) in the context of the Dutch Disease that the real appreciation in the currency takes the form of inflation if the country has a fixed exchange rate. As a price index, we choose not consumer prices but GDP deflator, since the data of consume prices are not available before 1985 in Bangladesh. Moreover, GDP deflator is broad based and covers overall change in prices across sectors than narrow consumer prices. In the combination between remittances-GDP ratio and GDP deflator as a proxy of real exchange rate, the “spending effect” in the Dutch Disease effect could be identified if GDP deflator were positively affected by remittances-GDP ratio. On the other hand, manufacturing-services ratio is a proxy of a ratio of tradable production relative to non-tradable production as in Lartey, et al. (2012). The “resource movement effect” could be suggested if manufacturing-services ratio were negatively influenced by GDP deflator. Investment-consumption ratio is for examining the capital accumulation effect presented by Bourdet and Falck (2006). The capital accumulation effect could be suggested, if the ratio was positively affected by remittances-GDP ratio.

Figure 4 displays the overviews of three key variables out of four above: remittance-GDP ratio, manufacturing-services ratio and investment-consumption ratio in Bangladesh for the period from 1976 to 2014. While the remittance-GDP ratio keeps an increasing trend overtime on the whole, both variables of manufacturing-services ratio and investment-consumption ratio represent somewhat different trends between the first half and the second half in the sample period. Manufacturing-services ratio has a declining trend in the first half, and levels off on the whole in the second half. Investment-consumption ratio has no trend in the first half and a clearly rising trend in the second half. This observation implies the existence of some structural change in the middle of the sample period, and some transition in the remittance impacts composed of the “Dutch Disease” effect and the capital accumulation effect. The observation, however, is statistically tested in a more sophisticated manner, i.e., VAR model estimation in the following sub-section 4.2. For the estimation, we convert all the data into natural logarithm form.

4.2 Methodologies for a VAR Model Estimation

We herein conduct a VAR model estimation. The reason why we adopt a VAR model for our impact analysis of remittance is that the VAR model allows for potential endogeneity between the variables of concerns, and also for tracing out the dynamic responses of variables to exogenous shocks overtime.

Before specifying a VAR model, we investigate the stationary property of the data, by employing more effective Ng-Perron unit root test for each variable. The empirical literature dealing with time series analysis mostly has used the augmented Dickey-Fuller (ADF) test (Said & Dickey, 1984) and the Philips-Perron (PP) (Philips & Perron, 1988) test. However, it is well-known by now that both the ADF and PP tests suffer from size and power problems depending on the nature of the process (highly persistent but stationary series, negative MA terms, etc.). Accordingly, Ng and Perron (2001) introduced a new unit root test, which used detrended data and a lag selection procedure that improved on previous methods. This study adopts the Ng and Perron test on the null hypothesis that a level of each variable has a unit root, by including "intercept" and "trend and intercept" in the test equation. This test constructs four test statistics: modified forms of Phillips and Perron and statistics (MZa, MZt), the Bhargava (1986) statistic (MSB), and the Point Optimal statistic (MPT). Table 2 reports the result of the Ng and Perron unit root test for the data for all four variables, i.e., remittances-GDP ratio (*roy*), GDP deflator (*def*), manufacturing-services ratio (*mos*), and investment-consumption ratio (*ioc*). The test rejected a unit root in their levels at the conventional level of significance by more than 95 percent, thereby their level data showing stationary property. We thus finally utilize the level data of all four variables for a VAR model estimation.

Based on the simple observation that implied a structural change in the middle of the sample period in the previous section, we herein identify a breakpoint by conducting Chow's breakpoint test. In order to obtain the same size of sample periods for the first half and the second half, we suppose that the year 1995 would be a breakpoint for the structural change. We then examine the F-statistics with probabilities for the hypothesis of parameter stability over different periods of 1976-1995 and 1996-2014, for the two combinations of variables: the one for remittances-GDP ratio and manufacturing-services ratio, and the other for remittances-GDP ratio and investment-consumption ratio. Table 3 reports the result of Chow's breakpoint test, and

it indicates that the hypothesis of parameter stability over the first and second halves is rejected for the both combinations of variables at high significance level. The structural change in the remittance-related variables is, thus, justified at a breakpoint of 1995.

