Sources of Growth in South Asian Countries

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Abstract

The purpose of this paper is to extract from the cross-country growth analysis insights about the performance of individual South Asian countries and the region as a whole. It provides a descriptive analysis of regional growth performance relative to performance in other regions, and of country performance within the South Asia region relative to the regional average. We go beyond simple decompositions to draw on the determinants of growth identified in the cross-country literature to assess the contribution of these factors to growth in individual countries.
We find that, historically, openness (measured by the Sachs-Warner index) explains a lot of the difference between the growth experiences of East and South Asia. However, an alternative index provided by the Heritage Foundation, which is based largely on tariff rates prevailing in a country, does not appear to be positively correlated with growth in the 1990s, whereas a liberal foreign investment policy does. In view of these, we examined the possible association between TFPG and the FDI-GDP ratio and found the two I(1) sequences to be co-integrated for Sri Lanka and Pakistan. Thus, FDI appears to be an important driving force behind growth in these South Asian countries.

Some of the South Asian countries, especially Nepal and Pakistan, have higher fertility rates compared to the others. High fertility rates are documented as being negatively correlated with growth mainly by reducing the amount of savings available. There is ample scope for government intervention by strengthening its population control programs on the one hand, and making more resources available for compulsory primary and secondary education. Persistently high shares of government consumption in total GDP negatively affect growth, especially through the capital-accumulation channel.

If we were to ask if growth has been good for the poor in South Asia, the answer is generally in the affirmative because the countries that have experienced sustained high growth over the last few decades have also reduced their absolute poverty levels. However, there are sharp differences at disaggregated levels, such as between the rural and urban population, skilled and unskilled workers, land owners and the land-less and so on. Overall, the incidence of poverty is still the highest in South Asia and the rate at which it seems to be declining is not commensurate with the admirable aggregate growth rates of some of the countries. Thus, a central question for South Asian governments is to decide whether their respective economic reform strategies should have a more explicit poverty focus or not.

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Section 1: Introduction

The purpose of this paper is to extract from the cross-country growth analysis insights about the performance of individual countries in South Asia. The paper will provide a descriptive analysis of regional growth performance relative to performance in other regions, and of country performance of India, Pakistan, Bangladesh, Sri Lanka and Nepal relative to the regional average. In addition, the paper will undertake a simple decomposition of growth in GDP per capita into increases in capital per worker and productivity growth. The heart of the paper is an attempt to go beyond simple decompositions and draw on the determinants of growth identified in the cross-country literature to assess the contribution of these factors to growth in individual countries. The range of factors embraces economic management, structural conditions, initial conditions, and exogenous factors. Using the cross-country regression framework, we tried not only to explain the growth of GDP but also the accumulation of inputs from which domestic product is derived. We focused on *two* inputs in particular, capital and total factor productivity, since our growth accounting exercise revealed their contributions to GDP to be the largest for the South Asia, region. In stead of examining the South Asian growth experience in isolation, we have chosen to compare it with the growth experience of East Asia, which enables us to highlight the commonalties and differences between the two regions.

In our growth accounting exercise, the contribution of capital accumulation to GDP growth came out to be the most significant. We also found that TFP, if not very large in absolute terms, is significant enough in a relative sense (that is, in terms of its percentage contribution to GDP growth). In particular, we found that across countries and periods, higher growth rates of TFP were associated with higher GDP growth rates. We found that the factors that have contributed to higher growth in East Asia, but in which South Asia have been lagging behind, include schooling, openness, strength of institutions, and government spending. The openness factor explains most of the TFPG difference between East and South Asia. South Asian countries also

have relatively higher fertility rates compared to East Asia. High Fertility rates are negatively correlated with growth. Since fertility rates are higher for low-income groups, they may be having an adverse effect on the overall quality of the labor force in the long run. Also, persistently high shares of government consumption to GDP negatively affect growth, especially through the capital-accumulation channel, as was revealed by the comparative analysis with East Asia. The indicators of the quality of education are also low compared to East Asia.

This paper is organized as follows. Section 1 introduces the paper. In Section 2, we have reported the results from our growth accounting exercise. The relative contributions of labor and capital accumulation as well as that of total factor productivity to the growth of GDP are discussed here. In Section 3, we assess the roles of economic and policy variables in affecting GDP growth, capital accumulation and the growth of total factor productivity. In Section 4, we focus on the role of economic reforms and institutional characteristics in stimulating growth. The methodology of this section is similar in spirit to cross country regression analysis. But the motivation for treating the role of reforms separately comes from the fact that reforms in South Asia are a relatively recent phenomenon, as it was only during the late eighties and nineties that most of the countries have adopted the policy of openness and economic liberalization. Also, South Asia's position in terms of institutional, political and social variables, all of which have undergone rapid changes in the recent past, is assessed relative to other sub-groups of developing countries. We also examine the correlation between the growth performances of developing countries and their institutional, political and social standings in the 90's. However, we maintain that the empirical findings of this section are subject to an important caveat: since the different subjective measures of reforms, institutional quality and political freedom show very little movement over time and across countries before the 1990s, we restricted attention only to 1990s, which unfortunately, restricts the size of the sample to the bare minimum. Also, the subjective indices used in Section 4 are, in a sense, *ex ante* measures, which are supposed to influence the decisions of economic agents. After finding that open FDI regimes are positively linked with growth, for completeness, in Section 5, we examined the relationship between the actual flow of Foreign Direct Investment as an *ex post* indicator of openness and the growth of total factor productivity and found that they are co-integrated. We also examined the relationship between other *ex post* measures of openness such as the ratios of total exports and imports to GDP, but failed to find any significant statistical association between trade flows and GDP growth (for

brevity, these inconclusive results are not reported in the paper). In Section 6, we explore the relationship between poverty reduction and growth. We find that the incidence of poverty is still the highest in South Asia and the rate at which it seems to be declining is not commensurate with the admirable aggregate growth rates of some of the countries. Thus, a central question for South Asian governments is to decide whether their respective economic reform strategies should have a more explicit poverty focus or not. The most compelling argument in its favor is that policies that are effective in increasing the incomes of the poor-such as investments in primary education, rural infrastructure, health, and nutrition-are also policies that enhance the productivity of the economy on the whole. Therefore, any reform agenda with the usual emphasis on macroeconomic stability, microeconomic efficiency, and institutional quality that aims at raising output levels can only strengthen itself by also including a poverty focus.

Section 2: Total Factor Productivity Growth (TFPG)

2.1 Methodology

The decomposition of the neoclassical production function to get the residuals is well known. One can start with the neoclassical production function

$$Y = F(A, K, L)$$

where A is the level of technology, K the capital stock, and L is the quantity of labor[2]. Differentiating and rearranging the equation we can get:

$$\dot{Y}/Y = g + (\frac{F_K K}{Y}).(\dot{K}/K) + (\frac{F_L L}{Y}).(\dot{L}/L)$$

where the dotted variables represent time derivatives, and F_K, F_L represent the factor marginal products. The growth rate due to technological change is given by

$$g \equiv (\frac{F_A A}{Y}).(\dot{A}/A)$$

Thus, g can be calculated from the above equation as a residual. We usually assume that factors are paid their marginal product so that the factor shares can be replaced by their respective marginal shares. The residual equation can be written as

$$\hat{g} = \dot{Y}/Y - s_K.(\dot{K}/K) - s_L.(\dot{L}/L)$$

where s_K, s_L are the respective shares of each factor payment in total product, and add to one as long as all income is distributed amongst the factors. The value $\hat{g}$ is the estimate of the total factor productivity (TFP) growth, referred to as the Solow residual.

The residual captures changes in the amount of output that can be produced by a given quantity of inputs. Intuitively, it measures the shift in the production function. Many factors may cause this shift: technical innovation, organizational and institutional change, shifts in societal attitudes, fluctuations in demand, changes in factor shares, omitted variables and measurement errors. One of the important corrections for the omitted variable bias is to include human capital,

[2] Capital and labor can be disaggregated among types and qualities as well.

in addition to physical capital and labor, in the TFP decompositions. There are two ways of doing this. Mankiw, Romer and Weil (1992) treat human capital as another factor of production in which case the residual equation becomes

$$\hat{g} = \dot{Y}/Y - s_K.(\dot{K}/K) - s_L.(\dot{L}/L) - s_H(\dot{H}/H)$$

where the last factor has the same interpretation as capital and labor above. Human capital is usually proxied by average years of schooling of the adult population.

