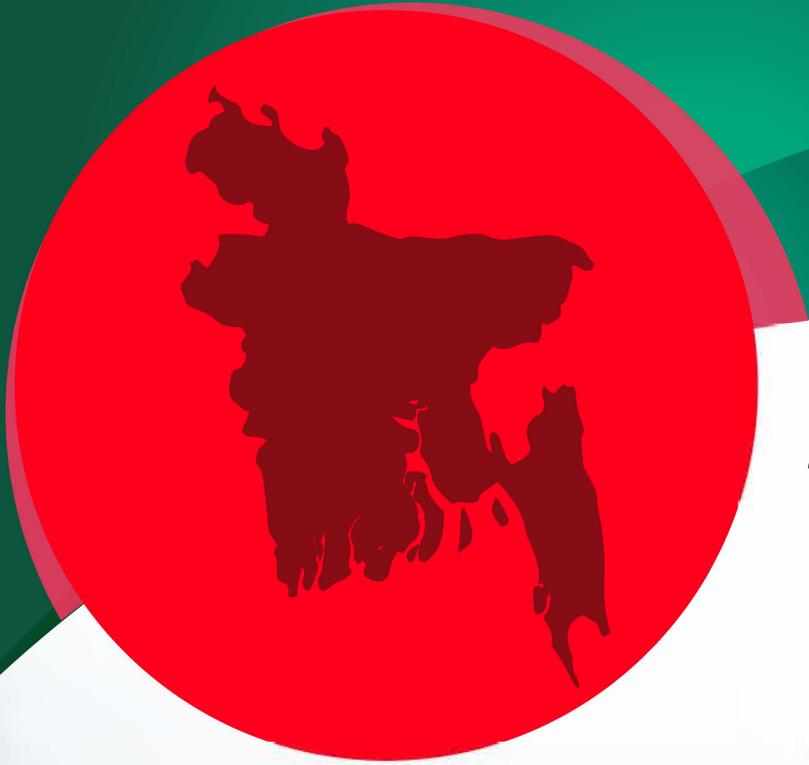


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# Can Bangladesh Grow Faster than India?

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## Abstract

Bangladesh and India, the two fastest growing economies of South Asia, have displayed remarkable policy synchronization of privatization since the mid-1980s and that of liberalization since the early 1990s. Despite this policy synchronization, Bangladesh lags behind India quite substantially in economic growth. In the 1986–2010 period, Bangladesh grew at 5 percent and India 6.5 percent on average. What is behind this growth differential is the focus of this study. As this study finds, differences in capital formation appear to play the most crucial role in determining the growth differential between the two countries. India exceeded Bangladesh in economic growth whenever India's capital growth exceeded Bangladesh's. Bangladesh had been able to reduce the growth gap with India when Bangladesh's capital growth had exceeded India's. Using the Solow model and the Cobb-Douglas production function, this study suggests that Bangladesh has to increase capital formation to surpass or at least to catch up with India in growth. Institutional indicators are an area where Bangladesh requires massive improvements. This comparative study has policy implications for other emerging markets that aspire to grow fast but confront low capital formation barriers and institutional bottlenecks.

## 1 Introduction

Economists have been interested in growth dynamics. This interest has recently grown rapidly in South Asia, a region that has emerged as a new growth zone of the world. South Asian economies are not comparable when it comes to Gross Domestic Product (GDP) levels, but they are so when it comes to the first difference of GDP — the output growth rate. India's GDP, being more than 10 times larger than Bangladesh's, never comes into comparison with Bangladesh's output, but India's growth rate has always generated policy dialogue as a point of comparison with Bangladesh's. Amartya Sen often compares both countries with different rates and socio-economic indicators (Dreze and Sen 2013, p. 45).

Bangladesh's national budget and monetary policy statements always mention India's output growth rate and inflation as a point of reference (see Budget 2013–2014, MPS 2013). This comparison has become more relevant in recent years when both India and Bangladesh have appeared to be the two fastest growing economies of South Asia. There are multiple reasons as to why they grew fast simultaneously. They have numerous aspects in common including geography, institutions, demography, and recent policy synchronization on liberalization.

There are also concerns, particularly from the Bangladesh side, over the fact that Bangladesh often lags behind India in growth rates. The policymakers are aware that the size effect is not necessarily the answer to this

puzzle. Had it been so, Taiwan could never grow faster than China. Hence, real concerns remain, and this study attempts to address them.

Comparative studies with growth between countries, particularly between neighboring countries, have always drawn the attention of growth and development economists. Despite differences in the size of the economy, population, and the level of development, a comparison in growth performance has always occupied a niche in the economic literature. For example, Chow and Lin (2002) compare the growth accounting between Taiwan and China. A similar comparative study between Bangladesh and India is starkly absent. This work attempts to address this intriguing vacuum.

Over the last decade, India outperformed Bangladesh considerably: India's average output growth was 7.69 percent in the 2001–2010 period, whereas Bangladesh's 5.82 percent created a growth differential of 1.87 percentage point (WDI 2012). This gap, an amount equivalent to the annual growth figure of many developed countries, poses some concerns to Bangladesh and raises a number of questions: 1) What mainly causes this growth differential to occur? 2) Is this growth gap between India and Bangladesh gradually augmenting? 3) How can Bangladesh surpass or at least catch India in growth? Despite a number of papers on these South Asian neighbors, no work has exclusively examined the dynamics of the growth differential between Bangladesh and India, leav-

ing an intriguing gap in this regard. This study fills that gap by addressing the above-mentioned questions.

Bangladesh earned its independence in 1971 after a devastating war with Pakistan, which destroyed the infrastructure of the country almost entirely. The initial years of its capital formation displayed serious volatility and created numerous statistical outliers as expected. The Mujib administration, the first regime of Bangladesh, began its journey with massive nationalization, centralized control, and socialist planning. The results of the economic management, however, in the initial years were disturbing mainly due to lack of capital and skilled manpower. The rise of global commodity and energy prices due to the first oil shock of 1973–1974 created hyperinflation in the economy and hampered capital formation and output to a great extent. The great famine of 1974 further fueled the crisis already in place. Hence, capital formation in the country was heavily disrupted.