We now specify a VAR model equation for estimation in the following way.

$$y_t = \mu + Vy_{t-i} + \varepsilon_t$$

where y_t is a column vector of the endogenous variables with year *t*, i.e., $y_t = (roy_t\ mos_t)'$ for examining the total Dutch Disease effect, and $y_t = (roy_t\ ioc_t)'$ for examining the capital accumulation effect. The former vector for the Dutch Disease analysis is further decomposed into $(roy_t\ def_t)'$ for examining the "spending effect", and $(def_t\ mos_t)'$ for examining the "resource movement effect". The other vectors are: μ is a constant vector; V is a coefficient matrix; y_{t-i} is a vector of the lagged endogenous variables, and ε_t is a vector of the random error terms in the system. Regarding the lag interval, we take the lags from one year to three year by i = 1, 2, 3 under the limited number of observations by considering the lagged effects of remittances. Based on the specification above, we conduct the VAR model estimation for the different periods of 1976-1995 and 1996-2014 on the four combinations of variables: $(roy_t\ mos_t)'$, $(roy_t\ def_t)'$, $(def_t\ mos_t)'$, and $(roy_t\ ioc_t)'$. We then examine the Granger causalities and impulse responses from *roy* to *mos*, from *roy* to *def*, from *def* to *mos*, and from *roy* to *ioc*.

4.3 Estimation Outcomes and Its Interpretation

Table 4, Table 5 and Figure 5 respectively report estimation outcomes of the VAR model, the bilateral Granger causalities and the impulse responses.

Regarding the Granger causalities shown in Table 5, as far as the causality between remittance-GDP ratio (*roy*) and manufacturing-services ratio (*mos*) as the total effect of the Dutch Disease was concerned, it was in 1976-1995, but not in 1996-2014, for the lag interval from one year to three year, when the causality from *roy* to *mos* was identified at a conventional level of significance. Considering the estimated VAR model in Table 4.1a, this causality was supposed to be a "negative" one as was expected. Then the causality from *roy* to *mos* as the total Dutch Disease effect was decomposed into the

causality from *roy* to *def* as the spending effect and the one from *def* to *mos* as the resource movement effect, focusing on the case of one-year lag interval that showed the most robust performance. Putting together the estimated VAR model in Table 4.1, the positive causality from *roy* to *def* and the negative causality from *def* to *mos* were verified in 1976-1995 as were expected, whereas the causality from *def* to *mos* was insignificant in 1996-2014. As for the causality from remittance-GDP ratio (*roy*) and investment-consumption ratio (*ioc*), on the other hand, it was during1996-2014 only for the three-year's lag interval when the causality was verified at a conventional level of significance, which was supposed to be a "positive" one judging from the model in Table 4.2b.

The impulse response analysis in terms of accumulated response to one standard deviation shock over eight-year horizons in Figure 5 focused on the four cases where the Granger causalities were identified above: the causalities from *roy* to *mos*, from *roy* to *def* and from *def* to *mos* during 1976-1995 with the one-year lag interval, and the one from *roy* to *ioc* in 1996-2014 with three-year's lag interval. The analysis of the Dutch Disease effect in 1976-1995 verified the negative response of manufacturing-services ratio (*mos*) to the shock of remittances-GDP ratio (*roy*) as the total effect, the positive response of GDP deflator (*def*) to the shock of remittances-GDP ratio (*roy*) as the spending effect, and the negative response of manufacturing-services ratio (*mos*) to the shock of GDP deflator (*def*) as the resource movement effect, with a 95 percent error band over eight-year horizons. The analysis of the capital accumulation effect in 1996-2014 identified the positive response of investment-consumption ratio (*ioc*) to the shock of remittance-GDP ratio (*roy*) after three year lags.

The implications of the estimation outcomes above are summarized as follows. First, we could argue that Bangladesh suffered the Dutch Disease through the spending effect and the resource movement effect from getting emigrant's remittances in 1976-1995, but not in 1996-2014. Instead, we could also argue that Bangladesh enjoyed the capital accumulation effect by remittances in 1996-2014, but not in 1976-1995. In short, Bangladesh experienced a transition of remittance effects from the Dutch Disease effect in the first half of the sample period to the capital accumulation effect in the second half.

The next question that arises is what makes the transition of remittance effects towards a positive direction in Bangladesh. We speculate that the

manufacturing-oriented policies together with institutional improvements in the recent two decades have contributed to the transformation in the remittance impacts.

Bangladesh has transformed her policy regime from import-substitution strategy to export-orientation one for manufacturing development since the 1990s. Nath (2012) argued that whereas in the 1970s and 1980s manufacturing sector performance was constrained by the dominance of poor performing nationalized enterprises under the import-substitution regime, since the 1990s the Government has changed its economic policy stance towards private-sector-driven growth and trade openness for export promotion. Nath (2012) also emphasized that under this policy-stance transformation one important structural change in manufacturing exports is the emergence of a dynamic export-oriented readymade garments (RMG) sector; by 1990 the RMG exports had overtaken the exports of traditional products such as jute goods and by the end of the 1990s the RMG exports reached more than 50 percent as a share of total exports. The RMG development has also been supported by the textile-promoting policy. Bhattacharya, et al. (2002) showed the fact that since 1995 the Government has launched the initiatives to identify the textile sector as a "thrust" sector and to reinforce the backward-linkage industries such as yarn and fabric to satisfy the need of the growing RMG sector. The subsequent industrial policies have continuously been facilitating manufacturing activities through their diversification under the export-oriented policy regime. According to Bhuyan (2010), the latest industrial policy in 2010 envisaged a clear target on manufacturing: an increase in the industry sector's share in GDP from the present 28 percent to 40 percent by 2021. In sum, the transformation in industrial policy regime since the mid of the 1990s seems to be consistent with a structural breakpoint of 1995 in the statistical analysis in Section 4.2.

