

Bangladesh Development Research Working Paper Series (BDRWPS)

BDRWPS 20 (January 2014)

**Economic Structure and Macroeconomic
Uncertainty: Policy Implications for Bangladesh**

Bernhard G. Gunter

American University and Bangladesh Development Research Center[‡]

Faisal Ahmed

International Monetary Fund[‡]

A. F. M. Ataur Rahman

North South University[‡]

and

Jesmin Rahman

International Monetary Fund[‡]

The Bangladesh Development Research Working Paper Series (BDRWPS) is a
peer reviewed working paper series of the

Bangladesh Development Research Center (BDRC)



[‡] The views expressed in this paper are those of the authors and should not be reported as representing the views of any organization/institution.

The views and interpretations in this paper are those of the author(s) and do not necessarily represent those of the Bangladesh Development Research Center (BDRC).

Copyright© 2014

Bangladesh Development Research Center (BDRC) for the overall Working Paper Series. The copyright of the content of the paper remains with the author(s) and/or the institution(s) submitting the content.

**Bangladesh Development Research Center
(BDRC)**

2508 Fowler Street
Falls Church, VA 22046-2012, U.S.A.

Tel. +1 703 532 4893

E-Mail: contact@bangladeshstudies.org

<http://www.bangladeshstudies.org>



Rights and Permissions

All rights reserved.

Text and graphics may be reproduced in whole or in part and in any form for educational or non-profit purposes, provided that credit is given to the source. Reproductions for commercial purposes are forbidden.

The Bangladesh Development Research Center (BDRC) disseminates the findings of work in progress to encourage the exchange of ideas about development issues in Bangladesh. Our main objective is to disseminate findings and ideas quickly, so we compromise to some limited degree on presentational quality. The papers are signed by the author(s) and should be cited and referred accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author(s). They do not necessarily represent the view of the BDRC.

Working Papers are available online at <http://www.bangladeshstudies.org/wps/>

Economic Structure and Macroeconomic Uncertainty: Policy Implications for Bangladesh

Bernhard G. Gunter, Faisal Ahmed, A. F. M. Ataur Rahman and Jesmin Rahman*

Abstract

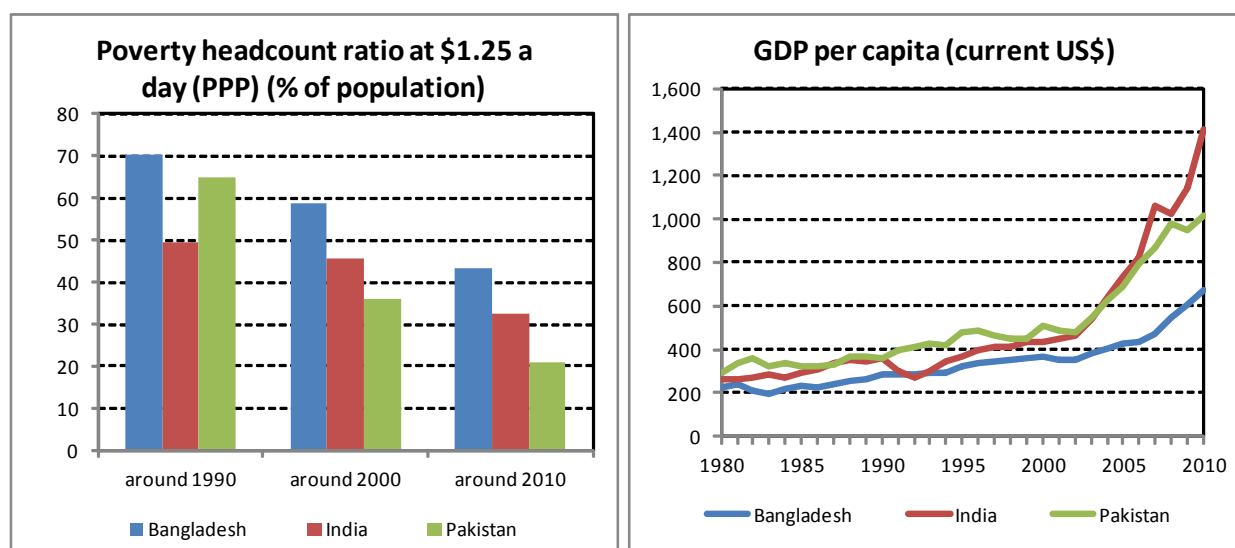
This paper begins with examining Bangladesh's economic structural transformation during 1980-2010, which is compared and contrasted with the transformation of India and Pakistan. It then calculates and compares the three countries' macroeconomic volatility and uncertainty for the observation period (1980-2010), using unbiased volatility and uncertainty measures. It also reviews the evolution of Bangladesh's macroeconomic uncertainty for each decade (i.e., the 1980s, 1990s and the 2000s). It shows, for example, that Bangladesh's GDP volatility and uncertainty have been increasing over time. Reflecting on the fact that macroeconomic uncertainty has a negative impact on investment and growth, the paper derives various policy implications for Bangladesh, highlighting the importance of economic diversification, countercyclical monetary policy, smoothing external factors, and building up reserves and buffers.

* Respectively, Assistant Professor, American University, Washington DC and President, Bangladesh Development Research Center, Falls Church, VA; IMF Resident Representative in Cambodia, International Monetary Fund (IMF), Phnom Penh, Cambodia; Associate Professor of Economics, North South University, Dhaka; and Deputy Division Chief, International Monetary Fund (IMF), Washington, DC. The authors are thankful for comments received from participants of the International Conference on Bridging the Policy-Action Divide: Challenges and Prospects for Bangladesh, which was held on February 22-24, 2013 at the University of California at Berkeley. Comments are welcome to be sent to Dr. Gunter at: president@bangladeshstudies.org.

I. Introduction

Bangladesh, a low-income country (LIC) of about 160 million people, aspires to become soon a middle-income country (MIC). A World Bank (2007, p. xv) report had confirmed that Bangladesh could join the ranks of MICs by 2016 or some time soon after that. This contrasts with Bangladesh's situation some 35 years ago, when it was one of the poorest countries of the world and was openly referred to being an international basket case. Bangladesh's success story with regards to substantially reducing poverty and increasing GDP per capita is reflected in Figure 1. The percentage of people living below \$1.25-a-day declined from 70 percent in 1992 to 43 percent in 2010, a tremendous achievement; GDP per capita (in current US\$) tripled from \$225 in 1980 to \$675 in 2010. GDP per capita, measured in purchasing power parity adjusted constant 2005 dollars, more than doubled from \$677 to \$1,488 during this period. Taking different starting points into account, Figure 1 also shows that Bangladesh has done better than India in reducing the poverty headcount ratio, though it has done worse than Pakistan. Bangladesh has also done worse than India and Pakistan in increasing GDP per capita.

Figure 1: Poverty Reduction and GDP per capita of Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012); headcount ratios are approximations due to limited data for the same year for all three countries.

This paper reviews how far Bangladesh's economic structural transformation has proceeded and examines the evolution of Bangladesh's macroeconomic volatility and uncertainty over the last three decades, using unbiased volatility and uncertainty measures (see Box 1 below). It also compares Bangladesh's experience with that of India and Pakistan. To the best of our knowledge, there is no publication that has analyzed Bangladesh's macroeconomic volatility and macroeconomic uncertainty.

The paper is structured as follows. Following this introduction, section II examines the three countries' structural transformation, reviewing the evolution of a) sectoral shares, b)

consumption, savings and gross capital formation, c) inflation and money supply, d) imports, exports, current account balance and the terms of trade, and e) net flows on external debt, net flows of foreign direct investment, and remittances. Section III analyzes the evolution of the three countries' macroeconomic uncertainty with regards to a few selected areas where volatility and uncertainty have become a concern for Bangladesh to achieve broad-based sustainable growth over the long-run. Section IV presents the main policy recommendations before the last section provides some conclusions.

II. Economic Structural Transformation

The first systematic economic analysis of development patterns were undertaken by Colin Clark, Hendrik S. Houthakker, and Simon Kuznets. Clark (1940) analyzed the sectoral composition of employment. Houthakker (1957) analyzed the pattern of consumption. The structural transformation as a whole was presented in various studies by Simon Kuznets between 1956 and 1971. Building on these early contributions, the seminal work of *Patterns of Development* by Chenery and Syrquin (1975) correlated the level of development to the accumulation of physical and human capital; shifts in the composition of demand, trade, output and factor use; and some socio-economic processes, such as urbanization, demographic transition and changes in income distribution in an econometric study for over 100 countries for the period 1950-1970.

The transformation of the economic structure was further elaborated in Chenery, Robinson and Syrquin (1986). Syrquin and Chenery (1989) re-examined a reduced set of development patterns, focusing on economic structure related to the sectoral allocation of resources for 108 economies during the period 1950-1983. Trade patterns were especially analyzed in McCarthy, Taylor, and Talati (1987). Branson, Guerrero and Gunter (1997) have re-examined the key patterns of development for a total of 93 countries with annual data from 1970-1994, using both cross-sectional and time-series analysis. This analysis reviews most of the patterns of development for Bangladesh, India and Pakistan from 1980-2010.