The other way is by adjusting the labor input by quality of labor, as measured by wage differentials between groups of distinct education attainment. This method assumes that the marginal product of labor, with certain educational attainment, is proportional to its wage. This is done by Collins and Bosworth (1996). We have used both of these methods, later in this section, in our calculations for TFPGs in South Asia.

An alternative approach of getting to TFP growth would be to regress the growth rate of output on the growth rate of inputs and interpret the intercept as g, and the coefficients on factor growth rates as the respective shares. But the regression approach has disadvantages mainly due to endogeneity problems. Due to the problems with regression method most studies estimate TFP through the residual method given above. We follow this literature in this study.

Barro (1998) gives a dual approach to growth accounting. Here the Solow residuals are computed from growth rates of *factor prices*, rather than factor quantities. The dual approach states that if output equals factor income

$$Y = RK + wL$$

where R is the rental price of capital and w is the wage rate, the TFP growth rate can be derived by differentiating and rearranging the above:

$$\dot{Y}/Y = s_K.(\dot{R}/R + \dot{K}/K) + s_L.(\dot{w}/w + \dot{L}/L)$$

By taking the terms involving the growth rates of factors to the left-hand side of the equation, TFP growth can be estimated by

$$\hat{g} = \dot{Y}/Y - s_K.(\dot{K}/K) - s_L.(\dot{L}/L) = s_K.\dot{R}/R + s_L.\dot{w}/w$$

The method requires rate of return on capital and wage rate series to estimate the residuals. These series might be tricky to find for developing countries. If the rate of return on capital is proxied by interest rate series, one would expect significant biases in the results since developing countries usually do not have free capital markets and interest rates are more often fixed by the government than determined by supply/demand interaction.

Estimates from the latter method can be a good check on the former, and can give some insights too. Hsieh (1998) does report that the TFP growth estimates from the dual method explain the experiences of some of the East Asian economies better than the estimates from the other method, reported in Young (1995).[3]

In computing the Solow residuals, we have used the capital stock data estimated by Nehru and Dhareshwar (1993), updated until 1996. Nehru and Dhareshwar use the perpetual inventory method to create their capital stock series. The other method for estimating capital stock would have been through direct surveys, but they are usually not feasible so Nehru and Dhareshwar like most other researchers use the indirect perpetual inventory method.

The Perpetual inventory method argues that the stock of capital is the accumulation of the stream of past investments:

$K_t = w_t I_t + w_{t-1} I_{t-1} + \ldots + w_{t-T} I_{t-T}$

Where $w_t = 1$, $0 < w_{t-i} < 1$, t-T is oldest surviving capital asset.

Using concept of initial capital stock K (0). Nehru and Dhareshwar thus construct the capital stock series using the following equation:

$$K_t = (1-\Phi)^t K(0) + \sum_{i=0}^{t-1} I_{t-i}(1-\Phi)^i$$

Φ = Rate of geometric decay and K (0) is the initial stock in period 0.

[3] If comparable data are available, it may be a good idea for the country-authors to crosscheck with these dual estimates.

Initial capital stock can be estimated in a number of ways. Nehru and Dhareshwar use a modified Harberger (1978) method to compute K (0). The value of investment in the first period is estimated through a linear regression of the log of investment against time. The fitted value of initial investment is used to calculate initial capital stock using the following equation:

$K_{t-1} = I_t / (g + \delta)$

Where g = rate of growth of output (δ-depreciation)

The other important estimate needed is of δ, the depreciation rate. Nehru and Dhareshwar surveyed both the theoretical work as well as the empirical evidence to come to the conclusion that the depreciation rate should be 4 percent. Though they acknowledge that better way would be to estimate individual country rates, but that is not feasible due to the dearth of data. In making the data set they did try other rates, but the results did not vary significantly with the changes in depreciation rate assumed so they are fairly confident that the assumption of $\delta = 4\%$ will not be inappropriate.

As a sensitivity check, we also used the King-Levine dataset on capital stock for calculating Solow residuals. This series is restricted until the late 1980s. King-Levine use the Summers-Heston investment rates which price investment quantities at world prices. Both Nehru and Dhareshwar and Bosworth-Collins use national accounting investment rates, which will not necessarily reflect the same quantity of capital accumulation in each case. The results for the three decades (1960s, 70s and 80s) are qualitatively no different from those obtained by using the Nehru-Dhareshwar series. These are presented in Table 2.6 in the appendix.

2.2 Regional Comparisons

A lot has been written about the 'East Asian Growth Miracle' and why it happened and how was it sustained. Within the neo-classical framework and the Solow growth accounting approach the debate has mainly boiled down to deciding whether the growth was largely a result of capital

accumulation and accumulation of other factors or whether it was due to technological innovation and catching up. 'The East Asian Miracle', the study conducted by the World Bank, estimated fairly high shares for technological innovation for most of these countries. This has sparked quite a debate in the area with a large volume of literature arguing for or against those initial findings. Young (1994), Krugman (1994), Kim and Lau (1994), and many others have given revised lower estimates for technological change. Hahn and Kim (1999) have recently argued that though TFP growth in East Asia has not been as good as the developed countries, it has been better than the comparative performance of other developing countries and regions, and the TFP growth has also been much more consistent and stable in East Asia than in other regions.

In view of the lack of consensus in the field, we looked at three different estimates of the role of TFP and capital in regional growth. Table 2.1 in the Appendix is from Nehru and Dhareshwar, which gives the regional comparisons for the various developing regions of the world. For virtually all groups of countries, the post-1973 TFP growth rates were lower compared to the pre-1973 period. Asia (both East and South) was the only exception. Subsequently, Nehru-Dhareshwar used their TFP estimates to identify economies where TFP growth has been a more important contributor to economic growth than growth in the capital stock. After restricting the sample for this exercise only to economies with average GDP growth rates of more than 2% per annum, they find that in the 1960-90 period, there were 8 economies (China, Kenya, Mauritius, Cypress, Belgium, Finland, Italy and Norway) where TFP contributed more to GDP growth than capital accumulation. For the sub-period 1980-90, this number goes upto 25, with *Bangladesh, India and Pakistan* added to the list. They note that virtually all these economies underwent reform programs during the 1980s.

Table 2.2 is from Senhadji (1999). It is interesting to note that although East Asia, as a region, shows much higher GDP growth rates for this period, compared to any other region, including the industrialized world, it is the South Asian region that had the highest growth of TFP over this period. The difference, between South Asia and East Asia is not large in absolute terms, but keeping in mind the differentials in growth rates of GDP, the performance of TFP in South Asia becomes quite significant. TFP growth is *10.7* percent of GDP growth in East Asia, but it is *17* percent of GDP growth in South Asia. For East Asia, the contribution of capital is much larger at *69.2* percent as compared to *60* percent in South Asia. This highlights the importance of TFP

growth in South Asia. On the whole, one can see that Senhadji (1999) does not find the contribution of TFP to be very significant across all regions, compared to the contribution of capital. Labor contributions also outweigh the contribution of TFP. It is also important to note that TFPs are generally higher in the sixties, lower in the seventies and recover in the eighties.[4]

Table 2.3 is taken from Collins and Bosworth (1996). In their calculations East Asia outperforms South Asia in TFP growth. But the TFP contributions are still lower than the contributions from Capital. The contribution of education is lower than TFP in two regions and higher in the other two. The two regions that have shown higher growth over the 1960-94 period (East and South Asia) have had higher contributions from TFP than from education. TFP contributions to GDP growth are 34.8 percent in South Asia, as opposed to 26.2 percent in East Asia. As with the earlier reported Senhadji (1999) figures, TFP has higher relative importance in South Asia than in East Asia. Thus, both data sets show that the importance of TFP growth is higher in South Asia as a higher percentage of the growth in GDP is attributed to TFP growth in South Asia, though the overall growth is also lower in South Asia.

Summary

Total Factor Productivity Growth (TFPG)
Regional Features
Period: 1960-1996

• GDP growth lower in SA than EA. Higher than other regions.

•TFP significant contributor, but capital *much larger.*

• TFP higher in the 60s, lower in the 70s, recovery in the 80s, sustained mostly through the 90s.

• TFPG contributed 17% of GDP growth in SA, 10% in EA. Capital contributed 60% in SA and 70% in EA.

[4] This trend will be seen again when we go through the country TFPs for South Asia.