The government policy-change requires institutional development. Therefore all these policy measures for manufacturing and exports sectors might have been accompanied with institutional improvement. Institutional quality in an economy affects its growth momentum as Van der Ploeg (2011) argued that with good institutions the "resource curse" could be turned into a "blessing". Table 6 represents the changes in the Worldwide Governance Indicators published by the World Bank for the period 1996-2005 vis a vis 2006-2015 in Bangladesh.[6] The index takes the value of -2.5 as the

6 Regarding the Worldwide Governance Indicators, see http://data.worldbank.org/data-catalog/worldwide-governance-indicators. Since there is no data before 1995 in this indicators, we focus only on the trend in the post-1996 period.

worst quality and of 2.5 as the best one. According to the Table, we found improvements in the majority of the indexes namely: “control of corruption”, “regulatory quality”, “rule of law” and “voice and accountability” and in the average of all the indexes. We can speculate, therefore, that the improvements of institutional quality have also contributed to the transition of remittance effects towards a positive direction in Bangladesh. Moreover, the per capita income of Bangladesh was very low and increasing at a gradual rate during first two decades after its independence. Therefore, it is logical to believe that remittance in first period would have led to positive spending effect leading ‘Dutch Disease’. However, improved per capita income and higher growth over last two decades along with wide well designed economic policies and institutional development would have led to productive use of remittance.

5. Concluding Remarks

This paper examined macroeconomic impacts of international emigrant remittances in Bangladesh by using a vector auto-regression (VAR) estimation as an analytical framework. Bangladesh has recorded better performance of economic growth during the recent two decades than that in the previous two decades since 1976, whereas she has continued to increase the dependence on emigrant’s remittances in her economy. The time-series analysis suggests some transition in the remittance impacts composed of the “Dutch Disease” effect and the capital accumulation effect. As a matter of fact, the VAR estimations identified the existence of the Dutch Disease effect in the previous phase for 1976-1995, but turned to show the positive effect of capital accumulation in the current phase for 1996-2014. We speculate that the recent manufacturing-oriented policies together with institutional improvements have contributed to the transformation in the remittance impacts between two analytical phases.

References

Acosta, P.A., Calderon, C., Fajnzylber, P. and Lopez, H. (2008). What is the Impact of International Migrant Remittances on Poverty and Inequality in Latin America? *World Development, 36*, 89-114.

Acosta, P.A., Lartey, E.K.K. and Mandelman, F.S. (2009). Remittances and the Dutch Disease. *Journal of International Economics, 79*, 102-116.

Acharya, C P., and Roberto Leon-Gonzalez. (2013) "The impact of remittance on poverty and inequality: A micro-simulation study for Nepal." *Asian Journal of Empirical Research* 3.9: 1061-1080.

Aggarwal, R., Demirguc-Kunt, A. and Peria, M. (2006). Do Workers' Remittances Promote Financial Development? *World Bank Policy Research Working Paper No. 3957*, World Bank.

Adams, R. and Page, J. (2005). Do International Migration and Remittances Reduce Poverty in Developing Countries? *World Development, 33*, 1645-69.

Bhargava, A. (1986). On the theory of testing for unit roots in observed time series. *Review of Economic Studies, 53*, 369–384.

Bhattacharya, D., Rahman, M. and Raihan, A. (2002). Contribution of the RMG Sector to the Bangladesh Economy. *Occasional Paper Series of The Centre for Policy Dialogue (CPD), 50*.

Bhuyan, A.R. (2010). Bangladesh Industrial Policy 2010: A Critical Appraisal. *Thoughts on Economics, 20(3)*, 1-16.

Bourdet, Y. and Falck, H. (2006). Emigrants' Remittances and Dutch Disease in Cape Verde. *International Economic Journal, 20(3)*, 267-284.

Brecher, R.A. and Alejandro, C.F. (1977). Tariffs, foreign capital and immiserizing growth. *Journal of International Economics, 7(4)*, 317-322

Chowdhury, M. (2011). Remittances Flow and Financial Development in Bangladesh. *Economic Modelling, 28 (6)*, 2600-8.

Corden, W.M. and Neary, J.P. (1982). Booming sector and de-industrialization in a small open economy. *Economic Journal, 92*, 825–848.

Fayad, G. (2011). Remittances: Dutch disease or export-led growth? *OxCarre (Oxford Centre for the Analysis of Resource Rich Economies) Research Paper 57*.