II.1. Evolution of Sectoral Shares

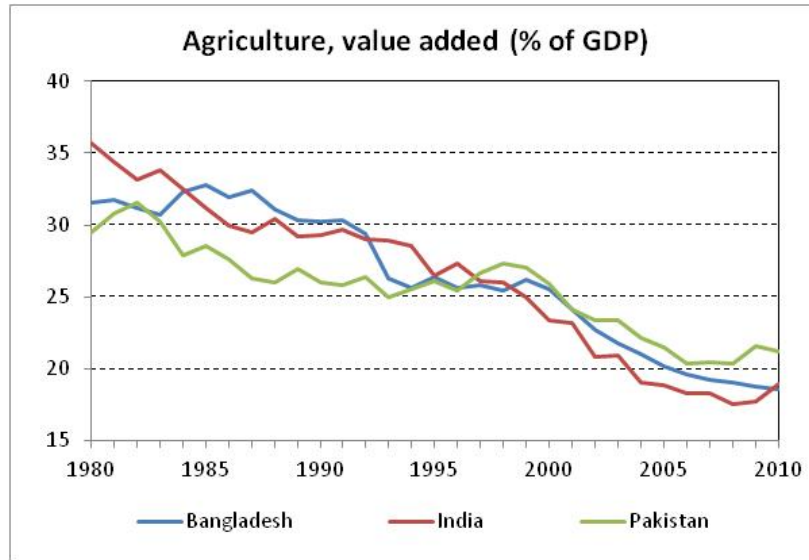
As shown in Figure 2, the share of agriculture/GDP in Bangladesh dropped from 31.6 percent in 1980 to 18.6 percent in 2010, which is a decline of 13.0 percentage points over 31 years. This decline is overall comparable to developments in India and Pakistan, though India's share of agriculture/GDP dropped slightly more (16.7 percentage points: from 35.7 percent in 1980 to 19.0 percent in 2010) and Pakistan's share of agriculture/GDP dropped considerably less (8.3 percentage points: from 29.5 percent in 1980 to 21.2 percent in 2010).

Hence, while India had the highest share of agriculture/GDP in 1980, it now has the lowest share among the three countries, Pakistan had the lowest share of agriculture/GDP in 1980 but has now the highest, and Bangladesh's share of agriculture/GDP was (excluding 1985-1992) basically always in between that of India and Pakistan. Still, comparing Bangladesh with other LICs, Bangladesh's share of agriculture/GDP declined more than that of the average LIC.

The developments in the industrial sector were far less homogenous across the three countries, in terms of both, the overall change over the last 30 years as well as annual changes. As shown in Figure 3, the share of industry/GDP in Bangladesh increased from 20.6 percent in 1980 to 28.4 percent in 2010, an increase of 7.8 percentage points over 31 years. On the other hand, the

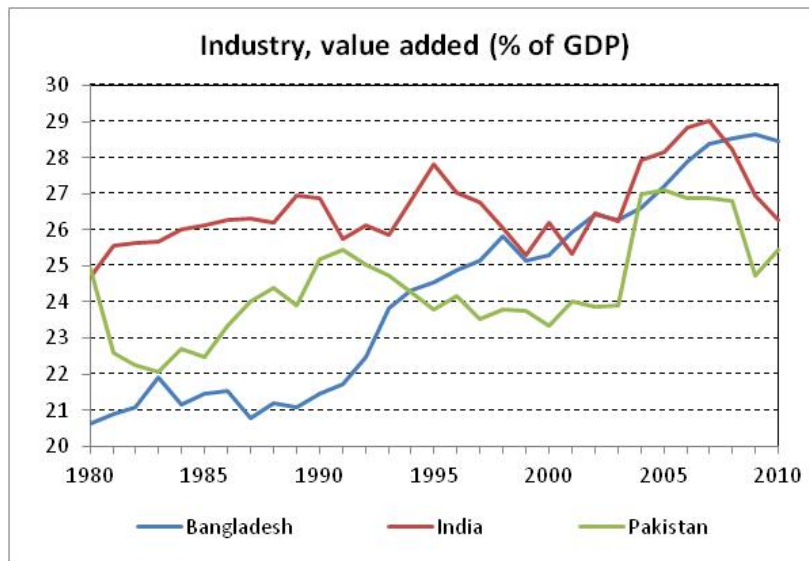
increase of the industrial sector/GDP were small in India (which increased by 1.6 percentage points: from 24.7 percent in 1980 to 26.3 percent in 2010) and marginal in Pakistan (which increased by only ½ percent from 24.9 percent in 1980 to 25.4 percent in 2010). Hence, even though Bangladesh had the lowest share of industry/GDP among the three countries in 1980, it now has the highest share. Bangladesh’s increase in the share of industry/GDP has also been the least volatile among the three countries.

Figure 2: Sectoral Shares of Agriculture in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

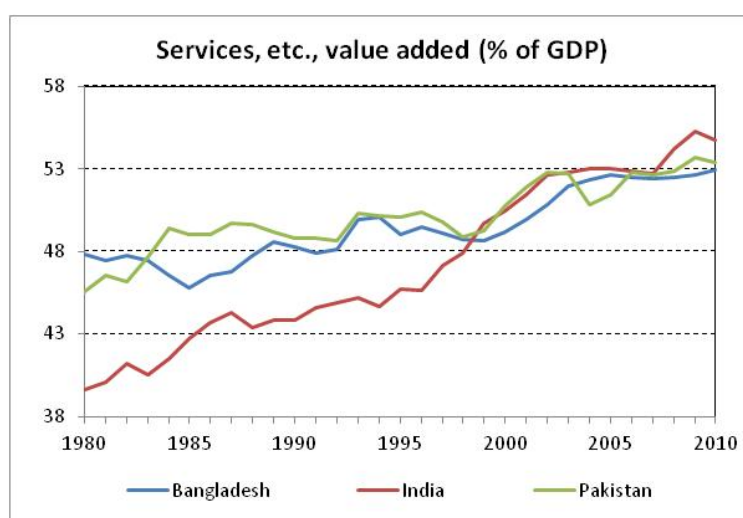
Figure 3: Sectoral Shares of Industry in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

Reflecting Bangladesh's huge success with industry's value-added in GDP, it has made the least progress in increasing its share of services/GDP among the three countries. As shown in Figure 4, the share of services in Bangladesh increased from 47.8 percent in 1980 to 52.9 percent in 2010, which reflects an increase of only 5.1 percentage points over 31 years. In India, the share of services/GDP increased by 15.1 percentage points (from 39.6 percent in 1980 to 54.7 percent in 2010); about three times the increase in Bangladesh. In Pakistan, the share of services/GDP increased 7.8 percentage points from 45.6 percent in 1980 to 53.4 percent in 2010. Hence, even though Bangladesh had the highest share of services/GDP among the three countries in 1980, it now has the lowest share. Compared to the typical pattern of development, which is characterized by a decrease in the share of agriculture/GDP that is first taken over by industry and later by services,¹ we clearly see that Bangladesh is lagging behind the typical sectoral transformation.

Figure 4: Sectoral Shares of Services in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

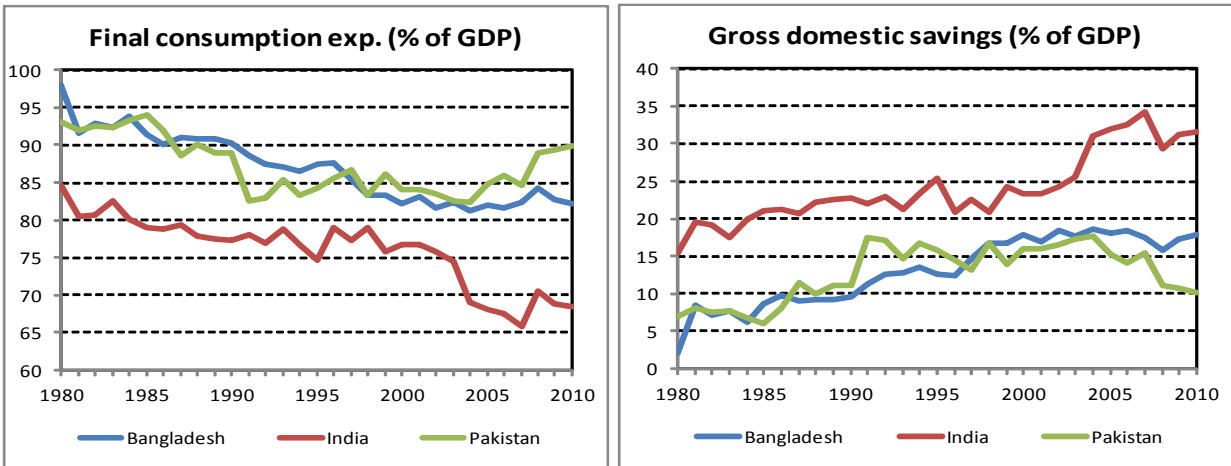
II.2. Evolution of Consumption, Savings and Investment

We now look at the evolution in the shares of final consumption expenditure/GDP and gross domestic savings/GDP, which by definition always add up to 100 percent. Hence, a decrease in the share of final consumption expenditure/GDP is reflected by an increase in gross domestic savings/GDP. As Figure 5 shows, Bangladesh has undergone a positive transformation of decreasing shares of consumption/GDP and increasing shares of domestic savings/GDP. Bangladesh has done considerably better than Pakistan, though it is far from catching up with India. While Bangladesh has increased domestic savings/GDP by 15.8 percentage points (starting at a very low value of only 2.0 percent in 1980), India increased its domestic savings/GDP by 16.1 percentage points (from 15.4 percent in 1980 to 31.5 percent in 2010). Despite Bangladesh's progress, domestic savings is at 16.1 percent of GDP still very low. Troublesome is that basically no progress has been made in increasing the share of domestic

¹ See for example Branson, Guerrero and Gunter (1998).

savings/GDP during the last ten years, despite accelerating GDP per capita. India had surpassed Bangladesh's current (2010) share of domestic savings/GDP in 1981 (at a time, India's GDP per capita was less than half of Bangladesh's current GDP per capita). On the other hand, Bangladesh had surpassed Pakistan's current (2010) share of domestic savings/GDP in 1991 (at a time, Bangladesh's GDP per capita was less than a third of Pakistan's current GDP per capita).