2.3 Individual Country Estimates

The data for South Asian countries show that growth rates of GDP in South Asia have not been as spectacular as they have been in China and some of the East Asian countries (the Tigers) of the last two decades. On the other hand, these growth rates have been better than many African and even some of the Latin American countries. During the period 1966-87, countries in South Asia (Bangladesh[5], India, Nepal, Pakistan, and Sri Lanka) grew at an average of 4.4 percent per annum (non-weighted average). Bangladesh grew at 3.19 percent, India 4.30 percent, Pakistan 5.84 percent, and Sri Lanka at 4.88 percent per annum. During the 1987-97 decade the performance has changed. The average growth rate has gone up a little to 4.9 percent (Bangladesh 4.19 percent, India 6.14 percent, Pakistan 5.09 percent and Sri Lanka 4.16 percent). The performance of Bangladesh and India improved in the last decade, while Pakistan slowed down significantly. Sri Lanka has slowed down, but only by a small measure.

The main findings of our growth accounting are as follows. In terms of magnitudes, capital accumulation comes out as the most important contributor to growth. Here the finding is similar to some of the later studies on East Asia. We find that TFP growth is usually the second most important factor, and by no means insignificant. The contributions of labor and education usually come out to be much smaller. On the regional level though capital accumulation comes out as the most important factor for South Asia, the relative contribution of capital accumulation to growth is much lower for South Asia than for East Asia.. TFP contributions were high in the 1960s, low in the seventies, better again in the eighties, and most countries have been able to sustain these contributions in the nineties as well. There are individual variations in performance.

On a country level, we find India to have had higher relative contributions from capital accumulation, and India's GDP growth performance has also been improving steadily. Pakistan

[5] Though Bangladesh came into being in 1971, the data for East Pakistan for the sixties, which is the region that became Bangladesh, was kept separate and allows us to have series on Bangladesh of the 1960s. The series for Pakistan have been appropriately adjusted as well.

has had higher but more turbulent performance, and its contribution from capital accumulation is also relatively lower. Bangladesh had a very poor decade in the 1970s, which pulls the overall averages down, but it has been doing well in the 1990s. Bangladeshi numbers have been more turbulent than the rest. Sri Lanka has had very steady but relatively slow growth through all of the decades, and it has had stable and high contributions from capital accumulation.

TFPG is calculated using three different data sets, with slightly different variables, retaining the basic definition of the Solow residual. In the first case TFP was calculated using annual growth rates of GDP (g), labor force (l), physical capital stock (k) and total mean years of schooling of the total population (e). The formula used was:

$TFP = g - 0.33l - 0.33k - 0.33e$.[6]

Overall and ten-year averages were then computed for each country, which are given in Table 2.4. GDP and labor force data were taken from the World Development Index 1999, capital stock data was taken from Nehru and Dhareshwar (1993), and education data came from Barro and Lee (1994).. The Barro and Lee data on educational attainment is compiled from a variety of sources to infer the percentage of each country's adult population that had obtained a particular level of education for each year of the data set. Since some of the data is available periodically, interpolation is used to fill in the gaps. The authors allocate each country's population among seven schooling levels and an estimate of average years of schooling of the adult population is from this data. In Table 2.4, the data typically starts from early sixties and ends in 1985.

The second TFPG exercise was conducted by using the Nehru and Dhareshwar (1993) data set. The formula for TFPG calculation was the same as before, but the variables were slightly different. Nehru and Dhareshwar (N&D) use GDP at market prices (1987 constant local prices) and capital stock is also in constant 1987 local prices. Human capital stock (e) is estimated by total mean years of schooling. Instead of using labor force, N&D use population between ages 15 and 64. Annual growth rates are calculated for the variables and then the following formula used to calculate the residuals:

$TFP = g - 0.33k - 0.33l - 0.33e$ [7]

[6] The factor shares are taken to be 0.3 for each factor. Here we follow the literature on TFPG, but some discussion of shares in given later in this section.

[7] The previous footnote about factor shares applies here too.

Overall and ten-year averages were then computed for each country as before. The results are reported in Table 2.5.

We have already mentioned the details of the capital stock measure of the Nehru and Dhareshwar. Nehru and Dhareshwar use total population as a proxy for labor force. This can bring some biases in the estimates. Collins and Bosworth (1996) point out that labor force grows slower than the population in low-income economies of South Asia and sub-Saharan Africa. This would imply that taking the population growth rate in these countries will overestimate the contribution of labor, and *will end up underestimating the contribution of TFP as well as capital.*

To control for this possibility, in the third exercise, we use the Collins and Bosworth (1996) data set.[8] Again the methodology used here is only slightly different from the first two calculations. TFP was calculated using GDP (g), capital stock (k), and human capital stock (h), based on years of schooling and labor (l). The annual growth rates for GDP/l and k/l were calculated and then used in the following formula:

$TFP = g/l - 0.35(k/l) - 0.65h$ [9]

Overall and ten-year averages for each country were then computed. These are given in Table 2.6.

Collins and Bosworth take the capital stock measure from Nehru and Dhareshwar, and they take the education measure from Barro and Lee. Output measure is the gross domestic product series in national prices of 1987 from the World Bank CD-ROM World Data 1995. The series has been updated and some of the gaps have been filled by taking data from IMF and OECD. The Table 2.5 data starts from 1960-61 and ends in 1996.

All three of the calculations above show some commonalties that are worth commenting on. On the whole, Total Factor Productivity comes out to be a significant factor, but the importance of capital accumulation overshadows the role of TFP. Except for Pakistan in the first data set, the overall average TFP measure never goes into the two-percentage point range and is usually

[8] This data set was provided to the authors by Barry Bosworth.
[9] Previous footnotes on factor shares apply here too.

below the one percentage point mark. This is especially true of the calculations based on the Collins and Bosworth data set.

The results are not very different from ones that have been calculated for some of these countries elsewhere. The period averages for individual countries are not very different from the period averages reported for the South Asia region in Tables 2.1-2.3. Capital accumulation comes out as the main factor accounting for growth in South Asia. This holds for all three of the calculations where it usually is larger than the contributions from other factors. But it should also be clear that TFP is typically more important than the contributions of labor or schooling (human capital) in these calculations. *In Bangladesh human capital seems to play a more important role than physical capital in two of the data sets.*

All three calculation show that TFP was larger in the sixties, lowest in the seventies, better in the eighties, and as the Collins and Bosworth data shows, though most countries have been doing well in the 1990s, Pakistan has been the exception in this period.

Through the 1960s and 1970s India had relatively low GDP growth rates and relatively low TFP growth rates compared to the contributions from capital accumulation. This started changing in the 1980s, and for the 1980s and 1990s India has had higher contributions from TFP growth than from capital, and its GDP growth has also been higher than the earlier decades. The same trend exists for Pakistan too, but Pakistani GDP growth has faltered in the 1990s and this has led to a deviation from the Indian pattern.

Pakistan has had two periods of high growth of GDP, in the 1960s and the 1980s. In both cases the economy was growing at more than 6 percent, but the two growth periods are also very different from each other. In the 1960s all three data sets report relatively higher contributions from capital and much lower ones from TFP. In the 1980s the story is very different. All three data sets report much higher contributions of TFP, to the extent that they outstrip the contributions from capital. Though both periods have seen the Pakistani economy go through a recession after the decade of growth, in the seventies the world also went through a recession and the Pakistani economy shared that, but the 1990s have been different. The world economy has not been as badly hit as the Pakistani economy.

The growth of the two periods was also very different in another respect. Through the 1960s Pakistan posted high growth rates for both agriculture and industry, but the industry growth rates were the more impressive. In the nineties the agricultural growth rates were relatively higher than the sixties, and the industrial growth rates were relatively lower. This might explain the rise of TFPs in the 1980s. Agricultural growth, especially if it is the result of good weather, and bumper crops due to availability of water, raise output growth but do not get captured in the capital or labor side. They are captured by the TFP. Mahmood and Siddiqui (1999) for the 1971-97 period, and Sayeed (1995) for the 1980s, show that TFP was not a very important factor in the growth of the large scale manufacturing industry in Pakistan. This might have connections with the slowdown of the Pakistani economy as well.

All three data sets report very poor performance for the Bangladeshi economy in the 1970s. This is not surprising given the war that Bangladesh had to go through to become independent. The 1980s were good for Bangladesh, reporting high contributions from TFP, and the trend has continued in the 1990s. But the poor performance of the 1970s has pulled the average numbers down for Bangladesh. Bangladesh faces higher risks of natural calamity than other countries in the region. This does make the GDP of Bangladesh jump around more, and it gets captured in higher variation in TFP growth rates as well.