With the end of the Mujib regime in 1975, the Zia regime started the process of capitalist transition in the form of encouraging privatization and development of a market economy. The regime replaced the word, ‘socialism’ with ‘economic and social justice’ in the Constitution. Islam (2007) asserts that this ideological move drove the capitalist economy towards privatization. The declaration of the Industrial Investment Schedule in 1976, the withdrawal of private investment ceiling in 1978, and the promulgation of the Foreign Investment Act in 1980 are significant steps of capitalist transition during the Zia regime. Ahmed and Sattar (2004) assert that Bangladesh’s first phase of liberalization began in 1976 after the regime change in 1975.

Although the liberalization process in Bangladesh is still continuing, 1976 can be marked as the beginning of a new era that gradually enabled market forces to operate. Despite some changes in the regime since then, all subsequent governments remained committed to implementing liberalization of the economy. Hence, most time series studies on Bangladesh exclude the data of initial years not only to extricate the effects of the controlled regime, but also to avoid excessive outliers that may distort econometric estimations (see Ahmed and Uddin 2009, Mamun and Nath 2005, Paul 2012). This study examines the estimation of growth variables in a relatively liberalized regime of Bangladesh, and hence its all empirical exercises begin in 1976 as well.

To investigate whether Bangladesh can grow faster than India, this paper includes the basic concepts of the Solow model and the Cobb-Douglas production function (CDPF). Hence, the differences in capital, labor, and technology are expected to reflect the differences in output between Bangladesh and India. Time series data on the level of technology, labor productivity, or effective labor are un-

available in Bangladesh. The Solow model argues that a country’s output is mainly determined by its level of capital stock (Solow 1956). Thus, the variable of capital formation becomes most relevant for examining growth dynamics. Capital formation is derived by subtracting capital stock of the previous year from that of the current year. Thus, it is investment as well. Data on the growth rates of Gross Domestic Product (GDP) and capital formation, which begin in 1976 and end in 2010, were collected from the World Development Indicators (WDI 2012).

To preview the results briefly, this work finds that capital-formation growth affects GDP growth in a positive fashion in both countries, as the theory suggests. But the capital-growth differential between India and Bangladesh does not exhibit a consistent pattern while affecting the GDP-growth differential between them. India exceeded Bangladesh in economic growth whenever India’s capital growth exceeded Bangladesh’s, but this is not exactly true for Bangladesh. However, Bangladesh was able to reduce the growth gap with India when its capital growth exceeded India’s, suggesting that capital formation plays a dominant role in determining the growth differential between these countries. Generalized impulse responses exhibit a positive and significant effect of capital growth on output growth in both countries. The answer to the question of whether Bangladesh can outperform India in output growth depends on how effectively Bangladesh can develop the determinants of capital formation in its economy. Bangladesh should address other institutional factors such as education quality, technology, corruption, openness, and finally business competitiveness, to accelerate its growth to surpass or at least to catch up with India. Investigation of the various determinants of capital formation and institutional factors in these countries goes beyond the scope of this paper, and hence is left for a future exercise. This study has policy implications for other emerging nations that confront low investment and institutional bottlenecks.

## 2 Literature Review

Comparative studies of economic performances between economies have occupied considerable space in the literature. Different studies, however, follow different criteria to select the countries. While most studies follow the regional groups, some studies set different yardsticks. For example, Rahman and Yusuf (2013) comprise a group of 7 economies for comparison based on population and the level of development. Das and Paul (2011) make a group of 12 Asian economies on the basis of growth rates. Here I present a number of comparative studies on Asian and South Asian countries in a chronological order.

In 1993, the World Bank published a policy research report where it claimed that using a combination of pub-

lic policy and facilitating a market economy some East Asian countries have achieved growth rates which can be termed as ‘miracles’ (WB 1993). In response, Krugman (1994) argued that there is nothing special or miraculous about the high growth rates in East Asia: they all resulted from very high investment rates, suggesting that capital formation is the main engine of growth.

Easterly (1994) picked the four Asian Tigers based on almost 6 percent growth rates of output: Hong Kong, South Korea, Singapore, and Taiwan. Although these economies differ in size and population, they had several things in common: they all performed above average in the region in investment, education, financial depth, and budget management.

A study by Bashir (2000) finds that agricultural capital formation contributes to agricultural productivity growth in India. This paper shows how capital formation helps productivity although agriculture comprises almost one-fifth of the Indian GDP. Siddiqui and Malik (2001) find a nonlinear relationship between debt burden and growth performance among three South Asian countries: India, Pakistan, and Sri Lanka. Sinha and Macri (2001) make a comparative study with 8 Asian countries. They, however, find a positive relationship between financial development and economic growth only in 4 countries such as India, Malaysia, Pakistan, and Sri Lanka. Some studies (e.g. Mallik and Chowdhury 2001) show how economic growth of Bangladesh and India exhibits a feedback effect, but a comparative growth study on these economies along with the underlying capital formation is starkly absent.

In line with the Schumpeterian hypothesis, Habibullah and Eng (2006) find how financial development promotes growth in 13 Asian developing nations including India and Bangladesh over the period 1990–1998. Bhandari, Dhakal, Pradhan and Upadhyaya (2007) compare South Asian countries on the basis of rates of privatization and economic growth, and find a positive impact of economic growth on savings. In a comparison between India and Korea, Panagariya (2008, p. 123) shows how Korean investment rates exceeded India and so did its economic growth.

Working over the 1980–2002 period with South Asian countries, Parida and Sahoo (2007) find a significant impact of capital formation on economic growth. The sample, however, has only 22 years of data, and hence appears to be inadequate. A study by Agrawal, Sahoo and Dash (2009) reveals that income and access to banking institutions determine savings in South Asian nations. Although high saving does not necessarily mean high investment, this study implies that output also affects capital formation through savings in South Asia.