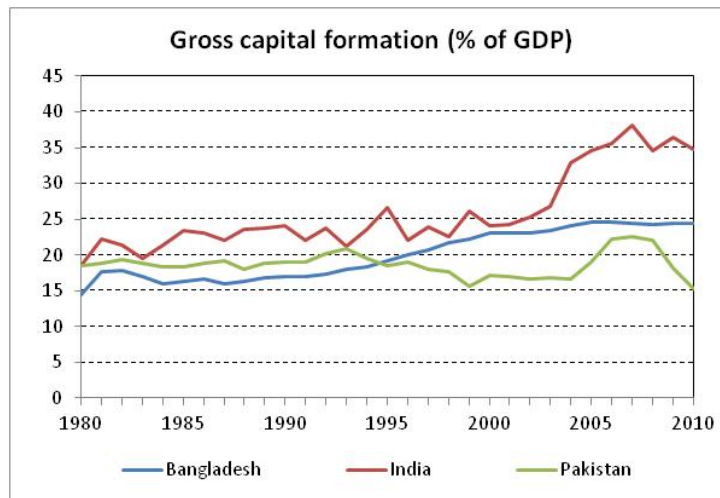
Figure 5: Consumption and Domestic Savings in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

With regards to capital formation, Bangladesh has fallen behind India in increasing gross capital formation but is ahead of Pakistan (Figure 6.) Bangladesh, which had the lowest share of gross capital formation/GDP in 1980 (14.4 percent), was able to increase it by 10.0 percentage points to 24.4 percent in 2010.

Figure 6: Gross Capital Formation in Bangladesh, India and Pakistan



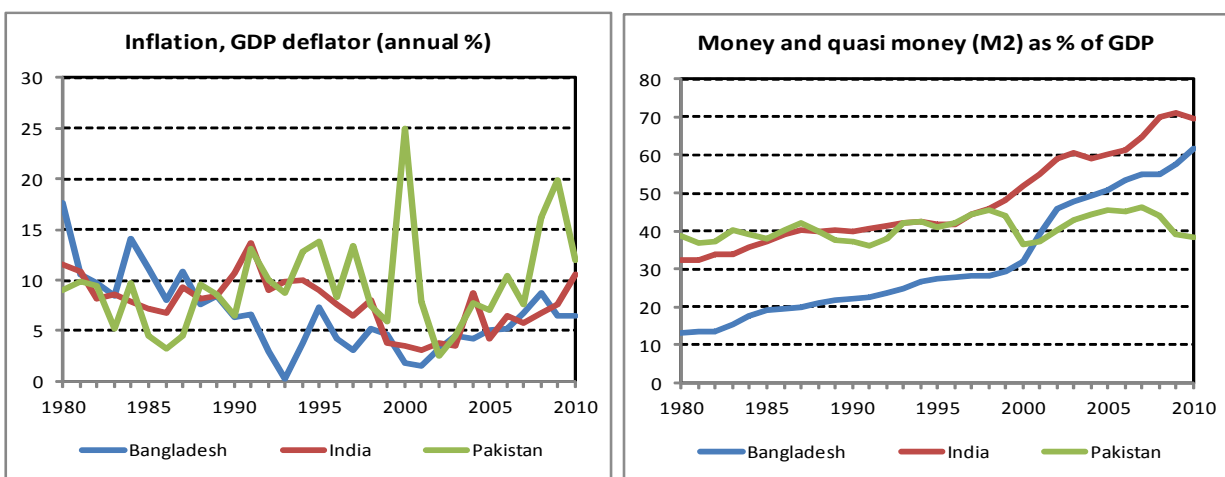
Source: Created by the authors based on World Bank (2012).

Comparing Bangladesh to India, India was able to increase its share of gross capital formation/GDP by 16.2 percentage points (from 18.5 percent in 1980 to 34.7 percent in 2010). On the other hand, Pakistan's share of gross capital formation/GDP dropped by 3.1 percentage points (from 18.5 percent in 1980 to 15.4 percent in 2010). So again, compared to Pakistan, Bangladesh has done very well, but compared to India, Bangladesh has fallen behind. As was the case for the share of domestic savings/GDP, it is once again troublesome that Bangladesh has made no progress in increasing the share of gross capital formation/GDP since 2005, despite accelerating GDP per capita. Increases in the share of domestic savings/GDP and gross capital formation/GDP are standard patterns of development, which Bangladesh is at least currently defying.

II.3. Evolution of Inflation, Money Supply and Exchange Rate

Bangladesh and most other South Asian countries are well-known to have—compared to many other developing countries—relatively low levels of inflation. There have been spikes of inflation in Bangladesh, like around 1980, 1985 and 2008, but overall, Bangladesh had an average inflation rate of 6.6 percent during 1980-2010 (which compares favourably with that of India's and Pakistan's average inflation rate during the same period of 7.7 percent and 9.5 percent, respectively). As shown in the left panel of Figure 7, in Bangladesh, there has been a clear downward trend in inflation from 1980-1993, a period of low inflation from 1992-2002 (averaging slightly below 3.5 percent), and an upward trend in inflation since 2001. It is this more recent upward trend in Bangladesh's inflation rate that implies a disproportional burden for the poor and has started to worry some investors.

Figure 7: Inflation and Money Supply in Bangladesh, India and Pakistan



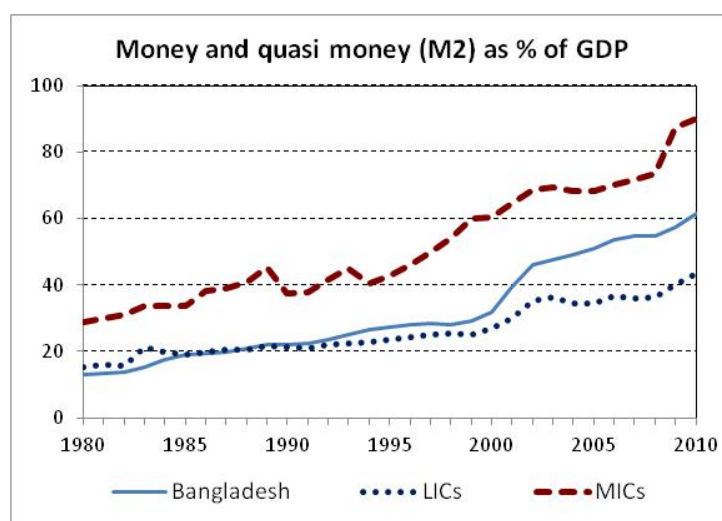
Source: Created by the authors based on World Bank (2012).

Money supply (M2) has increased steadily in Bangladesh from 12.9 percent of GDP in 1980 to 61.5 percent of GDP in 2010, which implies an increase of 48.6 percentage points. Despite this relatively sharp increase in M2/GDP, this share is currently still below that of India's 69.5 percent. India's share of M2/GDP has increased by 37.1 percentage points (from 32.5 percent in 1980 to 69.6 percent in 2010). Pakistan's share of M2/GDP has—despite some volatility—been

relatively stable, and has—due to the sharp contraction at the end of the first decade of this millennium—actually decreased by 0.2 percent from 1980-2010, see the right panel of Figure 7.

Opinions vary sharply among economists on the future implications of Bangladesh’s sharp increase in M2/GDP. Those worried argue that the sharp increase, most of which occurred during the last 10 years, is reflected in Bangladesh’s recent trend of an accelerating inflation rate.² Those not worried argue that an increase in M2/GDP is a normal feature of development, that the ratio is still below that of India’s level, and that a variety of external factors (like global food prices) are at least partly responsible for Bangladesh’s accelerating inflation rate during the last decade. Anyway, fact is that Bangladesh’s current ratios of M2/GDP are considerably higher than the average ratios of LICs (the blue-dotted line in Figure 8) but considerably lower than the average ratios of MICs (the red-dashed line in Figure 8).