The three data sets also show that Sri Lanka has had a relatively low but very steady growth rate of GDP through the 1960-1990s period. The contributions from capital accumulation have been larger than TFP, and they have also been steady. The capital accumulation contribution has also been higher, relatively speaking, than the corresponding contributions of capital for the three other countries.

Summary

Bangladesh:

- 1970s were very bad, war of liberation pulls overall average down.
- Recovery in 80s and 90s.
- High turbulence in GDP. Prone to natural calamities.
- Human capital plays a more important role than in other countries of the region.

Sri Lanka

- Steady, relatively slow GDP growth.
- Stable and high contributions from capital

Pakistan

- has had high GDP growth, but more turbulent
- Contribution of capital is lower compared to other countries in SA
- Trends similar to India, but faltering in the 90s
- Two periods of high GDP growth: 60s and 80s
- In the 60s, contribution of TFP<capital; also industry grew faster than agriculture
- In the 80s, contribution of TFP>capital; industrial growth lower than agricultural.

India

- slow GDP growth in 60s and 70s, with capital contributing relatively more than TFP
- higher GDP growth in 80s and 90s, with TFP contributing relatively more than capital

2.4 Caveats of TFP analysis

There are some caveats, which ought to be kept in mind while drawing conclusions from the Solow residuals. First, the differences in the three estimates given are not atypical of the literature on TFP. We have already mentioned the debate about the role of TFP in East Asian growth where various researchers have given significantly different estimates of the role of various factors of production in the growth process. De Gregorio and Lee (1999) on Latin America also shows significant differences in the estimates that it reports from the literature and their own estimates of TFP for individual countries.

Second, a significant fraction of economic activity in developing countries is in the informal sectors, which is not documented and accounted for. If this lack of documentation affects all factors equally it should not bias the TFP estimates, but if it does not, the sector that is neglected more will have its contribution underestimated. Again, this is an issue that may be addressed for the individual economies in the respective country studies.

Third, labor force series used above take the total number of people in the labor force. No distinctions are made about the quality of the labor. If the labor force has become more skilled over the years this does not get captured in numbers and so the contribution of labor is underestimated. Some work has been done on incorporating the quality of labor issue but we still do not have any significant results from these studies. More importantly, since such incorporation is likely to increase the attribution to labor, it will tend to depress the residual even further.

Fourth, human capital is proxied by years of schooling in the above data sets. Issues concerning the quality of education are ignored here. A lot of developing countries (e.g. Bangladesh and Pakistan) have concerns about the quality of education. A significant literature in these countries argues that the quality of education has indeed gone down even though the years of schooling have been steadily increasing. In this case the years of schooling overestimates the contribution of human capital to growth. At the same time years of schooling ignores technical education, apprenticeship programs, and on-the-job learning. This tends to underestimate the contribution of

human capital. It is difficult to argue *apriori* how important are these factors and which influence will dominate the other.

Fifth, we have taken the shares of the factors of production as given in the decomposition that we have carried out in the section above. These shares were taken from the literature on TFP calculations and are well within the range that other others have assumed or calculated. De Gregorio and Lee and Hahn and Kim also use factor shares from previous studies to work out TFPs in their growth study on Latin America and East Asia respectively. We tried calculating the factor shares using stacked regressions for the three data sets that have been used above. Since we did not have individual country time series data that gave us sufficient points, data for the four countries in one data set (Bangladesh, India, Pakistan, and Sri Lanka) were stacked to run regressions. We used dummies for coefficient differences across countries. In all 3 of the regressions none of the factor share coefficients were larger than 0.5 and most of the dummies were also not significant. The R-squares were within the range of 0.14 to 0.26. But in most of the regressions the shares were not significant either and in some cases the individual coefficients came out to be negative. The fact that the coefficients move around quite a bit, and even turn out to be negative at times is again not unusual in the literature. Rose and Heytens (1994) report similar results in their 'South Asia Growth Study'. They also report similar R-squares as we got. In the end their coefficient estimates are in the range that we have used in this study.

The final caveat is with respect to the basic assumptions that go into the calculation of Solow residuals and its subsequent interpretation. The minority role of TFP found in much of the empirical growth literature, some of which we reviewed, implies that accumulation is indeed the driving force of Asian growth, with only some help from TFP. Krugman drives home this point with the provocative analogy between the early success of Soviet economic planning and the more recent success of Singapore. Both are portrayed as situations in which governments boosted output growth by increasing the investment rate but not TFP. However, conventional TFP measures the shift in the implied production function and is accurate under the assumption of the TFP model. There are many potential problems with the maintained hypotheses of the TFP model (see Hulten, 2000, Hulten and Srinivasan, 1999). Hulten observes that "the model's assumptions are not the first place to look. A much bigger problem lies in the interpretation of the results." The argument is as follows. Within a more complete model (than the one, which is

used to calculate Solow residuals), capital is an endogenous variable. In the neoclassical growth models, capital per worker depends on the rate of growth of labor, the rate of innovation, and either the rate of saving or the rate of time preference. A conventional sources of growth accounting exercise ignores the "induced-accumulation" effect and tends to ascribe an erroneously high proportion of growth to capital accumulation. A correct accounting for the cause of growth should control for this possibility. The Harrod-Rymes variant of the TFP residuals would achieve this objective. They may be obtained from the conventional Solow residuals by dividing the latter by labor's share of income. Naturally, this modification will unambiguously increase the importance of TFP in the growth process.

In Chart 2.1, we plotted the growth rates of per capital GDP, capital per worker and Solow residuals (TFPG) for India, Bangladesh, Pakistan and Sri Lanka. It is evident that TFPG and GDP growth move together, while capital tends to follow a path that appears independent of the rest. Without attributing "causality" in a strict econometric sense, Chart 2.1 gives a visual account of what could be the more important driving force behind growth in South Asian countries.

Country analysis: Summary

•Capital accumulation most important in magnitude
•TFP comes next: contributions of labor and human capital much smaller.
•relative contribution of capital is lower in SA than EA
•TFP recovery of 80s continuing in the 90s, with individual variation

These findings warrant a closer examination of the *determinants* of TFPG as well as capital accumulation as important inputs in the growth process. This is done in subsequent sections of the paper through cross-country regression analysis.

Section 3: Cross-country regression analysis

In the 60s the growth literature centered on the neo-classical model, an important implication of which is the *theory of convergence*. The lower the per capita GDP of a country the higher is its predicted growth rate in the long run. This means that if the economies are intrinsically the same to begin with, they should converge in the absolute sense. This convergence hypothesis in the neoclassical framework is the direct consequence of the diminishing returns to capital. Economies that have less capital per worker, hence higher rates of return, are expected to have higher growth rates. Convergence in the neo-classical sense is *conditional* because the steady state values depend on the economy's propensity to save, the population growth rate and the position of the production function. Extensions of the model include a wider definition of capital, including human capital, which is a measure of how easily information can be assimilated and how well new technology can be used in the production process. Human capital too, like other endogenous variables, approaches a steady state value and the extent of departure of the initial value from the steady state value determines the speed of convergence. A country that begins with a high ratio of human capital to physical capital would thus tend to grow faster because physical capital is more amenable than human capital to rapid expansion. Another prediction of the neoclassical model even when extended to include human capital is that long run growth of per capita output must eventually cease. Recent work on endogenous growth provides a concrete theory of technical progress that is consistent with possibly persistent long run growth. Though the new growth theories provide an answer to the questions relating to long run growth, cross-country regression analysis has received more inspiration from the older, extended neo-classical growth theory.

We can explain growth in per capita output by treating it as a function of current level of per capita output and long run steady state level of per capita output. This can be mathematically written as:

$$D_y = f(y, y^*),$$

Where D_y is the growth rate in per capita output and y* is the equilibrium or long run steady state level of per capita output. The growth rate of per capita output is diminishing in y for a given level of y* and is increasing in y* for a given level of y. This equilibrium value of per capita output is a function of a number of environmental variables like life expectancy, fertility, average attainment in school for the male population (post secondary). It can be intuitively argued that a higher value of initial per capita GDP is likely to be associated with higher levels of the environmental variables mentioned above. Thus, a positive correlation between the initial per capita GDP and the components of the equilibrium value of the same over a period of time is expected to show up in cross-country regression analysis.