Frankel, J.A. (2010). The natural resource curse: a survey. *NBER Working Paper*, No. w15836

Gorlich, D., Omar, M. and Christoph, T. (2007). 'Explaining Labour Market Inactivity in Migrant-Sending Families: Housework, Hammock, or Higher Education? *Kiel Working Paper 1391*, Kiel Institute for the World Economy, Kiel, Germany.

Ilzetzki, E., Reinhart, C. M., & Rogoff, K. S. (2011). The country chronologies and background material to exchange rate arrangements into the 21st century: Will the anchor currency hold. http://personal.lse.ac.uk/ilzetzki/data/ERA-Country_Chronologies_2011.pdf.

Lartey, E.K.K., Mandelman, F.S. and Acosta, P.A. (2012). Remittances, Exchange Rate Regimes and the Ditch Disease: A Panel Data Analysis. *Review of International Economics, 20(2)*, 377-395.

Ng, S. and Perron, P. (2001). Lag length selection and the construction of unit root tests with good size and power. *Econometrica, 69(6)*, 1519–1554.

Nath, N.C. (2012). Manufacturing Sector of Bangladesh-Growth, Structure and Strategies for Future Development. Paper for Presentation at the Biennial Conference "Global Economy and Vision 2021" during 12-14 July, 2012, to be held at the Institution of Engineers, Dhaka.

Phillips, P. and Perron, P. (1988). Testing for unit root in time series regression. *Biometrika, 74*, 335–346.

Said, S. and Dickey, D.A. (1984). Testing for unit roots in autoregressive-moving average models of unknown order. *Biometrika, 71*, 599–607.

Van der Ploeg, F. (2011). Natural Resources: Curse or Blessing? *Journal of Economic Literature 49*, 366-420.

Woodruff, C. and Zenteno, R. (2001). Remittances and Microenterprises in Mexico. *Graduate School of International Relations and Pacific Studies Working Paper No. 43*, University of California, San Diego.

Yang, D. (2005). International Migration, Human Capital, and Entrepreneurship: Evidence from Philippine Migrants' Exchange Rate Shocks. *World Bank Policy Research Working Paper No.*

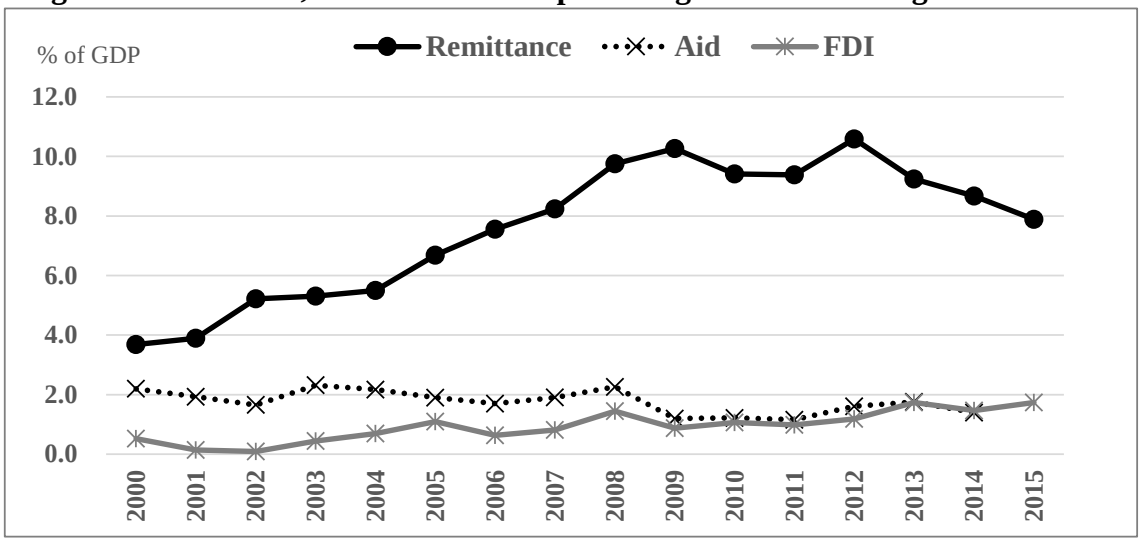
3578, World Bank.

Table 1 Major Recipients of International Emigrant Remittances in 2015

Country	USD mil.	% of Low & Middel Incomers	% of GDP
India	68,910	16.4	3.3
China	44,445	10.5	0.4
Philippines	29,799	7.1	10.2
Mexico	26,164	6.2	2.3
Nigeria	21,060	5.0	4.4
Pakistan	19,306	4.6	7.1
Egypt	18,325	4.3	5.5
Bangladesh	15,388	3.7	7.9
Vietnam	13,200	3.1	6.8
Indonesia	9,659	2.3	1.1