Kurosaki (2010) compares three South Asian

economies: India, Pakistan, and Bangladesh and finds how an improvement in aggregate land productivity helped improve output growth in these countries. Husain (2010) compares Pakistan’s performance in growth and development with India’s and asserts that Pakistan can be compared with India in development indicators and global competitiveness though these economies differ in size and population. Bano, Kumarasinghe and Tang (2011) make a comparative study with 14 Asia Pacific countries and show how stock market returns and GDP growth are linked. Working over the 1971–2009 period, Das and Paul (2011) find a positive impact of openness and growth in capital stock on output growth. They, nevertheless, work with 12 top performing Asian economies, whereas my study exclusively examines the comparative growth performance of capital and output for India and Bangladesh.

In a panel co-integration over the period of 1980–2005, Sahoo and Dash (2012) take a group of variables such as labor force, capital formation, international trade, and human capital, and find their positive impact on output in South Asia. Although this finding is useful for the current study, their exercise with observations of only 25 years requires further estimation with a longer time period.

Foreign Direct Investment (FDI) has often been perceived as a significant factor of capital formation in India and Bangladesh, particularly after liberalization. Hossain and Hossain (2012), however, do not find any cointegration between FDI and GDP in both long and short run in Bangladesh and India. This study, examining data over the 1972–2008 period, raises a question on whether FDI-driven capital formation contributes to output.

As we can see, there is no study that examines the comparative growth performance of Bangladesh and India; hence the importance of this work.

### 3 Methodology

Economic growth in continuous fashion can be expressed as:

$$\begin{aligned} g_t^Y &= \ln(Y_t/Y_{t-1}) \\ g_t^Y &> 0, \quad \text{if } Y_t > Y_{t-1} \end{aligned} \quad (1)$$

where,  $g_t^Y$  stands for economic growth,  $Y_t$  is GDP at the current year ( $t$ ), and  $Y_{t-1}$  denotes GDP of the previous year ( $t - 1$ ). The same expressions are applicable for defining capital growth ( $g_t^K$ ):

$$\begin{aligned} g_t^K &= \ln(K_t/K_{t-1}) \\ g_t^K &> 0, \quad \text{if } K_t > K_{t-1} \end{aligned} \quad (2)$$

To examine the role of capital formation in output growth, I engage the basic Solow model that focuses on four variables: output, capital, labor force ( $L$ ), and the effectiveness of labor or the productivity factor ( $A$ ). The production function takes the form:

$$Y(t) = F(K(t), A(t)L(t)) \quad (3)$$

Here  $A$  and  $L$  enter multiplicatively.  $AL$  is referred to as effective labor. Technological progress that enters in this fashion is called labor-augmenting or Harrod Neutral (Romer 2006, p. 9). Output changes over time only if inputs to production change. Ignoring the time subscript, the behavior of output in response to its inputs can be defined as:

$$\begin{aligned} \frac{\partial Y}{\partial K} &> 0 \\ \frac{\partial Y}{\partial(AL)} &> 0 \\ \frac{\partial^2 Y}{\partial K^2} &< 0 \\ \frac{\partial^2 Y}{\partial(AK)^2} &< 0 \end{aligned} \quad (4)$$

This implies the positive impact of inputs on output with diminishing marginal returns. To illustrate the basic functioning of the Solow model, I adopt the Cobb-Douglas Production Function (CDPF) as a specific example shown below:

$$\begin{aligned} Y_t &= F(K_t, (A_t L_t)) \\ &= K_t^\alpha (A_t L_t)^{1-\alpha}, \text{ where } 0 < \alpha < 1 \end{aligned} \quad (5)$$

Taking natural log of both sides, we get:

$$\ln Y = \alpha \ln K + (1 - \alpha) \ln L + (1 - \alpha) \ln A \quad (6)$$

Total differentials of both sides give us:

$$d \ln Y = \alpha d \ln K + (1 - \alpha) d \ln L + (1 - \alpha) d \ln A \quad (7)$$

Equation (7) can be expressed in the growth rates of output, labor force, and technology as follows:

$$g_t^Y = \alpha g_t^K + (1 - \alpha) g_t^L + (1 - \alpha) g_t^A \quad (8)$$

A rearrangement gives us:

$$g_t^Y = \alpha g_t^K + (1 - \alpha)(g_t^L + g_t^A) \quad (9)$$

Now output grows as long as capital growth is positive, but

$$g_t^Y < g_t^K, \text{ because } 0 < \alpha < 1 \quad (10)$$

This implies that if a country wants to grow fast, its capital formation must grow at a faster rate than the desired rate of GDP growth. Since this work wants to examine the basic forces behind the output differential between India and Bangladesh, we can subtract equation (9) for Bangladesh from a similar equation for India. Ignoring the time subscripts for the time and replacing them with country notations, we get:

$$\begin{aligned} g_{IND}^Y - g_{BD}^Y &= \alpha(g_{IND}^K - g_{BD}^K) \\ &+ (1 - \alpha)(g_{IND}^L - g_{BD}^L) \\ &+ (1 - \alpha)(g_{IND}^A - g_{BD}^A) \end{aligned} \quad (11)$$

Technological growth is computable as ‘‘Solow residual’’ as long as data on capital formation and labor force are available. In this study, while the data on capital formation are available over the entire sample 1976–2010, those on labor force are not (WDI 2012). The labor force data for both countries are missing until 1990, and the rest are not adequate to provide us with standard econometric exercises. Hence, this work follows Solow (1956) and subsequent studies that assumed technology and labor force to be constant. Practically, this is not a strong assumption mainly because of dealing with growth differentials in technology and labor force, not growth rates per se.

Technological growth differentials between developing countries have always been negligible, and this is more so between two neighboring countries like India and Bangladesh. The labor-force growth rate in both countries follows a similar pattern due to similar pattern of population growth and other demographic features between these two neighbors. Hence, the differential in labor-force growth rates becomes negligible, enabling us to drop the last term on the right-hand side of equation (10). Thus, we end up with:

$$g_{IND}^Y - g_{BD}^Y = \alpha(g_{IND}^K - g_{BD}^K) \quad (12)$$

Following equation (12), this work examines how capital-growth differential between India and Bangladesh can explain GDP-growth differential between them. None of the variables in this exercise is exogenous. Since theory suggests that both GDP and capital growth have a feedback effect, OLS estimations with them will not be a valid approach. To address this issue of endogeneity, VAR models are used in this regard to see their interactions. The most basic form of a VAR treats all variables symmetrically without making reference to the issue of dependence or independence (Enders 2010, p. 272).