If treated as a normal regression exercise the estimated coefficient of initial GDP would be biased upwards if the equilibrium level of per capita GDP were not held constant. This is true, since, all other things remaining the same a higher value of the equilibrium per capita GDP level would imply a higher growth rate, which is captured by the coefficient associated with the initial per capita GDP, thereby making it biased. This problem can be avoided by taking *initial* period values of the human capital variable as instruments for each period (decade) and obtaining a 3SLS estimate for all the countries.

Summary
Cross country regressions
Basic framework

$D_y = f(y, y^*)$, where

D_y = growth rate of per capita output
y = initial per capita output
y^* = equilibrium or long run value of y

Equilibrium y^* is a function of
(a) average attainment in male schooling above the secondary level for 25 years and above
(b) life expectancy
© fertility rate
(d) rule of the law index
(e) terms of trade change
(f) democracy index
(g) inflation rate

3.1 Actual versus predicted growth in South Asia:

In the South Asian case we are constrained by only five countries. Therefore, we used Barro's (NBER Working Paper No. 5698, Table 1, column 1) 3SLS coefficients, instead of obtaining our own, to explain decade wise growth in South Asia. The following variables are considered: log of initial per capita GDP (LN (GDP)), average attainment in male schooling above the secondary level for 25 years and above (SCHM), log of life expectancy (LN (LIEXP)), log of fertility (LN (FERT)), rule of law index (LAW), terms of trade *change* (TOT), democracy index (FREEIND) and inflation rate (INF).

The data come from the Barro-Lee dataset and the Penn World Tables (PWT 5). The per capita GDP values, used as initial conditions for each decade, are in constant U.S. dollar terms.[10] Initial human capital has been captured by three variables, average years of attainment for males aged 25 and over in secondary and higher schools at the start of each period, the log of life expectancy at birth at the start of each period (an indicator of the health status), and an interaction term, which is the product of the log of GDP and the male secondary and higher schooling. Barro found that the effect of *male primary schooling* on growth is insignificant so we have dropped the primary schooling variable. A negative coefficient on the interaction term implies that more years of schooling raise the sensitivity of growth to the starting level of GDP. A period average of the ratio of Government consumption to real GDP is taken with the motivation that a higher value of non productive government expenditure will have a negative impact on growth given an initial GDP level. The rule of law index for the South Asian case was available for the last two periods only, i.e. 1980-1990 and 1990-1997, which is used an index to gauge the overall investment climate by considering the effectiveness of law enforcement, the sanctity of contracts, and the state of other influences on the security of property rights. The terms of trade change variable considers the growth rate of export prices to import prices for each period. If a terms of trade change left output and employment unchanged, it would only imply a rise in income for the country. However, there may be situations where the effect of a terms of trade change extends to employment and output. For example, if an oil importing country faces a negative terms of trade shock, it may cut down on employment and output of sectors that use oil intensively. On the

[10] This series is labeled as RGDPC, which is Real GDP per capita in constant U.S. dollars using Chain index (1985 international prices) given in PWT 5.

other hand, improvement in the terms of trade, intuitively, will lead to a higher output per capita. Inflation rate, which is an indicator of the stability of prices, is calculated by considering the growth in CPI for the entire period.

In the last two columns, Table 3.1 show the estimated and actual growth rates for South Asia. The Table also shows average values of the variables for the periods 1970-1980, 1980-1990 and 1990-1997 except log of life expectancy, log of fertility, log of initial GDP and average years of male schooling for the male population above 25 years.. For each of these latter four variables the values corresponding to the *starting year* for each period is taken. For example for the decade 1970-1980 we take the value of the variable corresponding to the year 1970. We have then plugged in the coefficients obtained by Barro, to predict decade wise growth rates for each period. For example the average annual predicted growth rate for India for the first decade was 1.50% where as the actual growth rate for the same period was .79%. The estimated and actual growth rates are almost identical for India for the 1990s (4.39 versus 4.25). For Sri Lanka also, the numbers are fairly close to each other for all decades. However, except for the 1990s, the Nepalese figures seem wide apart. Broadly, the differences between actual and predicted growth rates are similar to those obtained for other developing regions other studies.

It is worth noting in Table 3.1 that Sri Lanka had a life expectancy of 63 years in 1970, which is far in excess of any of the other countries. Even in 1990, life expectancy in Sri Lanka (68) stood much higher than those of India or Pakistan (55). Sri Lanka also has the lowest fertility rate among all the South Asian countries. Along with these, a high rate of school enrollment as well as a high freedom ranking are more positive contributors of growth in Sri Lanka compared to other South Asian countries. On the negative side, Sri Lanka suffered from an adverse terms of trade movement (ratio of export to import prices) in the 1990s, which has a negative influence on the growth rate. In contrast to India, Bangladesh and Sri Lanka, Pakistan has made no progress in reducing its fertility rate between 1970 and 1990. Its terms of trade deteriorated slightly and the share of government consumption to GDP also shows an increase. There is also a slight fall in its freedom ranking. All of these affect growth rate in Pakistan negatively. On the positive side, there has been an improvement in life expectancy and school enrollment. The freedom indicator for Nepal has fallen substantially since 1970. Over the same period, fertility rate has actually *risen* and so has the rate of inflation. Bangladesh suffered from adverse movements in the terms

of trade and freedom indicator. In India, except the share of government consumption and the inflation rate, which have failed to show any significant declines, all other variables seem to have moved in the direction that is conducive to growth. The ratio of government to GDP has remained in the 10-12% range throughout the period with no sign of decline. This figure is nearly double that of East Asia (6.4%, reported later in Table 3.4).

3.2 Inter-decade comparison of growth rates in South Asian countries

In principle, the same comparison that we made between South and East Asia can be made between two periods for a single country. Here, the numbers would indicate the progress (or deterioration) with regard to the explanatory variables between decades. It should be noted that instead of the 3SLS estimates used in the earlier comparisons, we have used the Seemingly Unrelated Regression (SUR) estimates reported by Barro (Table 3 in NBER Working Paper no 5698). The SUR estimates are obtained from a panel regression of inter-decade growth difference on inter-decade differences of the same set of explanatory variables. The estimates obtained by Barro are somewhat different than those obtained under the 3SLS procedure. In fact, the sign of the life expectancy variable under SUR is negative (and insignificant). Nevertheless, for consistency (and comparability with other studies) we have used these estimates.

These results are summarized for each of the South Asian countries in Table 3.3. The way to interpret the numbers is as follows. A positive estimate with a negative differential (say, between 80-90 and 70-80) indicates that the level of that independent variable was higher during 70-80. In that sense, the country shows a decline in the performance on that particular economic policy or environmental variable. Thus, India shows a decline in "freedom indicators" in the 80's but an improvement in the 90's. Bangladesh is adversely hit but terms of trade shocks in the 90's relative to the 80's. Nepal shows a progressive decline in freedom indicator. Sri Lanka shows a decline in the contribution from school enrollment in the 90's relative to the 80's. Pakistan shows a decline in the freedom indicators in the 90's relative to the 80's.

A positive estimate with a positive differential implies the opposite phenomenon of an improvement in the 80's relative to the 70's (or 90's relative to the 80s). This is true of "life

expectancy" in all the countries and all the periods, and with the exception of Sri Lanka in the 90's, for "school enrollment" as well.

A negative estimate with a positive inter period differential depicts a deterioration with respect to that variable in the latter period of comparison. A negative differential, on the other hand, depicts and improvement. Here, India, Bangladesh and Sri Lanka have progressively reduced the fertility rates, whereas Pakistan and Nepal have managed to do it only in the 90s relative to the 80's.

Summary

	Positives	Negatives
Sri Lanka:	life expectancy fertility schooling institutional quality	deterioration of terms of trade
Pakistan:	life expectancy schooling	fertility terms of trade high govt. cons freedom ranking
India:	everything else	high govt. cons.
Bangladesh:	X	terms of trade freedom ranking
Nepal:	X	fertility freedom ranking

3.3 South Asia versus East Asia - growth rate comparison

We have attempted a comparative analysis of growth experience in South Asia *vis-a-vis* the growth experience in East Asia. The coefficients used are again from Barro (1996), Table 1, column 2, which were estimated after using regional dummies. The coefficient estimates are reported against the variables. Table 3.2 presents the results of this comparison. We have broken down the marginal contribution of each of the variables involved in explaining the difference in growth for the two groups. This exercise shows how the difference in a particular variable across

countries affects the growth rate differentials. The signs of the different coefficients estimated by Barro conform to the theoretical postulates and are as follows: initial income (negative), interaction term (negative), schooling (positive), life expectancy (positive), fertility (negative), terms of trade (positive), government consumption (negative), rule of law (positive), inflation rate (negative) and democracy (positive). A negative coefficient, as estimated by Barro, implies that if that particular variable increases then it adversely affects growth.