Figure 8: M2/GDP in Bangladesh, LICs and MICs

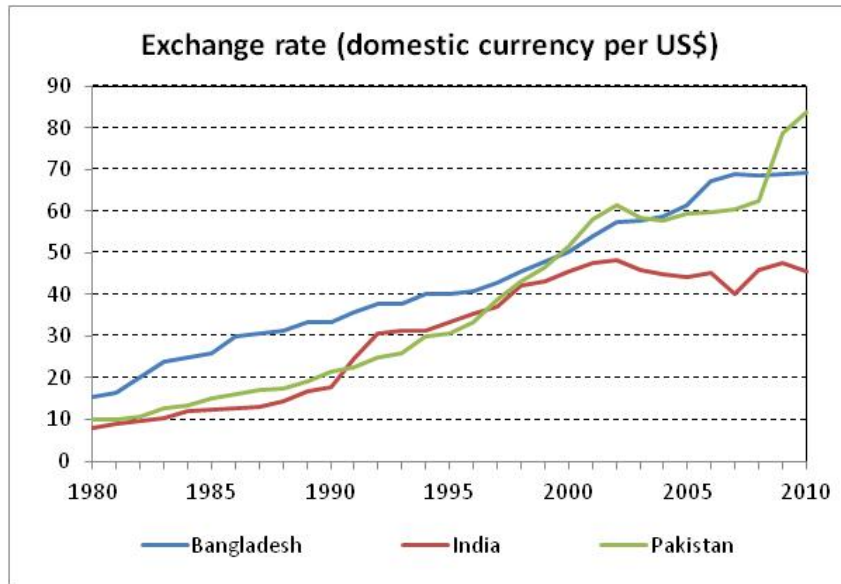


Source: Created by the authors based on World Bank (2012).

As shown in Figure 9, while all three countries experienced a depreciation of their currencies from 1980 to 2002, the evolution was different across the three countries since 2002. The Bangladesh Taka continued to depreciate until it stabilized at around 69 Taka per U.S. dollar from 2007-2010. India was able to reverse the long-term depreciation during 2002-2010. Pakistan’s currency stabilized on a temporary basis from 2002-2008, after it depreciated sharply in 2009 as well as in 2010. Bangladesh’s recent stabilization of the exchange rate is inconsistent with Bangladesh’s accelerating inflation rate, which is with about 7 percent per year considerably above Bangladesh’s 1992-2006 average. On the other hand, the depreciation of the Taka since 2010 can be explained by Bangladesh’s recent increase of its inflation rate and the sharp increase in Bangladesh’s money supply.

² The risk is amplified, especially given the nexus between a rapidly growing banking system and the stock market. The stock market capitalization shot up sharply before the 2010 collapse and crossed 50 percent of GDP at the peak of the bubble.

Figure 9: Exchange Rate Evolution in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

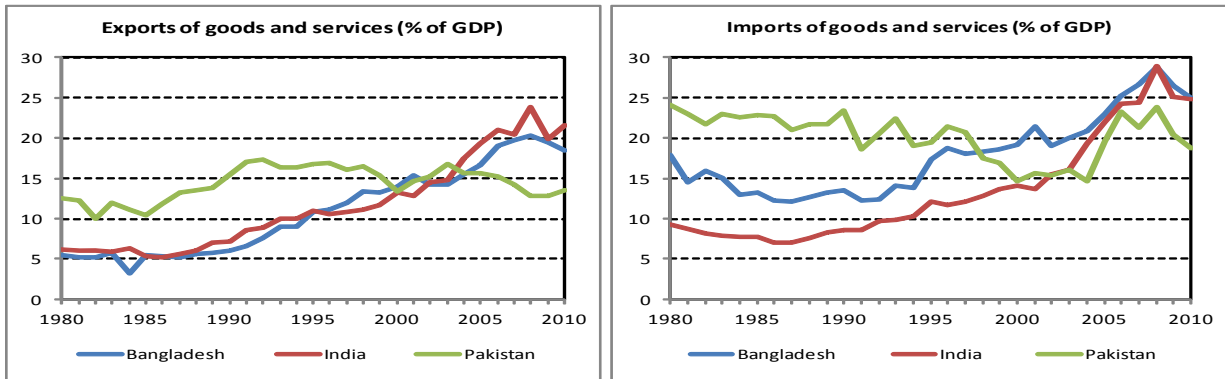
II.4. Evolution of Exports, Imports, the Current Account Balance and Terms of Trade

As shown in Figure 10, the share of exports/GDP in Bangladesh increased from 5.5 percent in 1980 to 18.4 percent in 2010, which is an increase of 12.9 percentage points for the whole 31-year observation period. This implies an average annual growth rate of exports/GDP of 5.4 percent, or an average annual growth rate of exports in current US\$ of 11.6 percent.

Despite this phenomenal progress, Bangladesh is lacking slightly behind India's progress, as India's export/GDP ratio increased from 6.2 percent in 1980 to 21.5 percent in 2010, implying an increase of 15.3 percentage points for the 31 years, or an average annual growth rate of exports in current US\$ of 12.9 percent. Pakistan on the other hand has made very little progress, increasing its exports/GDP ratio by only 1.1 percentage points from 1980-2010, and actually experiencing an overall decline in the export/GDP ratio since the maximum of 17.4 percent in 1992.

Bangladesh's share of imports/GDP also increased (though far less than the ratio of exports/GDP) from 17.9 percent in 1980 to 25.0 percent in 2010, which is an increase of 7.1 percentage points over 31 years. This implies an average annual growth rate of the imports/GDP ratio of 1.5 percent (compared to 5.4 percent for the exports/GDP ratio). India, which started with a far lower imports/GDP ratio than Bangladesh, experienced an increase of 15.4 percentage points for 31 years (from 9.4 percent in 1980 to 24.8 percent in 2010). Pakistan's imports/GDP ratio was the highest among the three countries in 1980 (24.1 percent) and has (despite considerable annual volatility) declined to 18.8 percent.

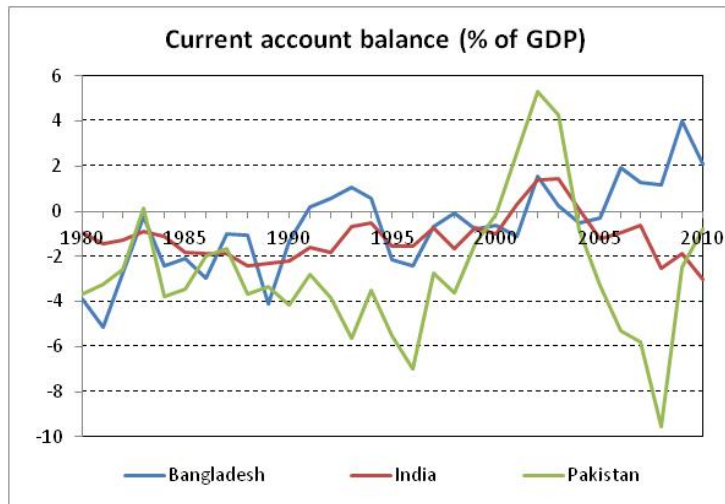
Figure 10: Exports and Imports in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

Combining these developments in exports and imports, the current account balance (CuA) to GDP ratio has significantly improved for Bangladesh, starting with a deficit of 3.9 percent in 1980 and ending with a surplus of 2.1 percent in 2010. Hence, this implies a very impressive improvement in the CuA/GDP ratio of 6.0 percentage points between 1980 and 2010 and improved competitiveness based on the export performance (Figure 11).

Figure 11: Current Account Balances in Bangladesh, India and Pakistan

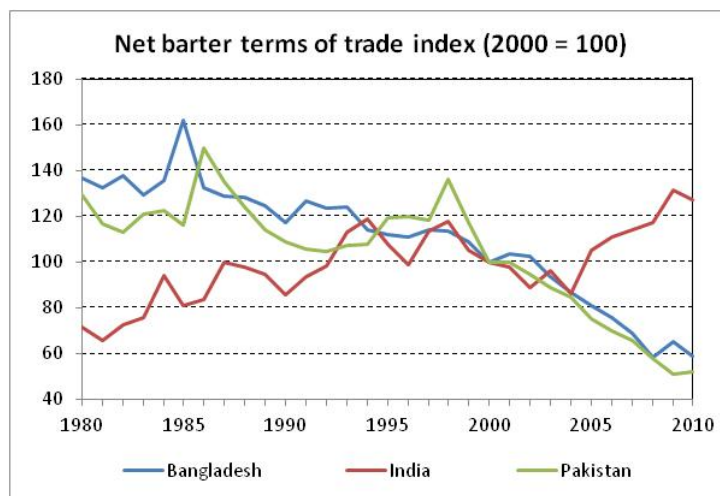


Source: Created by the authors based on World Bank (2012).

Despite India's stronger growth in exports, taking imports into account, India's CuA/GDP ratio deteriorated from a deficit of 1.0 percent in 1980 to a deficit of 3.0 percent in 2010. Pakistan, which made only marginal progress with increasing exports, was (due to the sharp reduction in imports) able to improve its CuA/GDP ratio from a deficit of 3.7 percent in 1980 to a deficit of 0.8 percent in 2010, though this improvement of 2.9 percentage points from 1980-2010 lacks far behind Bangladesh's 6.0 percentage points improvement over the same period. In conclusion, looking at both, the evolution of exports and imports, Bangladesh had made the most progress across South Asia and is (excluding mineral exporters) among the best performers of all LICs.

Despite Bangladesh's progress with increasing exports and improving its current account balance, there is one highly disturbing fact: Bangladesh's terms of trade index (2000=100) has deteriorated from 137 in 1980 to 59 in 2010, which implies a total deterioration of 78 index points over 31 years or an average annual deterioration of 2.5 index points (Figure 12). On the other hand, India's terms of trade index has improved from 72 in 1980 to 127 in 2010, which implies an average annual improvement of 2.4 index points. Pakistan's terms of trade index experienced basically the same deterioration as that of Bangladesh.