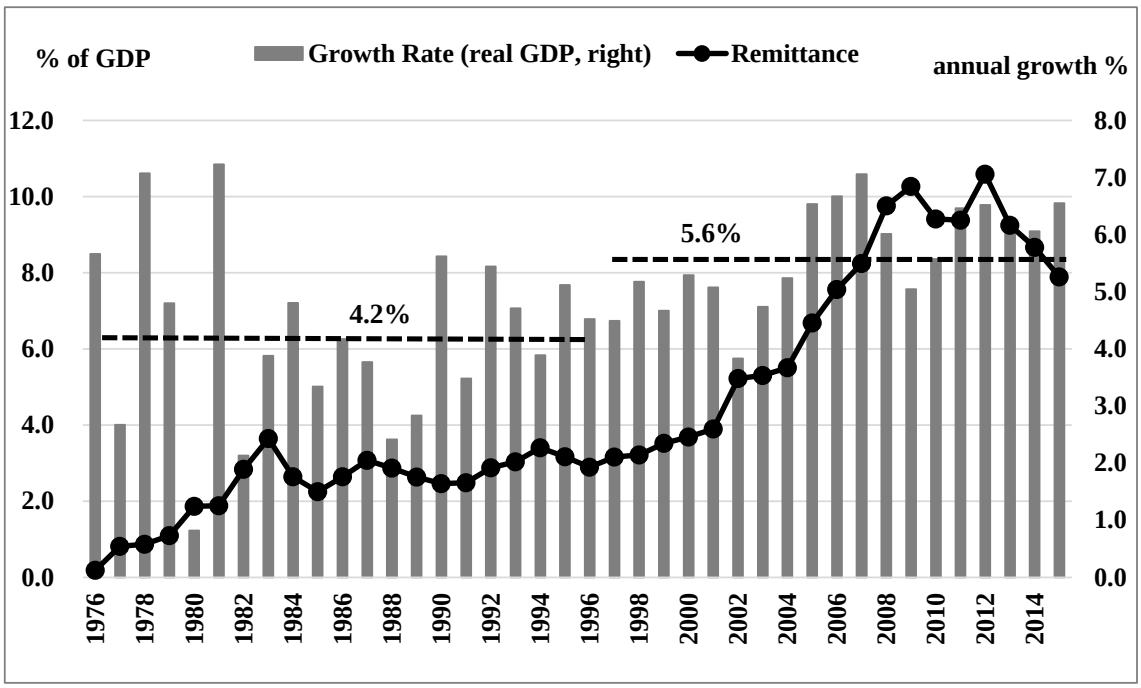
Source: World Bank Data: http://data.worldbank.org/

Figure 1 Remittance, Aid and FDI as a percentage of GDP in Bangladesh



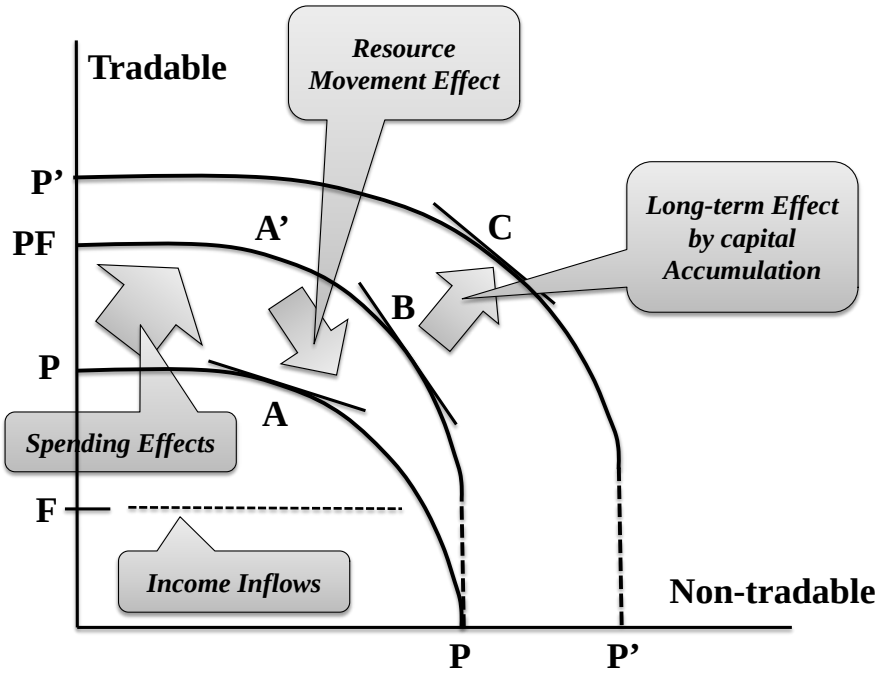
Sources: World Bank Data: http://data.worldbank.org/