The results of VAR estimation are sensitive to the lag length and the ordering of the variables. For determining the lag length, the most common procedure is to estimate an unrestricted VAR with the variables, and to use the Akaike information criterion (AIC) or Schwartz

Bayesian criterion (SBC) to decide on the lag length (Enders 2010, p. 402). VAR results are sensitive to the orderings of the variables. There is no guideline on which variable is to be put first in the order. However, the issue with the ordering of the variables will be inapplicable in this exercise since impulse responses will be generalized. Pesaran and Shin (1998) first proposed the generalized impulse response analysis for unrestricted VAR models. Unlike the traditional impulse response analysis, their approach does not require orthogonalization of shocks and is invariant to the ordering of variables in the VAR.

Sims, Stock and Watson (1990) argue that the goal of a VAR analysis is to determine the interrelationships among the variables, not to determine the parameter estimates. As Enders (2010, p. 272) asserts, the impulse response analysis can be helpful in understanding the interrelationships among economic variables and in the formulation of a more structured economic model. As Hamilton (1994, p. 291) asserts, impulse response functions are used to summarize the dynamic relations between variables in a VAR.

Although this work examines Bangladesh's growth differential with India, the role of capital formation in economic growth will be examined individually within each country in the first place. Next the growth differentials of capital and GDP will be used to justify the role of capital in output growth for both countries.

## 4 Estimation and Analyses

The series of the growth rates of capital formation and output are plotted in Figure 1 (WDI 2012). The series are found to be stationary for both countries, as shown in Table 1. Thus, they are ready for estimations in OLS or VAR models. The top panel that plots the growth rates of GDP and capital for Bangladesh does not show any consistent pattern of relationship between capital growth and output growth until the mid-1980s. The capital growth line shows a drastic collapse until 1983. Bangladesh's first decade after independence experienced high volatility in capital formation, which is likely for a war-ravaged country. The relationship between capital growth and GDP growth appears to be positive since the mid-1980s. In contrast, the bottom panel of Figure 1, which depicts capital and output growth for India, shows some degree of co-movement between the variables.

Before the estimations begin, a table of comparative growth statistics can be used for primary motivation. Table 2 presents a summary of GDP-growth and capital-growth differentials between India and Bangladesh over different periods. A closer examination of the table will substantiate the role of capital formation in output growth, although there is no strong pattern of relationship, at least,

apparently. The upper part of the table makes periods having a fixed endpoint at 2010. Except for the first row of numbers, which defines the most turbulent period of capital formation for Bangladesh, the rest three rows show that Indian capital growth differential is on the rise and so is its GDP growth differential. Over the last decade of the sample, 2001–2010, India's capital grew faster than Bangladesh's by a differential of 4.62 percent. The corresponding output-growth differential of India over Bangladesh was close to 2 percent in the same period.

The lower part of the table compares these differentials over 5-year windows in a progressive fashion. One pattern is obvious that India had output growth higher than Bangladesh whenever India had exceeded Bangladesh in capital growth, but that is not true for Bangladesh at least up to the mid-1980s for reasons discussed earlier. Although India had a lead in GDP growth over Bangladesh in every period after the mid-1980s, the growth-gap decreased remarkably whenever Bangladesh outperformed India in capital growth, suggesting that capital formation has been a vital factor for Bangladesh to supersede or, at least, to catch up with India in economic growth. VAR estimations will substantiate this point to a great extent.

The upper two diagrams of Figure 2 present the case with Bangladesh. They sketch the generalized responses of one variable due to one standard deviation shock in the other. Shocks are the exogenous impulses or the sudden unexpected changes of a variable in an economy. While the response of capital growth to output growth is insignificant, the reverse is significant with a lag between one and two years, suggesting that capital growth played a significant role in economic growth over the last 35 years in Bangladesh. The results for India, as shown in the lower panel of Figure 2, confirm the same finding as expected. They show a significant impact of output growth on capital growth as well.

Since capital growth has a significant effect on output growth in both countries, the answer to the question on whether Bangladesh can grow faster than India will depend on whether Bangladesh's capital can grow faster than India's. The capital-growth differential between Bangladesh and India should be able to explain the output-growth differential between them. Hence, I further extend this study by including the estimations on both differentials between two countries.

I derive the series of 'IND-BD GDP-growth differential' by subtracting Bangladesh's GDP growth from India's. The similar method is followed to derive the series of 'IND-BD capital-growth differential.' The results exhibit a considerable degree of co-movement most of the time. The scatter plot along with the regression line vindicates this pattern of co-movement. The correlation co-