Figure 12: Terms of Trade in Bangladesh, India and Pakistan



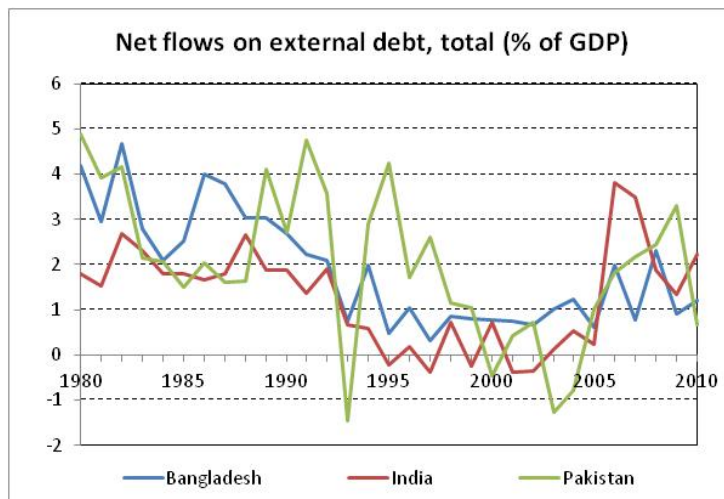
Source: Created by the authors based on World Bank (2012).

II.5. Evolution of Net Flows on External Debt, FDI, and Workers' Remittances

As shown in Figure 13, net flows on external debt (in percent of GDP) have been highly volatile for all three countries. Still, it is possible to identify two similar phases across all three countries: the first one from 1980 to about 2000, showing an overall declining trend, and a second one since 2000, showing an overall increasing trend.

- Bangladesh started with net flows on external debt of about 4 percent of GDP in the early 1980s, which then declined to about 0.7 percent of GDP around year 2000, and then increased to about 1 percent in 2009-2010.
- India started with net flows on external debt of about 2 percent in the early 1980s, which declined to about 0.5 percent of GDP during the late 1990s and the early 2000s, before increasing to about 2.5 percent towards the last few years.
- Pakistan started with net flows on external debt/GDP of about 5 percent in the early 1980s, which then declined to about 2 percent of GDP during the mid-1980s, and then turned highly volatile, averaging at 2.3 percent of GDP during the 1990s and 0.9 percent of GDP during the 2000s.

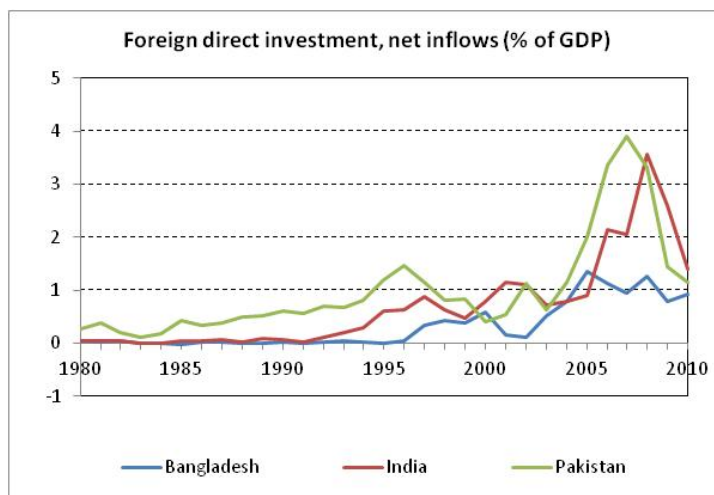
Figure 13: Net Flows on External Debt in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

As shown in Figure 14, Bangladesh’s net inflows of FDI have been negligible until 1996. Following some increase during the late 1990s and early 2000s, they stabilized around 1 percent of GDP since 2005. India also had net FDI inflows close to 0 percent of GDP until about 1991, but increased then to about 3.5 percent of GDP in 2008, after which FDI declined sharply to 1.4 percent of GDP in 2010. Pakistan is the only country (among the three countries) that received at least some FDI inflows during the 1980s, amounting to an average of 0.33 percent of GDP. Pakistan’s FDI inflows then rose to an average of 0.88 percent of GDP during the 1990s. They further accelerated sharply during the mid 2000s, reaching a maximum of 3.9 percent of GDP in 2007, after they declined equally sharp and reached barely 1.1 percent of GDP in 2010.

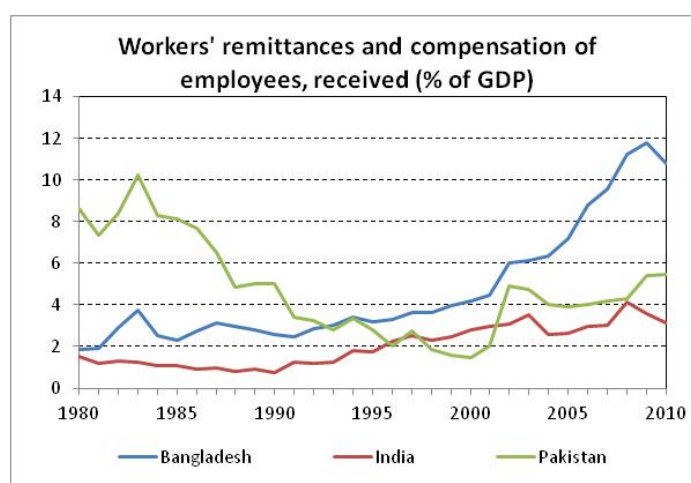
Figure 14: Net Inflows of FDI in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

Finally, comparing the percentage of workers' remittances across these three countries (see Figure 15), Bangladesh has done extraordinarily well, especially since 1995. Bangladesh's workers' remittances increased from 1.9 percent of GDP in 1980 to about 3.2 percent in the mid-1990s, after which they increased sharply during the 2000s, reaching a maximum of 11.8 percent of GDP in 2009. Bangladesh's workers' remittances always exceeded those of India's and since 1995, also that of Pakistan's. India's workers' remittances remained relatively stable, starting with about 2 percent of GDP in 1980 and reaching barely 4 percent of GDP by the end of the 2000s. Pakistan's workers' remittances experienced a sharp decline during most of the last 31 years (from a maximum of 10.2 percent of GDP in 1983 to a minimum of 1.5 percent of GDP in 2000). Pakistan's workers' remittances then stabilized at around 5 percent of GDP during most of the 2000s.

Figure 15: Workers' Remittances in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

III. Macroeconomic Volatility and Uncertainty

As is well known today, macroeconomic volatility and especially macroeconomic uncertainty have a negative impact on investment and growth (for an extensive review of the literature, see Gunter, 1998). When measuring macroeconomic uncertainty, it is important to differentiate between risk, volatility, and uncertainty. There are two ways to look at uncertainty: one way is to look at uncertainty as a situation or a state of the world; the other way is to look at uncertainty as a motion or movement of a variable. When comparing states of the world, the difference is made between risk and uncertainty. When comparing movements of a variable, the difference is made between volatility and uncertainty.

Risk and volatility are thus comparable in the sense that risk and volatility are measurable. Uncertainty is a more complicated concept, either when referred to as a situation or a variable's movement. While the terms "risk" and "uncertainty" are often used as synonyms, they are different concepts and need to be treated as such. Based on the pioneering work of Frank H. Knight (1921), a risky situation does not need to be uncertain and vice versa. Uncertainty is a situation in which the likelihood of an event occurring is not known at all; no probability distribution can be attached to the outcomes.

Similar to the difference between risk and uncertainty, there is -- at least at the theoretical level -- a very clear distinction between the concept of volatility and the concept of uncertainty. Referring to the behavior of a variable over time, Hausmann et al. (1995, p. 193) have pointed out: "Volatility and uncertainty are in principle distinct concepts: volatility refers to the tendency of a variable to fluctuate, while uncertainty is present only when those fluctuations are unpredictable." Though Hausmann et al. (1995) have stressed the difference between volatility and uncertainty, they continue to say that volatile quantities also tend to be unpredictable, so that in practice, the distinction is less relevant. Even though we will show below that this is not necessarily the case, we will report both a standard measure of volatility and a standard measure of uncertainty (which are each measured as detailed in Box 1).

Box 1: Measuring Volatility and Uncertainty

Volatility is measured by the standard deviation of a variable, i.e., the square root of the variance of a variable, divided by the average of the variable over the observation period to reduce any possibly remaining bias related to differences in absolute levels across countries or time. The variance is defined according to the formula:

$$\sigma^2 = \frac{\sum_i (X_i - \bar{X})^2}{N} \quad (\text{discrete case})$$

or

$$\sigma^2 = \int (X_i - \bar{X})^2 f(X) dX \quad (\text{continuous case})$$

where \bar{X} is the variable mean,
 X_i is the i th observation of the variable,
 N is the number of observations, and
 $f(X)$ is the probability density function.