Figure 2 GDP Growth Rate in Bangladesh



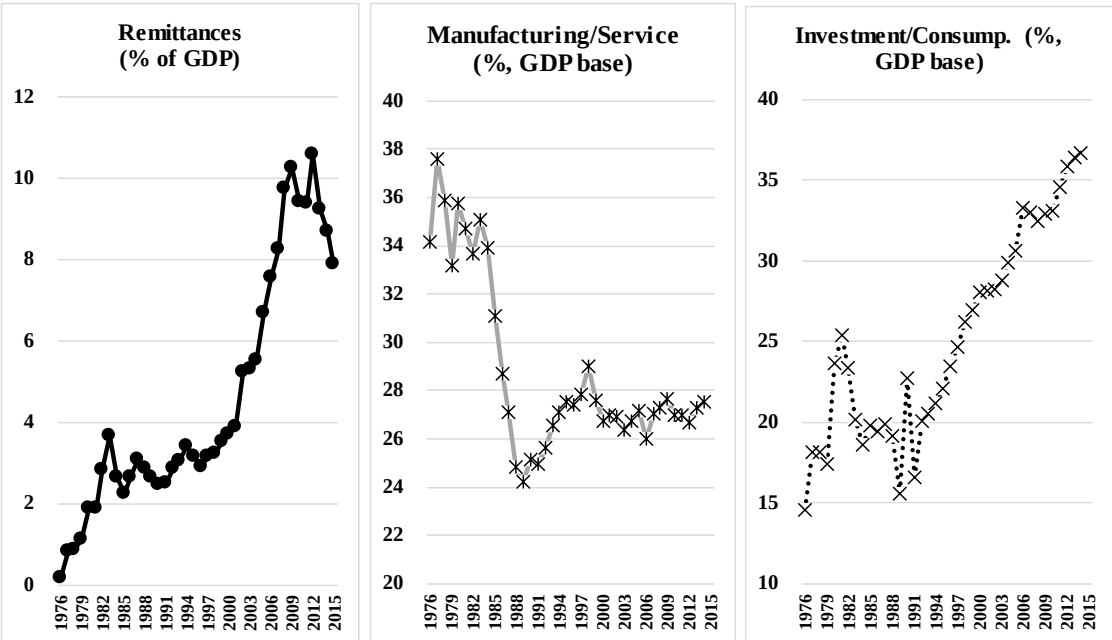
Sources: World Bank Data: http://data.worldbank.org/

Figure 3 Theoretical Framework of the Dutch Disease



Sources: This diagram is based on Corden and Neary (1982) and Bourdet and Falck (2006).

Figure 4 Overviews on Key Variables in Bangladesh



Source: World Development Indicators (World Bank) and UNCTAD Stat.

Table 2 Ng and Perron Unit Root Test

Intercept	MZa	MZt	MSB	MPT
roy	-16.27 ***	-2.76 ***	0.17 ***	1.81 **
def	-33.71 ***	-3.876 ***	0.11 ***	1.388 ***
mos	-25.07 ***	-3.52 ***	0.14 ***	1.04 ***
ioc	-308.15 ***	-12.37 ***	0.04 ***	0.12 ***
Trend & Intercept	MZa	MZt	MSB	MPT
roy	-18.88 **	-3.01 **	0.15 **	5.18 **
def	-31.14 ***	-3.76 ***	0.12 ***	3.94 ***
mos	-243.37 ***	-11.11 ***	0.04 ***	0.39 ***
ioc	-31.05 ***	-3.94 ***	0.12 ***	2.93 ***

Note: ***, **, * denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively.

Table 3 Chow's Breakpoint Test

	Breakpoint	F-statistic	Probability
roy & mos	1995	35.38	0.00
roy & ioc	1995	18.78	0.00

Table 4 Estimated VAR Model

4.1a) Model for Examining Dutch Disease Effect in 1976-1995

roy & mos	*roy*	*mos*
roy $_{-1}$	0.503 *** [6.603]	-0.043 ** [-2.277]
mos $_{-1}$	-0.448 [-1.270]	0.823 *** [9.342]
C	2.011 [1.634]	0.619 * [2.018]
adj. R^2	0.794	0.892
roy $_{-2}$	0.427 *** [5.359]	-0.058 ** [-2.195]
mos $_{-2}$	-0.156 [-0.425]	0.666 *** [5.404]
C	1.138 [0.888]	1.144 ** [2.662]
adj. R^2	0.694	0.771
roy $_{-3}$	0.309 *** [4.452]	-0.065 * [-2.020]
mos $_{-3}$	-0.023 [-0.071]	0.551 *** [3.653]
C	0.827 [0.733]	1.524 *** [2.897]
adj. R^2	0.597	0.644

roy & def	*roy*	*def*
roy $_{-1}$	0.369 *** [3.348]	0.125 ** [2.496]
def $_{-1}$	0.250 * [1.998]	0.798 *** [13.952]
C	-0.180 [-0.561]	0.621 *** [4.237]
adj. R^2	0.818	0.978

def & mos	*def*	*mos*
def $_{-1}$	0.919 *** [12.990]	-0.068 * [-1.869]
mos $_{-1}$	0.010 [0.036]	0.689 *** [4.640]
C	0.308 [0.264]	1.252 ** [2.082]
adj. R^2	0.970	0.883