A negative percentage point difference (South Asia minus East Asia) along with a negative estimated coefficient implies that the particular (bad) variable is abundant in South Asia thereby negatively affecting the growth differential for the groups. Similarly, a positive estimated coefficient with a negative percentage point difference would imply that the variable average for the decade was more for East Asia, implying a negative effect on the growth differential between South Asia and East Asia. The other two combinations of signs can be similarly interpreted.

In Table 3.2 we summarize the results obtained by breaking down growth into marginal contributions of each of the variables. The values given in the row against a variable measures its contribution to the growth differential between South Asia and East Asia. The variables Schooling, Life expectancy and Fertility are grouped under Human Resources. Similarly Government consumption, Rule of Law, inflation rate and democracy are grouped under Institution and Policy. For all three decades, the positive figures in the "initial income" row indicates that East Asia had higher initial GDP, resulting in a positive differential between the predicted growth rates. The positive figures in the "interaction term" column indicate a higher sensitivity of East Asian growth rate to schooling. The negative figures in the "schooling" and "life expectancy" rows indicate higher levels of those in East Asia as contributing factors to the higher predicted growth rate for the region. Similarly, the negative figure in the "fertility" row, in combination with the negative estimate of this parameter, indicates a higher level of fertility in South Asia contributing to a lower relative growth rate. The other figures may be interpreted similarly.

It should be noted that this set of explanatory variables does not include an adequate measure of *openness*, which is the reason why the actual and predicted differences are not close enough. To correct this, we have used a slightly different set of variables (chosen by Hahn and Kim for the

East Asian paper on sources of growth) to explain differences in the growth rates of *total factor productivity* between the two regions. Before we report those, we present a inter-decade comparison of growth rates for the individual countries using the Seemingly Unrelated Regression estimators reported by Barro.

3.4 Explaining differences in the growth rates of total factor productivity and capital accumulation

The previous analysis tells us that a significant part of GDP growth can be explained by initial conditions (such as initial per capita GDP, initial human capital stock), institutional quality and the terms of trade. In "Sources of East Asian Growth: Some Evidence from Cross-country Studies", Hahn and Kim try to explain TFPG as well as capital accumulation with the same set of variables with which they explain the growth of per capita GDP. The regression framework chosen by Hahn and Kim is motivated by essentially the same principle followed by Barro, with certain differences in selecting proxies for the various factors that presumably affect growth.

As noted earlier, a measure of openness is missing in the set of regressors used by Barro. Hahn and Kim introduced openness as an explicit policy variable. It is denoted by the fraction of years an economy was open to trade between 1950 and 1990 (from Sachs and Warner, 1995). In this measure, an economy is considered as open if it satisfies *all* the five criteria below: (a) average tariff rates are lower than 40%. (b) quotas and licensing cover less than 40% of total imports. (c) the black market premium is less than 20%. (d) it is a non-socialist economy. (5) major exports are not monopolized by the state. According to the Sachs-Warner index, East Asia was more open during 1950-90 than any other developing region of the world.

The second innovation in the Hahn-Kim dataset is the introduction of the *share of primary product exports in GDP* (in 1970) as a region or country specific initial condition variable. This variable measures a country's dependence on natural resources. Sachs and Warner observe that the resource-rich countries have tended to grow more slowly, confirming the "resource-curse". The logic is that the availability of natural resources allows a country to stick to the old and inefficient system, avoiding any drastic steps towards restructuring and promoting efficiency of

resource use. Thus, natural resource abundance, as captured by the ratio of natural resource exports to GDP, is expected to be negatively correlated with the growth of total factor productivity.

As a measure of institutional quality, we use the index created by Knack and Keefer (1995), averaged over the 1980s. The index is based on the average of subjective scores on five aspects of government: (a) repudiation of contracts by the government. (b) risk of expropriation. (c) corruption. (d) rule of law. (e) bureaucratic quality. A *lower* value of the index indicates *poor* quality of institutions and higher investment risks. Table 3.4 gives the values of the variables for East and South Asia as groups, and also for the individual South Asian countries.

With these explanatory variables, Hahn and Kim ran two sets of regressions with TFPG and the growth of capital as dependent variables. We used their estimates[11] to explain the difference in TFPG and the growth of capital accumulation between South and East Asia. Table 3.5 summarizes the results. The predicted annual percentage difference in TFPG between the two regions is 1.13 (the actual being .74). The most significant contribution comes from the openness variable, followed by natural resource endowments. It is worth noting that although East Asia started with a higher natural resource export to GDP ratio, its negative effect on TFPG is far outweighed by its high degree of openness. In the capital accumulation regression, high government spending and low institutional quality account for most of the predicted difference of 2.43% per annum.

3.5 TFPG in individual countries in South Asia compared to the regional norm

In Tables 3.6 and 3.7, we have reported the TFPG in individual South Asian countries against the regional average for the period 1960-90 and for the 1980-90 decade, respectively. An interesting point to note is that Sri Lanka had the highest degree of openness as well as the highest share of

[11] Hahn and Kim report a number of regressions for both TFPG as well as capital accumulation with small variations in the exact explanatory variables chosen. In each case, we have chosen the regression, which yielded significant coefficients for all the variables. Thus, in the capital accumulation regression, openness and endowments are not included as explanatory variables. Instead, terms of trade shock and government consumption are included as explanatory variables

primary exports in total GDP for the entire period. These two factors pull TFPG in opposite directions and the magnitudes almost offset each other. The higher initial income of Sri Lanka compared to the regional average, drives down its TFPG, while a higher level of schooling, puts it ahead of the rest. All of India, Bangladesh and Pakistan had lower (in fact, zero according to the Sachs-Warner index) scores on openness compared to regional average, which is driven primarily by the Sri Lankan score. Hence, they fall behind the regional growth of TFP by a factor of 6.16 for the whole period. This is partly offset by their lower initial share primary exports in GDP (compared to the regional average, which again is dominated by the high value of 15% for Sri Lanka). Also, both Sri Lanka and Bangladesh had a higher per capita GDP than India or Pakistan in 1960 (Penn World Table, series RGDPC)**,** explaining the positive entries in the first column of Table 3.6. However, by 1980, the initial GDP (as of 1980) of Bangladesh had fallen below the regional average, turning the first entry in the first column of Table 3.7 into a negative number. It implies that although for the period 1960-90 as a whole TFPG in Bangladesh lags behind the regional norm owing to its higher than average per capita GDP in 1960, the situation reverses itself in the 1980s, when owing to a lower than per capita GDP in 1980, TFPG has been faster in that country in that decade.

Institutional quality (the Knack-Keefer index) has been higher for India and Sri Lanka than the regional average. The contribution from schooling is higher in Sri Lanka than the average and lower in all other countries for the entire period as well as for the 1980s.

Given that the actual growth rate of South Asia has been low compared to the predicted growth rates, it is possible that the variables used in standard regression exercises do not capture the true contribution of these variables. An important example is the class of education related variables.
The quality of education has an important bearing on growth rates through the human capital channel. Even if enrollment ratios are the same for two countries or regions, it does not necessarily imply the same level of human capital. In Table 3.8, we have presented other relevant attributes of education (Barro and Lee, 1998) in South Asian countries compared to East Asia.

It is seen that between 1960 and 1990, the pupil to teacher ratio has decreased substantially for East Asia at both the primary as well as secondary levels. The same have gone up for South Asia.

The real salary of primary schoolteachers have risen substantially for East Asia during the period. Data on this variable is available only for Bangladesh. It shows only a marginal rise in the same, which is no where commensurate with the East Asian number. Also, dropout rates have actually increased in South Asia, while it has declined in East Asia. Thus, initial enrollment rates are likely to be misleading indicators of the level of human capital in South Asia.

Summary

Factors, which have contributed to higher growth in EA, compared to SA

(a) Schooling (adjusted for quality)
(b) Openness (through the TFPG channel)
© Strength of institutions
(d) Government size (through the capital accumulation channel

An interesting feature:

Although EA started with a higher natural resource export to GDP ratio, its negative effect on TFPG (hence GDP growth) is more than offset by the higher openness of EA relative to SA.