Following the seminal work of Engle (1982) and the empirical work on macroeconomic uncertainty measures by Gunter (1998), we measure uncertainty by the standard deviation of the error terms of an autoregressive model, divided by the average of the variable over the observation period to reduce any possibly remaining bias related to differences in absolute levels across countries or time. The standard error of AR (1) estimations are defined as follows:

$$S_t = c + aS_{t-1} + e_t$$

where S_t is the structural variable under consideration, and e_t is the error term.

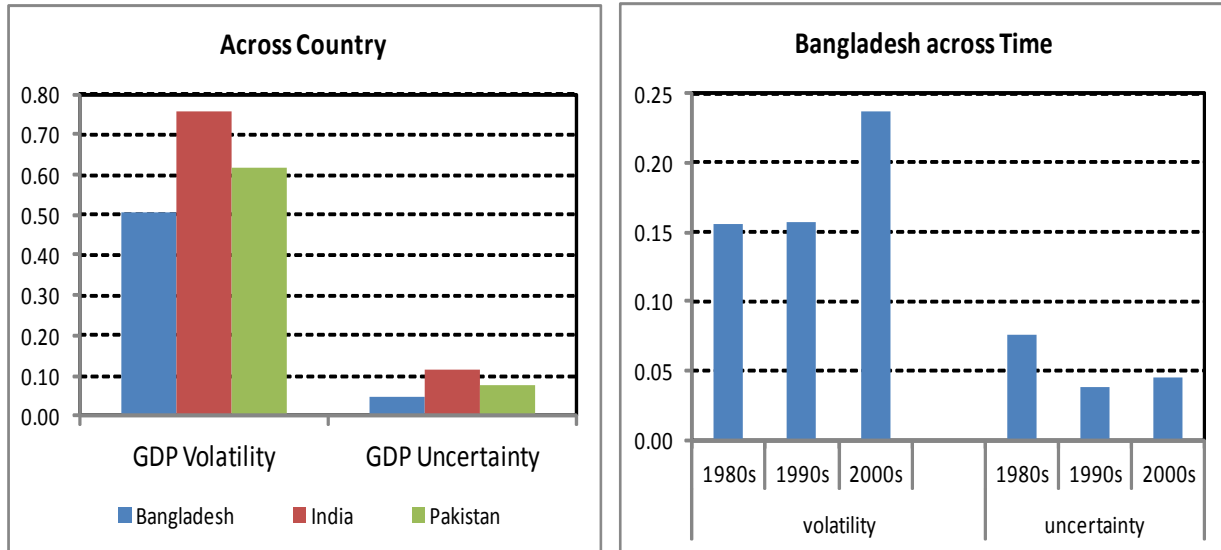
III.1. GDP Volatility and Uncertainty

As shown in Figure 16, compared to India and Pakistan, Bangladesh's GDP is the least volatile as well as the least uncertain during 1980-2010. It should be stressed that this is not due to Bangladesh having the lowest GDP among the three countries (as the standard deviations had been normalized by dividing by average GDP), but due to Bangladesh's relatively smooth acceleration of GDP growth rates since 1980, especially if compared to the more erratic GDP

growth rates of India and Pakistan.³

However, as the right-hand side panel of Figure 16 shows, the volatility of Bangladesh’s GDP has increased over time, especially the last decade, and while GDP uncertainty has been lower during the 2000s than during the 1980s, Bangladesh’s GDP uncertainty has increased from the 1990s to 2000s. Furthermore, while Bangladesh remains to have the lowest volatility and uncertainty across the three countries based on the experiences of the 2000s, the differences between the three countries is smaller for the 2000s than for 1980-2010.

Figure 16: GDP Volatility and Uncertainty



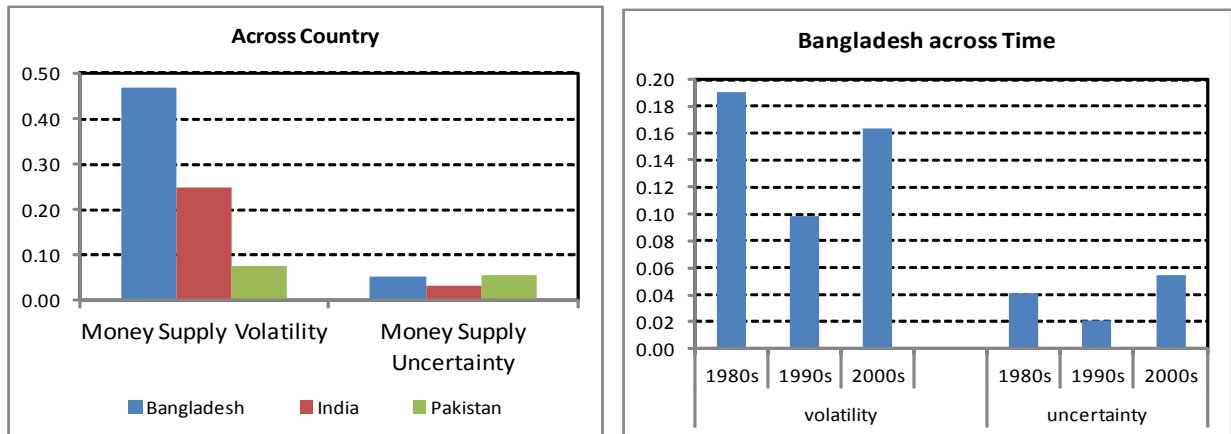
Source: Created by the authors based on World Bank (2012).

III.2. Money Supply Volatility and Uncertainty

While Bangladesh’s GDP volatility and uncertainty have been the lowest across the three countries, Bangladesh’s money supply volatility is the highest among the three countries and Bangladesh’s money supply uncertainty is (like that of Pakistan) considerably higher than India’s money supply uncertainty (see Figure 17). Both, Bangladesh’s money supply volatility and uncertainty have also been rising significantly since the 1990s, and money supply uncertainty has been the highest in the 2000s. Calculating volatility and uncertainty for inflation rates (instead of for money supply) provides the same qualitative results. Hence, in addition to the likely negative impacts of an accelerating inflation rate shown in Figure 7, the high and accelerating volatility as well as uncertainty of Bangladesh’s money supply is further increasing the negative impact on investment on growth.

³ We also calculated the volatility and uncertainty of PPP-adjusted GDP and GDP per capita and got qualitatively the same results.

Figure 17: Money Supply Volatility and Uncertainty

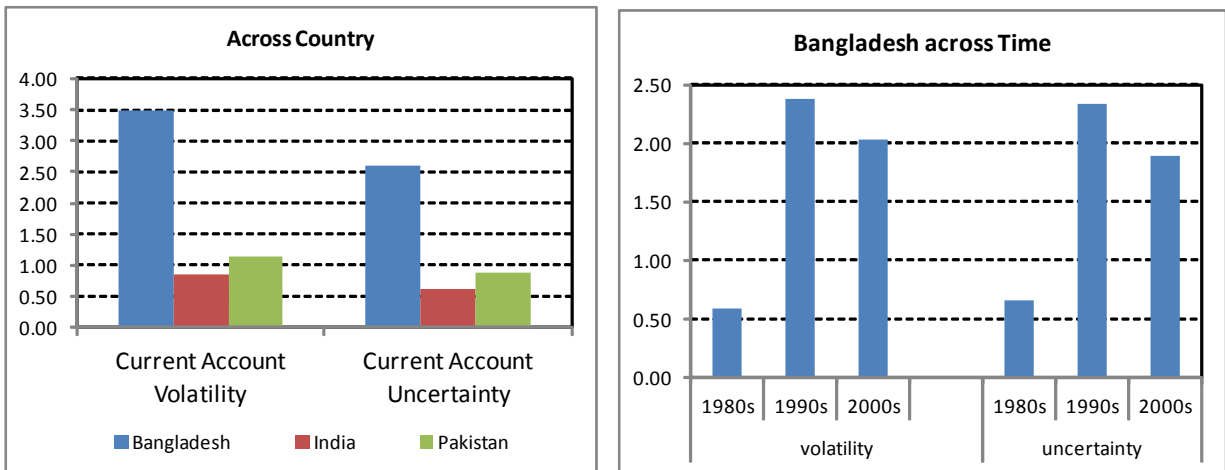


Source: Created by the authors based on World Bank (2012).

III.3. Volatility and Uncertainty of the Current Account Balance (CuA)

As shown in Figure 18, during the last three decades, Bangladesh’s CuA volatility and uncertainty has been about three times higher than the CuA volatility and uncertainty of India and Pakistan. Furthermore, though the volatility and uncertainty declined a little bit during the 2000s compared to the 1990s, they still remain at about three times the 1980s level. This relative instability in Bangladesh’s CuA is mostly due to highly volatile and uncertain imports of goods and services, which is clearly visible in Figure 10.