**Table 1:** Phillips-Perron unit root tests with output growth and capital growth of Bangladesh and India: 1976–2010

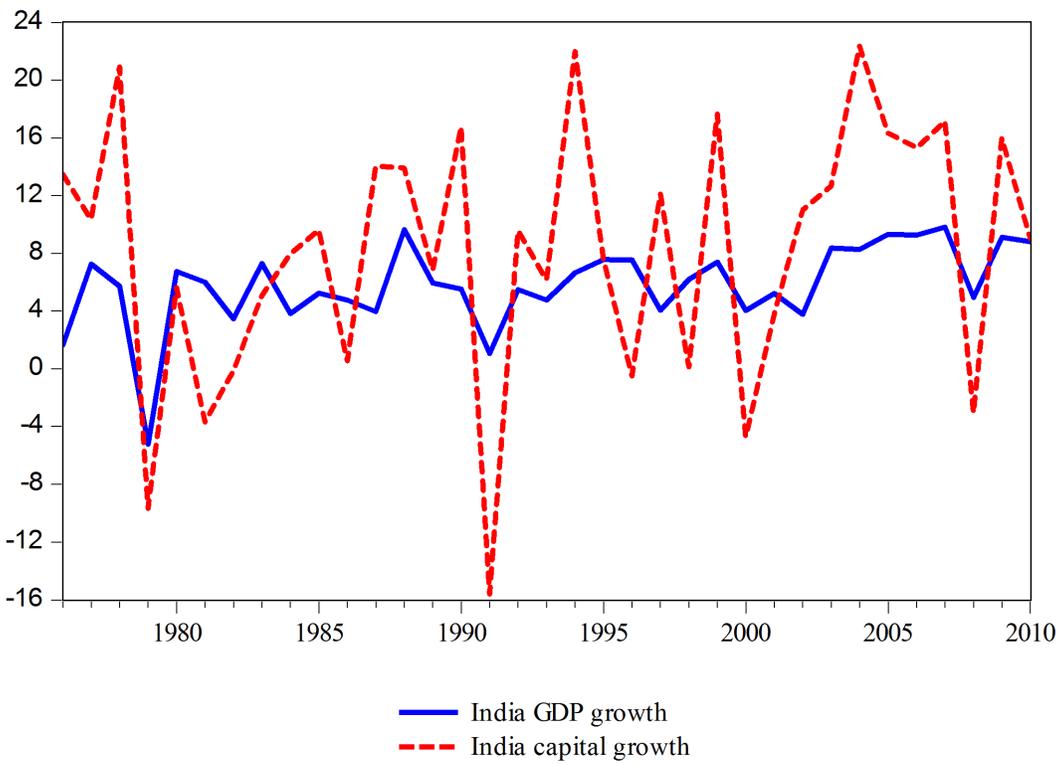
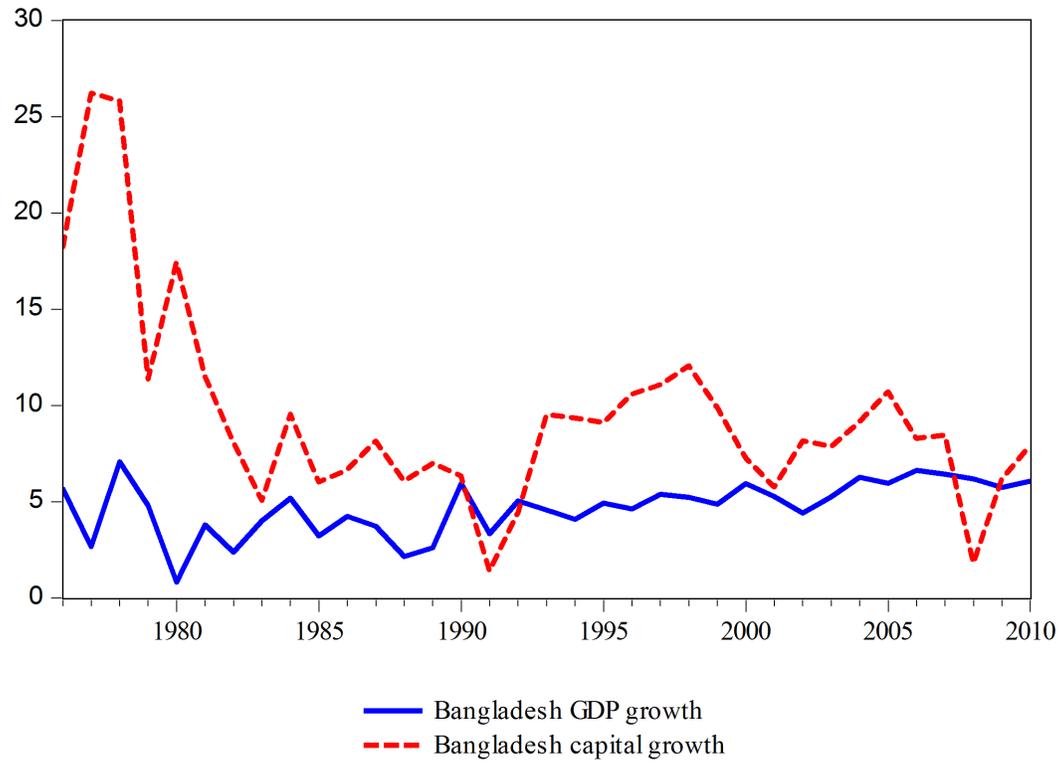
Series	In levels		Integration
	Model A	Model B	
Bangladesh:			
GDP Growth	-4.52 (0.00)	<b>-6.79</b> <b>(0.00)</b>	I(0)
Capital Growth	<b>-2.72</b> <b>(0.08)</b>	-2.68 (0.25)	I(0)
India:			
GDP Growth	-5.40 (0.00)	<b>-7.84</b> <b>(0.00)</b>	I(0)
Capital Growth	<b>-6.55</b> <b>(0.00)</b>	-8.09 (0.00)	I(0)
Differential Series:			
GDP Growth	<b>-7.51</b> <b>(0.00)</b>	-8.41 (0.00)	I(0)
Capital Growth	-5.12 (0.00)	<b>-6.38</b> <b>(0.00)</b>	I(0)

Note: Model A includes intercept, and Model B includes both intercept and trend. The null hypothesis states that the variable has a unit root. *p*-values are shown in the parentheses under each adjusted *t*-statistic. The critical values and details of the test presented in Phillips and Perron (1988). The bold items under any model is actual model as per the estimation results. Bangladesh's capital growth is stationary at the 10 percent level. Source: WDI (2012)