Section 4: Reforms, Freedom and Growth

There is a growing recognition of the fact that various "non-economic" attributes of a society can go a long way in affecting the growth rate of countries by creating or destroying incentives for the private agent to do well. It is often claimed that a society that ensures reasonable political and civil rights to its population provides a more conducive environment to growth than a society, which does not. Similarly, a society that is low on corruption, has a well-functioning bureaucracy and high level of law enforcement should do better in comparison to those who do not meet these criteria. The Freedom House provides ratings of countries on their civil and political environment, and the International Credit Rating Group provides data on corruption, law and bureaucracy ratings. The Heritage Foundation provides ratings on economic reforms. In this section, we have examined the possible effect of such freedom attributes using all three data sources.

4.1 Freedom House Data

Political rights and civil rights

The Freedom House annual comparative survey was first compiled for 1972-73. The scores are for political rights and civil liberties. Each of the two is measured on a one-to-seven scale, with one representing the highest degree of freedom and seven the lowest. Countries whose scores fall between 1.0 and 2.5 are designated "free;" between 3.0 and 5.5 "partly free;" and between 5.5 and 7.0 "not free."

In the panel, the dependent variable is the rate of growth of GDP for each South Asian country during 1972-98. Our independent variables are the indices of civil and political rights and the lagged value of GDP growth. The latter controls for the confounding effects of other explanatory variables in the growth process. We tested several specifications, described below. We first estimated a basic pooled or *total regression* model, which is

$$y_{it}=X_{it}\beta + \alpha + u_{it}$$

Here, x is a vector of independent variables (civil and political rights as well as the lagged value of GDP growth) and y is the dependent variable, which is the growth rate of GDP. Alpha is the overall intercept and u is i.i.d. This model assumes a single set of slope coefficients for all the observations.

In the *fixed effect or within model* it is assumed that there are common slopes, but that each cross section, in our case, the individual countries of South Asia, has its own intercept, which may or may not be correlated with the Xs. Thus,

$$y_{it}=X_{it}\beta + \alpha_i + u_{it}$$

The *between* model specifies the same relationship between the individual means:

$$y_i=X_i\beta + \alpha + u_i$$

where $y_i = \sum y_{it}/T$

The *random effects* or VARCOMP model resembles the WITHIN model, but assumes that the intercepts are drawn from a common distribution with mean alpha and variance sigma alpha square. Unlike the WITHIN model, the estimates for this $\{\alpha_i\}$ model will not be consistent if the individual intercepts are correlated with the independent variables. Because of this, it is important to test for correlation. We calculated the Hausman test statistic for the difference between the fixed effects and the random effects estimates, along with its p-value.

The VARCOMP estimator is computed by estimating the relative importance of between and within variation of the disturbance $\alpha_i + u_{it}$ and using this estimated ratio to combine the within and between estimators optimally. Under the null of uncorrelated intercepts, the VARCOMP estimator is asymptotically efficient, since it is a generalized least squares estimator. We report the various estimates in Table 4.1. We do not find evidence of any significant contribution of either civil or the political rights indicators in any of the model specifications. We conclude, subject to the caveat of a restricted sample, that these variables did not have any perceptible influence on the growth process in South Asia. Also, the Hausman test accepts the null of a Fixed Effect model. Hence the results of the Random Effects model are redundant.

4.2 International Credit Rating Guide (ICRG) Data

The ICRG data set deals with law , bureaucracy and corruption levels in countries. The countries are graded in a scale of 0-6, where lower point totals indicate higher risk. In other words, countries that have lower points are ranked lower to countries that have higher points. The data is shown in Graph 4.1

For South Asia. we performed a panel regression of the type described in the previous section.
The lack of law enforcement has a significantly negative effect on growth rates in South Asia (Table 4.2). In view of the significant effect of the quality of law enforcement, we chose to look at these attributes more carefully in each of the South Asian countries.

Corruption:

Bangladesh have a dismal performance amongst the group having zero points till 1990. After 1990 there is a marginal improvement in its scores. India has a steady score all through the time period considered, hovering around three points suggesting a medium level of risk throughout. Pakistan, like Bangladesh has a poor start till 1996, though it has improved its performance after 1997. Sri Lanka, probably the best of the lot, has maintained a score of at least 3 throughout and actually has graduated to 4 points by the end of the period

Law and Order Tradition

Bangladesh start off in a poor note with a score of 1 till 1992. The post 1992 period shows a gradual improvement in the risk perception where it ends up with a scores of 3 in each of the last five periods. India though started with a healthy 3 gradually lost its advantage over time as its score declined all through the period till 1991. Post 1991 shows a renewed vitality when it receives scores of 4 till the end of the period. Pakistan has low scores all throughout except at the end years where it improves slightly to get scores around 3. Sri Lanka , like Pakistan and Bangladesh has a dismal beginning. However the end years show definite improvements in its score.

Quality of Bureaucracy

Bangladesh has poor scores throughout with meager improvements only at the last two or three periods. India probably fares best in the group with scores hovering around 4 all along and improving to 5 in the last couple of years. Pakistan's performance in this category is much better than the rest of its performances in terms of the other indicators. Pakistan maintains a score of around 3 all along. Similar is the case for Sri Lanka.

4.3 Heritage Foundation Data

The motivation for this separate exercise is that the indicators of economic freedom used in the previous section (Section 3) show very little change in the 1960s, 70s and 80s. Most of the changes occur in the 1990s. Therefore, we have performed a panel regression of growth rates on measures of economic freedom on 121 developing countries. We then reestimated the models only for South Asia.

As almost every country in South Asia has pursued economic reforms with vigor, especially during the nineties, the following estimates attempt to capture the effect of the same on economic growth. An index of reform (on a scale of 1-5), based on ten factors described below, is calculated for each country. The lower the value, the higher is the level of economic freedom defined below. The data is provided by the Heritage Foundation.[12]

The Factors of Economic Freedom:

For all factors the grade ranges from 1 to 5 suggesting levels such as "very low", "low" , "moderate", "high", and "very high" respectively.

Income Tax Grading scale:

Each country is graded according to the tax structure it follows, grades going from 1 to 5. While a very low tax structure (criteria being no taxes on income, or a flat tax rate of 10 percent or less) gets the highest rank - a grade of 1 point, considerably stricter tax regimes get higher scores and consequently lower ranks. The highest grade being 5 which suggests "very high taxes", where a top rate above 50% and a tax on average income between 20% and 25%, or a tax rate on average income of 25% or above regardless of the top rate , or a tax system through which the government confiscates most economic output.

Corporate Tax Grading Scale:

This is the other type of tax that is analyzed for each country. The grading is again based on the corporate tax regime that the government follows. The country having the best corporate tax system gets a grade of 1 signifying very low taxes, the criteria being limited or no taxes imposed on corporate profits. While a "very high" tax rate gets a grade of 5 points where there is a cumbersome progressive tax system with top corporate tax rates of more than 46%, or a tax system in which the government confiscates most economic output.

Government Intervention:

Government consumption poses as an indicator of the level of Government intervention. A consumption level of 10% of GDP and virtually no government owned enterprises gets the highest grade of 1, while government consumption of 46% or more of GDP along with a high number of Government owned industries gets a low score of 5. The former a "low"

[12] We are indebted to Dr. John Williamson for providing us with the detailed freedom scores for all countries since 1995.

interventionist economy while the latter gets characterized as a “very high” level of government interventionist economy.

Monetary Policy:

The level of inflation rate in the economy indicates the efficiency of the monetary policy of a country. An inflation rate of 6% or below is graded as 1 the highest rank while countries having inflation rates of over 30% get a grade of 5 suggesting a very high level of inflation structure and consequently a lower level of efficiency in terms of its monetary policy.

Investment Policy:

The efficacy of the investment policy of a country is judged by its openness to foreign investments. In other words, more the barriers lower is the rank and higher the grade. A grade of 1 suggests an open and impartial treatment of foreign investment and an accessible foreign investment code. A government that seeks actively to prevent foreign investment and is ridden with corruption gets a grade of 5.

Banking

Here lower is the restrictions on foreign banks better is their grade. So a country where there are very few restrictions on foreign banks ,banks engage in all types of financial services and government controls are few, if any, on commercial banks gets a grade of 1 denoting the best scenario. In contrast, a situation where there is high financial institution chaos, banks operate on primitive basis and most credit only goes to state owned enterprises fare badly in the “banking scale” receiving a grade of 5.