Figure 18: Current Account Balance Volatility and Uncertainty



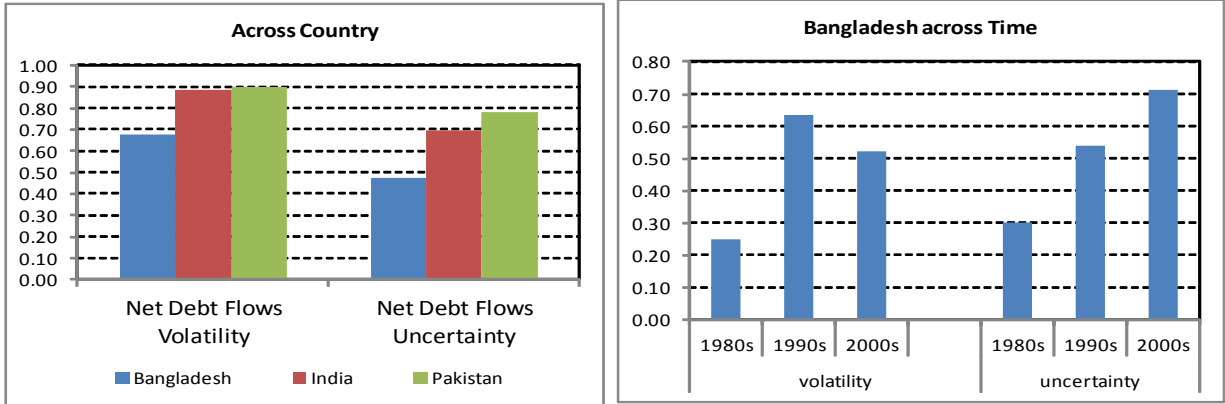
Source: Created by the authors based on World Bank (2012).

III.4. Volatility and Uncertainty of Capital Flows: Debt, FDI and Remittances

III.4.a. Volatility and Uncertainty of Net Flows of External Debt

As shown in Figure 19, Bangladesh also has the lowest volatility and uncertainty with regards to net flows of external debt during 1980-2010. The volatility and uncertainty of debt flows have doubled from the 1980s to the 1990s, and while the volatility has decreased a little bit in the 2000s, the uncertainty of net external debt flows has accelerated further from the 1990s to the 2000s.

Figure 19: Net Debt Flows Volatility and Uncertainty

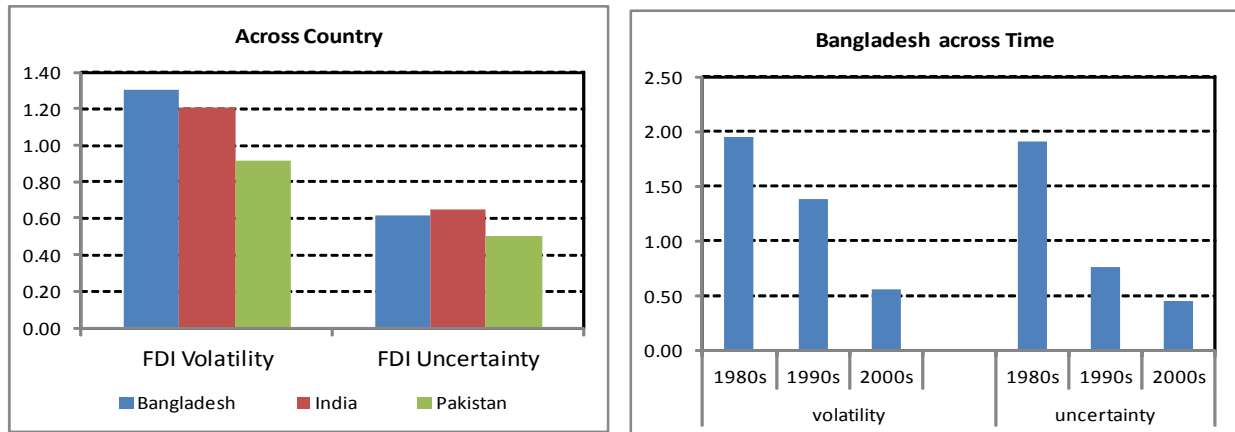


Source: Created by the authors based on World Bank (2012).

III.4.b. Volatility and Uncertainty of Net FDI Inflows

Bangladesh's positive record of having the lowest volatility and lowest uncertainty with regards to debt flows among the three countries is countered by Bangladesh's negative record of having the highest FDI volatility and the second highest FDI uncertainty across the three countries (see Figure 20).

Figure 20: FDI Volatility and Uncertainty



Source: Created by the authors based on World Bank (2012).

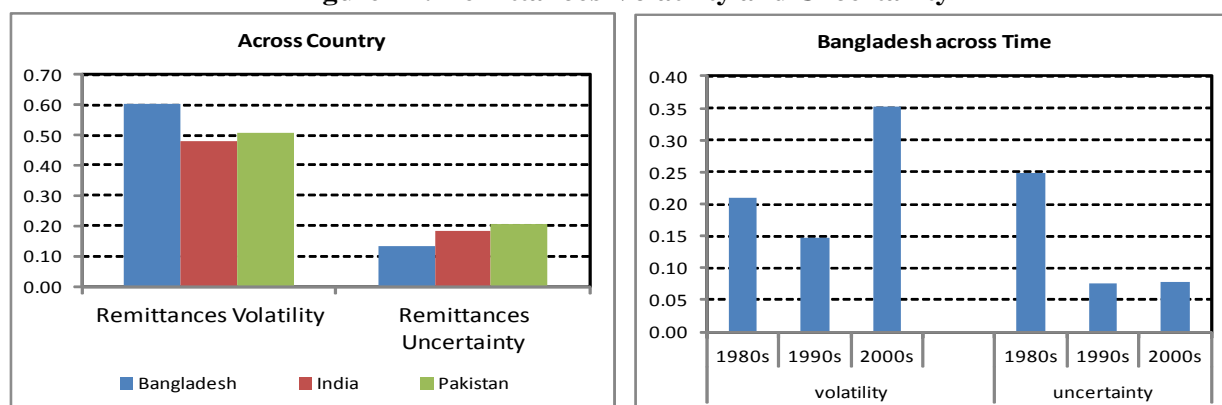
On the positive side, both, the volatility and uncertainty of net FDI inflows have decreased from

the 1980s to the 1990s and once again from the 1990s to the 2000s. This trend could be explained by Bangladesh becoming more and more recognized as a country of interest for foreign investors, and with the increased interest comes more stability, though we should not forget that Bangladesh's ratios of net FDI inflows to GDP are still lacking behind the ratios of India and Pakistan (as was shown in Figure 14).

III.4.c. Volatility and Uncertainty of Workers' Remittances

Looking at the volatility and uncertainty of workers' remittances displayed in Figure 21, the data appears inconsistent as Bangladesh has the highest volatility but the lowest uncertainty. However, as stressed before, given that volatility and uncertainty are different concepts, there actually is no inconsistency. The sharp increase in workers' remittances for Bangladesh during the 2000s has come with some increased volatility, while their uncertainty has decreased. From an economic point of view, we should clearly be more worried about a variable's uncertainty than a variable's volatility.

Figure 21: Remittances Volatility and Uncertainty



Source: Created by the authors based on World Bank (2012).

IV. Policy Recommendations

IV.1. Economic Diversification

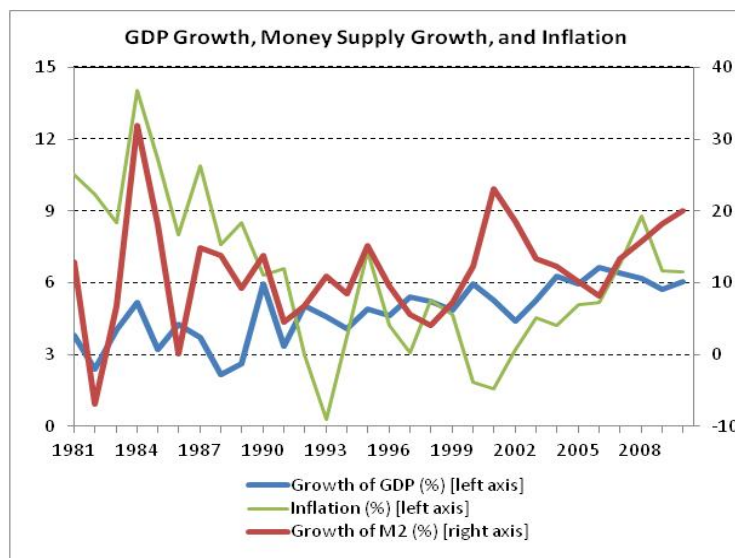
While not the most urgent concern, there is a serious issue related to Bangladesh's little progress towards a diversified economy. Clearly, while the rise of Bangladesh's textile industry has contributed to poverty reduction and GDP growth, Bangladesh is lagging in completing the structural transformation towards a more significant service sector. Bangladesh is lacking clearly behind the progress made in India, and even though India's rise of the service sector has been exceptional, Bangladesh also lacks behind the typical pattern of development. This might not constitute a problem right now as the textile sector remains dynamic in Bangladesh, but it may complicate Bangladesh's long-term prospects if the sectoral transformation and especially the diversification of the industry sector are not making progress. Policy makers should intensify their efforts for diversifying the Bangladeshi economy in order to be less vulnerable from any future problems in the garments sector.

This diversification would likely also be useful for halting or reversing Bangladesh’s serious deterioration in its terms of trade, which – as was shown above (Fig. 11) – has deteriorated from 137 in 1980 to 59 in 2010. Bangladesh’s terms of trade deterioration is even worse if considering that India’s terms of trade index has improved from 72 in 1980 to 127 in 2010. This sharp divergence between Bangladesh and India is based on Bangladesh exporting mostly textiles (where international competition has intensified), while India has emerged to become a service-based economy. Hence, this is another argument for Bangladesh to diversifying its exports from textiles towards services.