**Table 2:** Comparison of output growth and capital growth between Bangladesh and India: 1976–2010

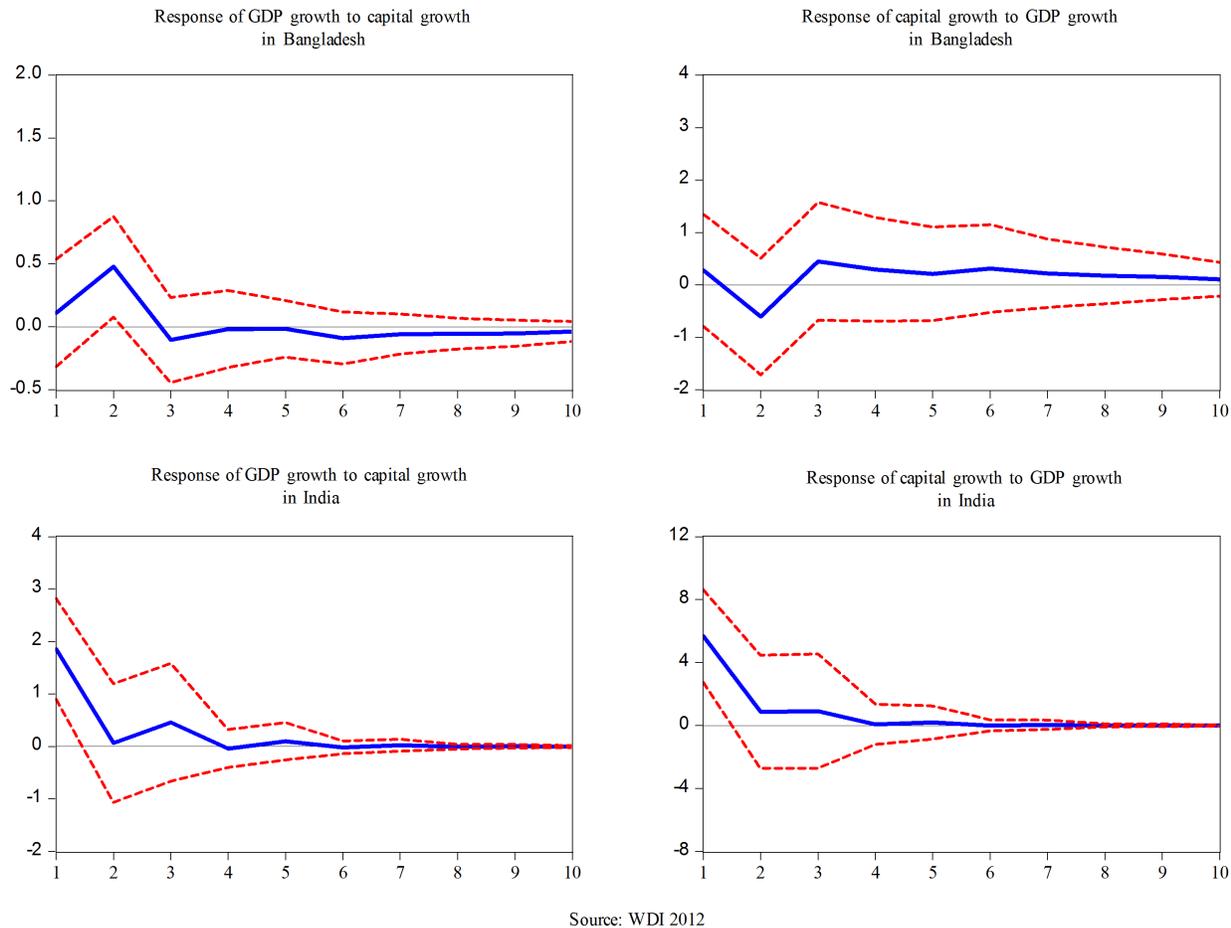
Periods	GDP Growth			Capital Growth		
	Bangladesh	India	Differential	Bangladesh	India	Differential
Fixed endpoint:						
1976–2010	4.70	5.81	1.11	9.51	8.19	-1.32
1981–2010	4.78	6.24	1.46	7.79	8.19	0.40
1991–2010	5.31	6.58	1.27	7.95	8.75	0.80
2001–2010	5.82	7.69	1.87	7.43	12.05	4.62
5-year window:						
1976–1980	4.21	3.23	-0.98	19.82	8.13	-11.69
1981–1985	3.72	5.16	1.44	8.05	3.76	-4.30
1986–1990	3.74	5.97	2.23	6.85	10.42	3.57
1991–1995	4.39	5.11	0.71	6.77	5.59	-0.82
1996–2000	5.21	5.84	0.63	10.18	4.94	-5.24
2001–2005	5.43	6.99	1.56	8.33	13.23	4.89
2006–2010	6.21	8.39	2.17	6.54	10.87	4.34

Note: The figures are averages of the period. First four periods have the fixed endpoints at 2010 while the starting point is moving forward. The periods under 5-year window divide the whole sample into seven segments. Differentials are calculated by subtracting Bangladesh's value from India's, suggesting that it would be optimal for Bangladesh to minimize the differential values. Source: WDI (2012)



Source: WDI 2012

**Figure 1:** Growth rates of capital formation and output for Bangladesh and India: 1976–2010



**Figure 2:** Response to generalized one S.D. innovation (shock)  $\pm 2$  S.E. in 10 years

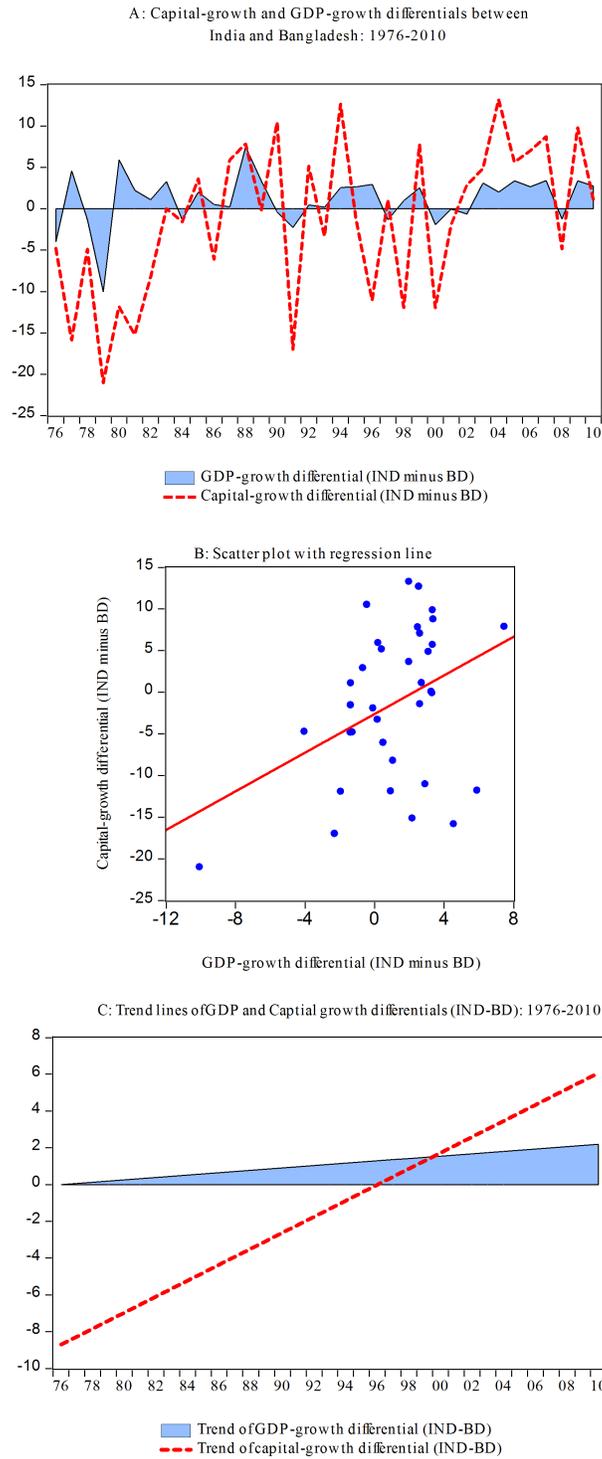
efficient of these differential lines is highly positive, 0.39, and significant at the 1 percent level.