4.1b) Model for Examining Dutch Disease Effect in 1996-2014

roy & mos	*roy*	*mos*
roy $_{-1}$	0.925 ***	-0.007
	[16.291]	[-0.614]
mos $_{-1}$	-1.116	0.339
	[-0.964]	[1.383]
C	3.868	2.193 **
	[1.002]	[2.676]
adj. R^2	0.947	0.075
roy $_{-2}$	0.862 ***	-0.010
	[10.466]	[-0.813]
mos $_{-2}$	-2.735	-0.017
	[-1.630]	[-0.063]
C	9.371	3.376 ***
	[1.674]	[3.805]
adj. R^2	0.890	-0.075
roy $_{-3}$	0.896 ***	-0.007
	[9.415]	[-0.587]
mos $_{-3}$	-1.752	0.015
	[-0.936]	[0.059]
C	6.123	3.264 ***
	[0.984]	[3.872]
adj. R^2	0.847	-0.097

roy & def	*roy*	*def*
roy $_{-1}$	1.106 ***	0.116 **
	[7.065]	[2.311]
def $_{-1}$	-0.231	0.886 ***
	[-1.085]	[12.868]
C	0.841	0.332
	[1.300]	[1.592]
adj. R^2	0.948	0.981

def & mos	*def*	*mos*
def $_{-1}$	1.038 ***	-0.002
	[37.742]	[-0.128]
mos $_{-1}$	0.070	0.389
	[0.171]	[1.631]
C	-0.334	2.024 **
	[-0.239]	[2.498]
adj. R^2	0.988	0.055

4.2a) Model for Examining Capital Accumulation Effect in 1976-1995

1976-1995	*roy*	*ioc*
roy $_{-1}$	0.530 *** [6.624]	0.007 [0.141]
ioc $_{-1}$	0.207 [0.517]	0.173 [0.691]
C	-0.152 [-0.130]	2.473 *** [3.390]
adj. R^2	0.777	-0.070
roy $_{-2}$	0.379 *** [5.119]	-0.027 [-0.532]
ioc $_{-2}$	0.630 [1.710]	0.232 [0.913]
C	-1.236 [-1.153]	2.326 *** [3.143]
adj. R^2	0.741	-0.073
roy $_{-3}$	0.304 *** [4.307]	-0.015 [-0.290]
ioc $_{-3}$	0.072 [0.208]	-0.024 [-0.093]
C	0.536 [0.530]	3.087 *** [4.022]
adj. R^2	0.598	-0.130

4.2b) Model for Examining Capital Accumulation Effect in 1996-2014

1996-2014	*roy*	*ioc*
roy $_{-1}$	0.718 *** [5.136]	0.041 [1.335]
ioc $_{-1}$	0.806 * [1.736]	0.777 *** [7.467]
C	-2.188 [-1.623]	0.706 ** [2.335]
adj. R^2	0.953	0.971
roy $_{-2}$	0.423 *** [2.941]	0.057 [1.527]
ioc $_{-2}$	1.666 *** [3.743]	0.673 *** [5.833]
C	-4.518 [-3.536]	1.055 *** [3.184]
adj. R^2	0.932	0.944
roy $_{-3}$	0.346 ** [2.629]	0.079 ** [2.053]
ioc $_{-3}$	1.836 *** [4.892]	0.577 *** [5.220]
C	-4.882 *** [-4.588]	1.363 *** [4.239]
adj. R^2	0.935	0.931

Note: ***, **, * denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively. The figure in parenthesis [ ] indicates t value.

Table 5 Bilateral Granger Causality Tests

roy & mos	Lags	Null Hypothesis	Chi-sq
1976-1995	1	*roy* does not Granger Cause *mos*	5.186 **
	2	*roy* does not Granger Cause *mos*	4.818 **
	3	*roy* does not Granger Cause *mos*	4.083 **
	1	*roy* does not Granger Cause *def*	6.234 **
	1	*def* does not Granger Cause *mos*	3.496 *
1996-2014	1	*roy* does not Granger Cause *mos*	0.377
	2	*roy* does not Granger Cause *mos*	0.662
	3	*roy* does not Granger Cause *mos*	0.344
	1	*roy* does not Granger Cause *def*	5.340 **
	1	*def* does not Granger Cause *mos*	0.016
roy & ioc	Lags	Null Hypothesis	Chi-sq
1976-1995	1	*roy* does not Granger Cause *ioc*	0.020
	2	*roy* does not Granger Cause *ioc*	0.283
	3	*roy* does not Granger Cause *ioc*	0.084
1996-2014	1	*roy* does not Granger Cause *ioc*	1.784
	2	*roy* does not Granger Cause *ioc*	2.331
	3	*roy* does not Granger Cause *ioc*	4.218 **