IV.2. Countercyclical Money Supply

While opinions may vary on the optimal level of Bangladesh’s money supply, there should be little disagreement on making Bangladesh’s money supply less volatile and less uncertain, especially as Bangladesh’s money supply has overall been more pro-cyclical than countercyclical (see Figure 22). Nor does it look like that money supply has been used effectively to control inflation. Hence, there is room for using monetary policy to smooth money supply and GDP as well as to control inflation.

Figure 22: GDP Growth, Money Supply Growth and Inflation (all in percent)



Source: Created by the authors based on World Bank (2012).

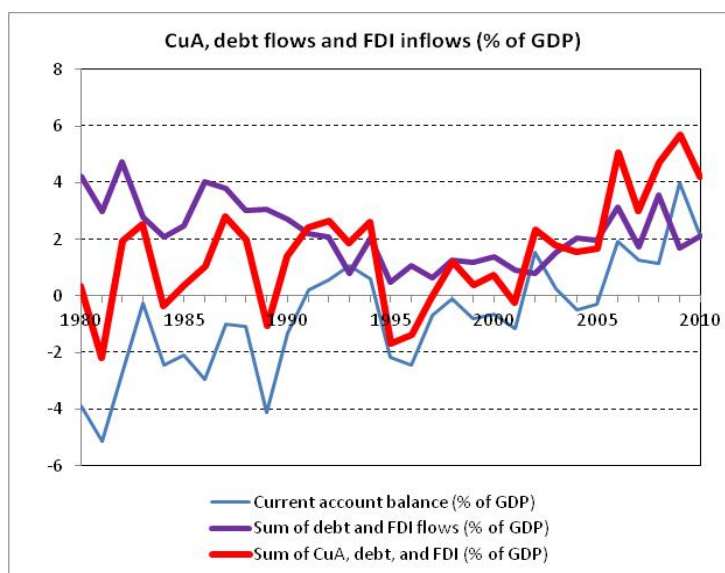
IV.3. Smoothing of External Factors

We had shown above (Figure 18) that Bangladesh’s CuA volatility and uncertainty have been about three times higher than the CuA volatility and uncertainty of India and Pakistan; and the recent trend points towards further increases. Given Bangladesh’s commitment to free trade and that a considerable part of Bangladesh’s volatility of imports is due to volatile oil prices (as oil constitutes a significant part of imports), there is little the government can do directly to smooth the current account balance beyond smoothing imports by the public sector. Still, there are some options for indirect measures.

First, efforts should be increased to make Bangladesh less dependent on oil imports. Second, more regional coordination, especially with India, within the energy sector would be beneficial to Bangladesh as well as its regional trading partners. Obviously, there is no shortage of government awareness related to Bangladesh’s severe power crisis. While overcoming the power shortage is more important than worrying about the volatility and uncertainty of energy imports, the two problems can—to some degree—be tackled simultaneously.

Third, there are some options to reduce the negative impact resulting from Bangladesh’s high volatility and uncertainty of the current account by smoothing other capital flows, especially external public debt flows. As shown in Figure 23, the problem is that debt and FDI flows have typically increased the overall volatility of capital flows. As at least external public debt flows are under the government’s control, as well as the overall government deficit that determines net debt flows, the government has some options to smooth the volatility and uncertainty of some external factors.

Figure 23: Current Account, Net Debt Flows, and FDI Inflows of Bangladesh

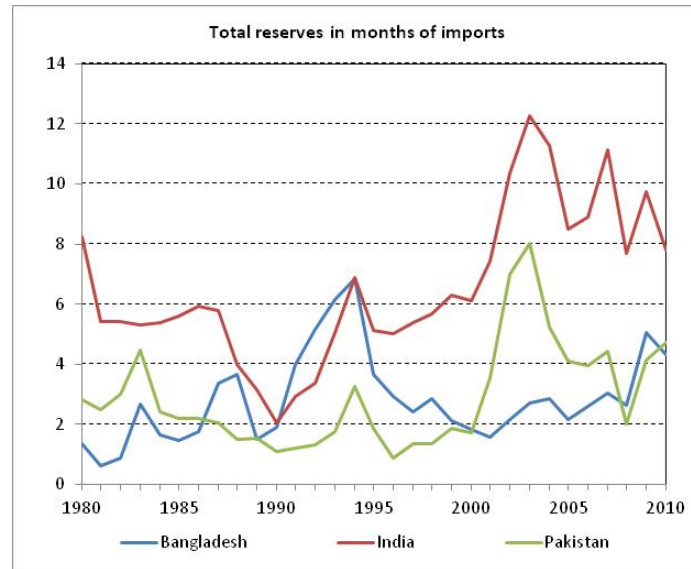


Source: Created by the authors based on World Bank (2012).

IV.4. Reserves and Buffers

Given the limited options to reduce the volatility and uncertainty of macroeconomic variables, especially with regards to the current account balance and other external flows, it would be crucial to build up reserves and other macroeconomic policy buffers (IMF 2010). As Figure 24 shows, expressed in terms of months of imports, Bangladesh has overall the lowest reserves among the three countries. Hence, increasing reserves would compensate for Bangladesh’s high current account volatility and uncertainty, and it is also important now as Bangladesh is (like other LICs) highly vulnerable to the risk of a sharp global downturn (IMF, 2011).

Figure 24: Reserves in Months of Imports in Bangladesh, India and Pakistan



Source: Created by the authors based on World Bank (2012).

V. Conclusions

We have shown that Bangladesh has made considerable progress with regards to achieving poverty reduction and GDP growth. However, Bangladesh's economic structural transformation lags behind that of India and this explains Bangladesh's serious long-term deterioration in its terms of trade. We then focused on some areas where increasing volatility and uncertainty have become a concern, though it should be clarified that there are other macroeconomic variables (like for example the exchange rate) for which Bangladesh has a lower volatility and lower uncertainty than India and Pakistan. It should also be clarified that there are a variety of other uncertainties, especially political uncertainty, which amplify the importance of our policy implications and that the removal of bottlenecks (especially in the power and infrastructure sectors) are critical not only to reverse Bangladesh's stalling investment/GDP ratio but also to reduce volatility and uncertainty. The earlier Bangladesh addresses the policy implications presented in the last section, the more likely will it continue to grow sustainably and beyond reaching its short-term goal of becoming a middle-income country.

References

- Branson, William H., Isabel M. Guerrero and Bernhard G. Gunter (1998). *Patterns of Development, 1970-1994. EDI Working Paper* (Washington, DC: World Bank, June); available at: <http://siteresources.worldbank.org/WBI/Resources/wbi37132.pdf>.
- Chenery, Hollis B. and Moises Syrquin (1975). *Patterns of Development: 1950-1970* (New York: Oxford University Press for the World Bank).
- Chenery, Hollis B., Sherman Robinson and Moises Syrquin (1986). *Industrialization and Growth: A Comparative Study* (New York: Oxford University Press).

- Clark, Colin (1940). *The Conditions of Economic Progress* (London: Macmillan, 1940 (2nd ed. 1951, 3rd ed. 1957).
- Engle, Robert F. (1982). Autoregressive Conditional Heteroskedasticity with Estimates of the Variance of United Kingdom Inflation. *Econometrica*, Vol. 50, No. 4 (July), pp. 987-1007.
- Gunter, Bernhard G. (1998). *Economic Structures and Investment under Uncertainty* (Washington, DC: American University, Economics Department, *Ph.D. Dissertation*).
- International Monetary Fund (2010). *Emerging from the Global Crisis: Macroeconomic Challenges Facing Low-Income Countries* (Washington, DC: International Monetary Fund, October); available at: <http://www.imf.org/external/np/pp/eng/2010/100510.pdf>.
- International Monetary Fund (2011). *Managing Global Growth Risks and Commodity Price Shocks—Vulnerabilities and Policy Challenges for Low-Income Countries* (Washington, DC: International Monetary Fund, September); available at: <http://www.imf.org/external/np/pp/eng/2011/092111.pdf>.
- Hausmann, Ricardo et al. (1995). Overcoming Volatility in Latin America. In: Inter-American Development Bank (ed.), *Report on Economic and Social Progress in Latin America: 1995* (Washington, DC: Inter-American Development Bank).
- Houthakker, Hendrik S. (1957). An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law. *Econometrica*, Vol. 25, No. 4 (October), pp. 532-551.
- Knight, Frank H. (1921). *Risk, Uncertainty, and Profit* (Boston: Houghton Mifflin).
- McCarthy, F. Desmond, Lance Taylor and Cyrus Talati (1987). Trade Patterns in Developing Countries, 1964-1982. *Journal of Development Economics*, Vol. 27, Nos. 1-2 (October), pp. 5-37.
- Syrquin, Moshe and Hollis B. Chenery (1989). Patterns of Development, 1950 to 1983. *World Bank Discussion Papers*, No. 41 (Washington, DC: World Bank).
- World Bank (2007). Bangladesh: Strategy for Sustained Growth. *Bangladesh Development Series (BDS)*, Paper No. 18 (Washington, DC: World Bank, July).
- World Bank (2012). *World Development Indicators/Global Development Finance database* (Washington, DC: World Bank); as posted on the World Bank website: <http://data.worldbank.org/data-catalog/> (downloaded on May 16, 2012).