An upward trend of these series is fairly visible in Panel A of Figure 3 (WDI 2012). To examine this observation, trend estimation in OLS is used. GDP-growth differential is regressed on trend, and capital-growth differential is regressed on constant and trend. In both cases the trend coefficient is significant at the 5 percent level. The trend values are plotted in Panel C of Figure 3. Although the trend term of GDP-growth differential is much smaller than that of capital-growth differential, it implies that Bangladesh is lagging behind India in output growth, and the gap is slowly increasing over time. Bangladesh's distance with India is augmenting much faster in capital growth than that in output growth in the long run. I argue that the rising capital-growth differential is eventually contributing to the slightly rising tendency of GDP-growth differential, suggesting that faster capital formation is crucial for Bangladesh to catching India in the race of economic growth.

Both the differential series are found to have stationarity, as shown in Table 1. Thus, we can put them in a VAR model to check the generalized impulse responses. Figure 4 (WDI 2012) shows the results: they affect each other. The positive effect is strongly significant in the first year for both types of interaction. If Bangladesh outperforms India in capital growth, Bangladesh's economic growth will be close to India's, or it will outperform India's growth. Thus, Bangladesh can exceed India in output growth by enhancing its capital formation at a higher rate than India. It implies that the factors affecting capital formation must be improved in Bangladesh to make the country grow faster than India.

## 5 Productivity and Institutional Factors

Equation (6) in the methodology part lays out the role of effective labor as well as capital formation in economic growth. Not only is defining effective labor in quantita-



**Figure 3:** Capital-growth and GDP-growth differentials: India and Bangladesh: 1976–2010

FIGURE 4  
Response to Generalized One S.D. Innovations  $\pm 2$  S.E. in 10 Years