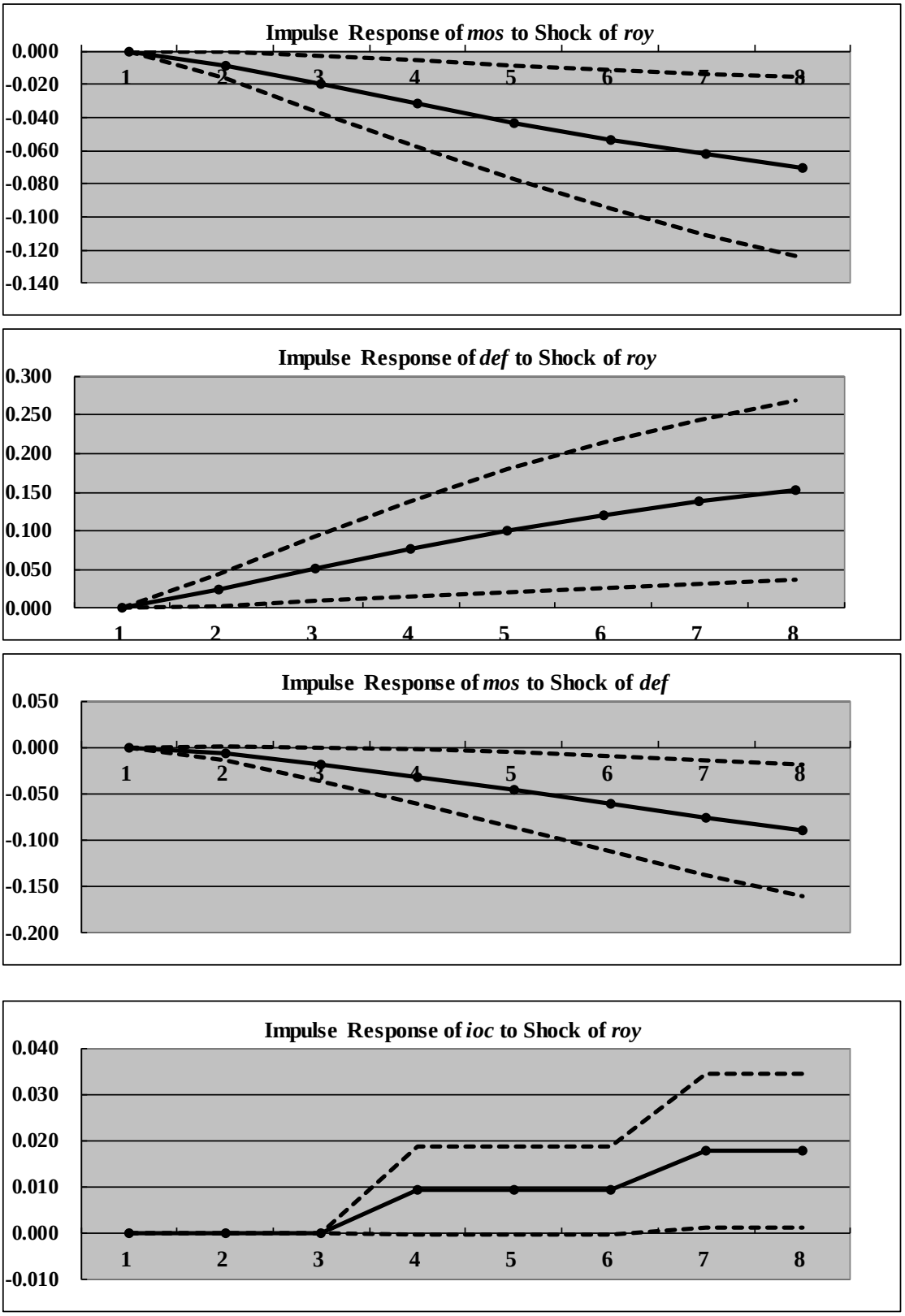
Note: ***, **, * denote rejection of null hypothesis at the 99%, 95% and 90% level of significance, respectively.

Table 6 Change in Worldwide Governance Indicators in Bangladesh

	1996-2005 (average)	2006-2015 (average)	Direction of Changes
Control of Corruption	-1.07	-1.01	Improvement
Government Effectiveness	-0.68	-0.76	Deterioration
Regulatory Quality	-0.98	-0.90	Improvement
Rule of Law	-0.96	-0.79	Improvement
Voice and Accountability	-0.44	-0.42	Improvement
Average	-0.83	-0.78	Improvement

Note: The index takes the value of -2.5 in the worst quality and of 2.5 in the best one.
Sources: Worldwide Governance Indicators (World Bank)

Figure 5 Accumulated Impulse Response to One Standard Deviation Shock



Note: The dotted lines denote a 95 percent error band over 8-year horizons.