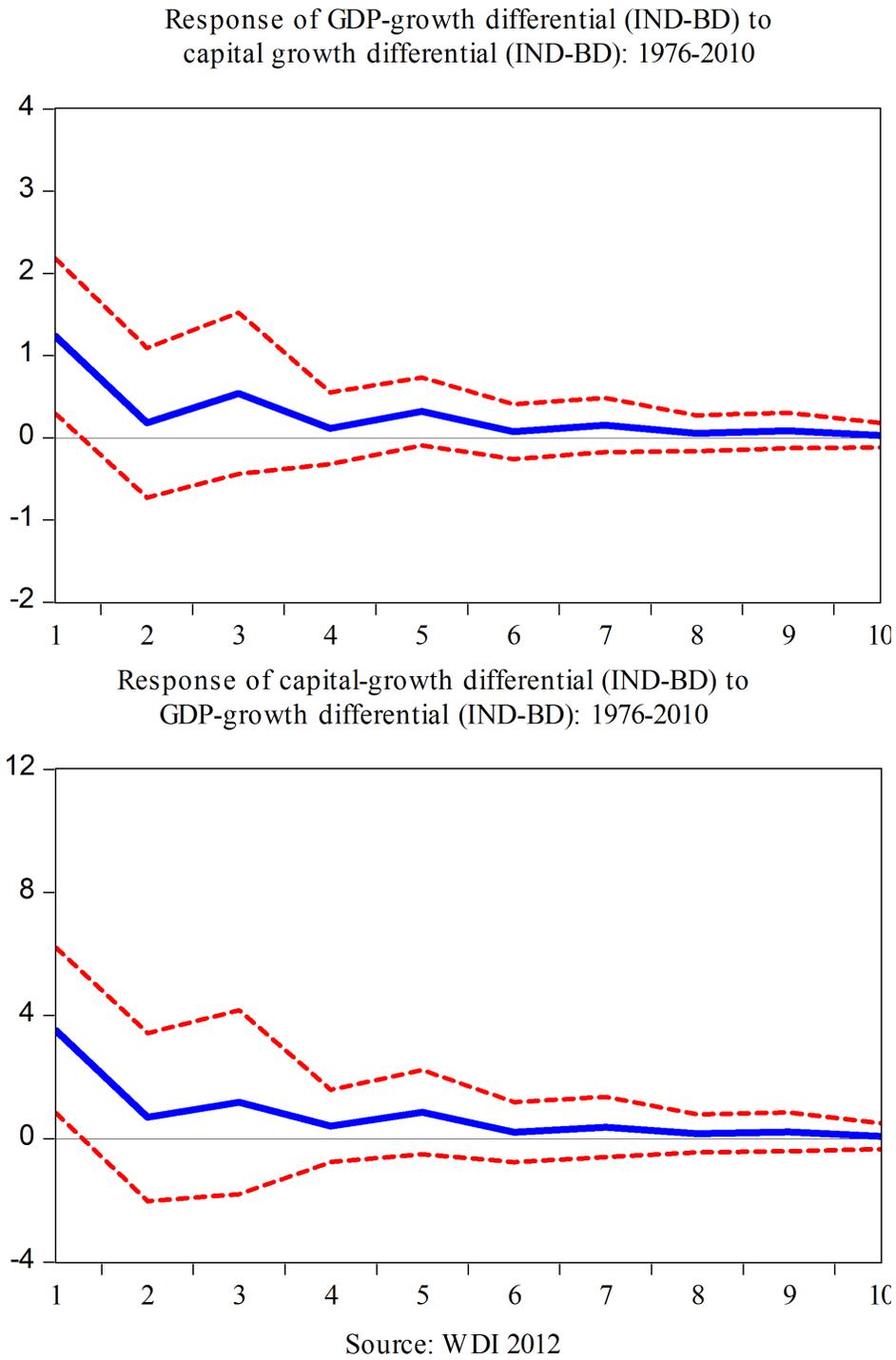


Figure 4: Response to generalized one S.D. innovation (shock)  $\pm 2$  S.E. in 10 years

tive research a problem, but time series data on this item are also unavailable. Labor productivity and other institutional factors are likely to influence effective labor to a great extent. While investment works as a necessary condition to affect output differentials, productivity and institutional factors act as a sufficient condition in this case. Unfortunately, time-series data on these items over the sample 1976–2010 are conspicuously absent.

It is, however, not very difficult to show how Bangladesh lags behind India in some vital institutional indicators. A snapshot of institutional comparison between these countries, as shown in Table 3, portrays India's advancement in human development, combating corruption, and liberalization. In the table, India's lower rankings than Bangladesh's, which imply India's better positions in these institutional factors, have arguably further contributed to India's growth acceleration. In the 'Doing Business Index,' Bangladesh is slightly above India. I have also included the 'Failed State Index' because it also considers the level of public services and human rights, which affect institutions.

Although Sen (2013) observes that Bangladesh has left India behind in many social indicators, particularly of gender equality, these achievements have not done enough to make Bangladesh supersede India in the overall human development index. Bangladesh still belongs to the 'Low Human Development' category, as calculated by UNDP, while India belongs to the 'Medium Human Development' group. Rahman and Yusuf (2013) identify factors that inhibit growth spurts in Bangladesh: low levels of human capital, poor infrastructure, market failures specific to individual industries, low levels of international trade, corruption, and cumbersome regulations. Of these, they argue, tackling infrastructure bottlenecks, promoting trade, and carrying out regulatory reforms should be the top priorities for the policymakers in Bangladesh.

In 1972, India's GDP was almost 8 times bigger than Bangladesh's. In 1991, it became 9 times bigger — a 12.5 percent increase in the relative size in 20 years. In 2010, India's GDP became almost 12 times bigger than Bangladesh's — a 33 percent increase in the relative size in the last 20 years. This implies that despite starting at the same time, India benefited more from liberalization than Bangladesh. Put differently, India's liberalization has been faster than Bangladesh's, as vindicated by the indices of economic freedom and global competitiveness. Over the last decade, Bangladesh mostly remained in the lowest category of the economic freedom index, which the HF (2013) termed as "Repressed." India, in contrast, stayed one level up, termed as "Mostly Unfree." Even some apparently closed African countries such as Ghana, Libya, Zambia, and Gabon rank higher than BD in global competitiveness.

As Mujeri and Sen (2003) observe, Bangladesh entered a new era in 1990 when crisis-driven reforms began to march. This era necessitated institutional changes more remarkably than ever before. Rahman and Yusuf (2013) mark 1990 as the beginning of economic acceleration due to a remarkable turnaround in the growth of multifactor productivity. Hence, institutional aspects played a role in Bangladesh's growth although data availability is still an issue in this regard. Addressing these aspects of institutions as well as investment is likely to propel Bangladesh to catch up with or surpass India in economic growth.

## 6 Conclusion

While India and Bangladesh are the two fastest growing economies of South Asia, the growth differential of Bangladesh with India is remarkable. It was 1.87 in percentage point over the last decade from 2001 to 2010. Both countries share many commonalities such as geography, institutions, demography, and recently policies on liberalization. But the growth gap shows a little divergent pattern on the trend, which is of serious concern for Bangladesh. The main aspiration of this paper is to find the answer to the question on whether Bangladesh can surpass India in the race for growth. Working on the 1976–2010 period, this paper finds that it is capital formation that can mainly contribute to faster growth for Bangladesh. Historically, India had higher output growth than Bangladesh whenever India's capital growth had exceeded Bangladesh's. Although that was not always true for Bangladesh, its output growth came much closer to India whenever Bangladesh outperformed India in the growth of capital formation. Bangladesh could minimize its growth differential with India whenever Bangladesh outperformed India in investment. Hence, Bangladesh has to accelerate its investment at a much faster rate than India to supersede or at least catch India in GDP growth.

Labor productivity and other institutional factors such as combating corruption and opening up the economy are other areas where India left Bangladesh behind in a remarkable way. Addressing these aspects can arguably reinforce the quality enhancement of capital formation in Bangladesh.

This work raises some additional questions such as: 1) What are the main factors that contribute to faster capital formation? 2) How to develop a time series on technological differences between these countries? 3) Why is India's growth higher than Bangladesh's in some years when India's capital growth has not been higher than Bangladesh's in those years? These questions require further investigation and hence are left on the agenda of future study.

**Table 3:** Comparison of institutional factors between India and Bangladesh

Indices:	India	Bangladesh	Countries
Human Development Index(HDI) 2011	134	146	187
Corruption Perception Index(CPI) 2012	94	144	176
Economic Freedom Index (EFI) 2013	119	132	177
Global Competitiveness Index (GCI) 2013	59	118	144
Doing Business Index (DBI) 2013	132	129	185
Failed State Index (FSI) 2013	79	29	178

Note: The lower the ranking, the better the position, except for FSI. The last column shows the total number of countries the respective surveys included. Sources: UNDP (n.d.) for HDI, TI (2012) for CPI, HF (2013) for EFI, WEF (2013) for GCI, IFC (n.d.) for DBI, and FP (2013) for FSI.

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