Wage and Price Controls:

This is another indicator of the government control. Countries where solely the market determines wages and prices and there is no minimum wage are placed at the top of the grading scale with a score of 1. Countries where wages and prices are almost completely controlled by the government are at the bottom of the rung with scores of 5 suggesting “very high” degrees of wage and price control.

Property Rights:

The level of protection of the private property rights is being measured here. A score of 1, the best grade indicates that private property is guaranteed by the government and a n efficient court system enforces contracts. In addition the Justice System punishes those who unlawfully confiscate private property and hence expropriation is unlikely. On the other hand a grade of 5 being the lowest grade pictures a country with private property outlawed, almost all property

belonging to the state and the country is so corrupt and chaotic that property protection is almost nonexistent.

Regulation:

This measures the level of regulation that a business house faces. If the existing regulations are straight forward and applied uniformly to all businesses, also the regulations do not pose too much of a burden for business then the country has a "very low" levels of regulation receiving a score of 1. In contrast a "very high" (a grade of 5) level of regulation suggests that the government discourages creation of new business, regulation is applied randomly and the degree of corruption is rampant.

Black market :

The level of Black market activity is measured here. A grade of 1 places the country at the top , characterizing very low levels of Black Market activity. A very high level of black market (grade of 5) economy consists of countries where the black market is larger than their formal economies.

Graph 4.2 (Appendix) above depicts the average scores of the different regions. South Asia has the highest score, reflecting the most restricted economic regime according to these criteria, followed by Sub-Saharan Africa.

Next, to see if these freedom indicators have any significant association with growth rates in the1990s, we ran a panel regression of growth rate on the freedom indicators for all developing countries. Again, the method of estimation is similar to that described earlier in the section. We included 121 developing and semi-industrialized countries and used the freedom scores from 1995-2000. Later, we estimated the same model only for South Asia.

In the model, the dependent variable is the rate of growth of GDP. We included all ten freedom factors, described above, as independent variables. In addition, we included the lagged value of the dependent variable as a regressor. We have included this to control for other explanatory variables, other than the freedom factors, which may have a confounding effect on the growth

rate of GDP. Admittedly, this is a somewhat strong assumption, but the alternative was to have no control at all for other factors.[13]

The results are given in Table 4.3. The random effect model was rejected by the Hausmann criterion. We have reported the results of the fixed effect model. There are some interesting observations. Contrary to expectations, restricted trade regimes and high level of government intervention (in the sense explained above) tend to be associated with higher growth rates in the large sample. A free banking regime and lower inflation rate (as captured by the monetary policy variable) turns out to be conducive to growth. The results for the sub-group of South Asia are in places different from the overall sample. Here, *we find that unrestricted taxation, foreign investment and wage-price controls are positively associated with growth.* However, as opposed to the large sample, a restricted banking regime promotes growth. The most interesting result is the positive and significant coefficient on "black market". It implies that if the black market transactions are significant relative to the official market, growth gets a fillip in this region. Although surprising at first, it may be explained by the fact that economic transactions in the black market are driven by market forces, which is otherwise unrealized in countries with restricted formal markets.

The scores reveal that India and Bangladesh still have the most restricted trade regimes compared to Sri Lanka, Pakistan and Nepal. Pakistan and Bangladesh have the most restricted property rights regimes. India and Nepal have relatively restricted foreign investment regimes. Among the South Asian countries, Sri Lanka seems to be better placed than the rest in terms of these indicators. We also look at the performance of the five South Asian countries in the year 1999 for each of the above categories.

Trade:

India, Bangladesh and Sri Lanka have poor performance indicating quite high rates of trade distortion through tariff measures. Pakistan and Sri Lanka are at middle of the road situation.

Taxation

There is not much to choose from the five South Asian countries here, as all of them hover around a score of 3.

[13] An alternative would be to estimate the model under Generalized Methods of Moments (GMM), since a lagged dependent variable is added as a regressor.

Government Intervention

Again all the five countries have “moderate” performance.

Monetary Policy

All the countries have reasonable control over their Monetary Policy and levels of inflation

Foreign Investment

Sri Lanka and Nepal have a more open attitude towards foreign investment while the rest are moderately closed to foreign investment.

Banking

Again all the countries fare badly suggesting very high levels of banking restrictions. However, this seems to be promoting growth.

Wage/Prices, Property Rights, Regulation, Black Market

In all the above categories the five countries have poor or very poor performances.

We compared the scores of East Asia with South Asia for all ten categories. The first panel of Chart 5.3 shows the comparative figures. East Asia is ranked higher in all categories. The differences are particularly pronounced for trade openness, black market, regulation and the property rights categories. In Section 3 we saw how openness explains the majority of the TFPG difference between the two regions for 1960-90. South Asia continues to suffer from low trade openness during the 1990s as well, in spite of reforms and liberalization in the region. Thus, even though the single regression reported in this section does not find a significant role of trade openness, it is clear that the openness factor is crucial for understanding the varying growth experiences of the two regions. South and East Asia are more close to each other in terms of government intervention, monetary policy and restrictions on banking. The score differences are moderate for foreign investment, taxation and price controls. The lower panel of Chart 5.3 gives the regional average for South Asia and the individual country figures. Sri Lanka fares better than the other countries in all except taxation, monetary policy and foreign investment.

Summary
Reforms and Growth: the 90s

Caveats:
(a) short period
(b) reform indices are subjective
© they show very little cross-time variation

Findings:
Positive factors
(1) open FDI regime
(2) less control on prices and wages
(3) less regulation
(4) more black market activity

Surprisingly, there is no perceptible influence of *open trade or banking* regimes on growth.

Section 5: Openness and TFPG

In Section 3 we found that openness, measured by the Sachs-Warner criteria accounted for the majority of the difference in TFPG between East and South Asia. In Section 4, we found two apparently contrasting effect of openness on growth. We saw that restricted trade regimes (in the sense of high tariffs) are positively associated with growth but unrestricted foreign investment regimes promote growth.

A selective survey of the large empirical literature on whether countries with lower policy-induced barriers to international trade grow faster includes Dollar (1992), Ben-David (1993), Sachs and Warner (1995), Edwards (1998) and Rodriguez and Rodrik (1999). The evidence is largely affirmative, although Rodriguez and Rodrik raise some methodological issues with earlier studies mentioned above, which find a positive influence of trade liberalization on growth.

In a recent study analyzing the effect of trade liberalization on growth within the framework of an empirical model, Wacziarg (1998) finds that trade openness affects growth mainly by raising the ratio of domestic investment to GDP. *Foreign direct investment*, used as a proxy for technological transmissions and the quality of macroeconomic management accounts for roughly 20% of the overall effect.

We checked whether there is any long-run relationship between TFPG and FDI for the three countries (India, Pakistan, Sri Lanka), where reasonably long time-series data are available. As a first step we test each of the series for stationarity. Here we observe that the FDI series for India is stationary at its level values whereas for the other countries both the FDI and the TFPG series are I(1) i.e. first difference stationary. We tested the existence of a cointegrating relationship for the two countries Sri Lanka and Pakistan only, since for India the FDI series is stationary at level values. We followed the well-documented Johansen's approach of a Log-likelihood ratio test. The null hypothesis is the existence of a cointegrating vector, which mathematically reduces to decomposing the coefficient matrix into the product of two lower order matrices. This is rejected at 5% level of significance if the value of the test statistic is less than the critical value. For Sri

Lanka and Pakistan the test concludes the existence of one cointegrating relation.[14] In Table 5.1 the normalized cointegrating vector is given. This vector when multiplied with the elements of the cointegrating equation gives a stationary series. This suggests there is a long run relationship between TFPG and FDI for the two countries.

We performed similar tests for the export/GDP and the import/GDP ratios, and their relationship with TFPG. Our tests rejected the existence of cointegration between both of these openness indicators and TFPG (to save space, we have not reported the negative results). In a sense, these tests tend to reconcile the two sets of findings from Sections 3 and 4 (at least for India, Pakistan and Sri Lanka). To recapitulate, In Section 3 we saw that openness, measured by the Sachs and Warner index explains differential performance of TFP. In Section 4, we found that open trade regimes do not support growth, but open FDI regimes do. We discuss these more in the concluding section.

Section 6: Growth and Poverty

Growth is not an end in itself but a means to reduce poverty principally because it creates economic opportunities, incomes and jobs. The Quality of Growth principle advocates broadening the policy framework to go beyond the pace of growth to include the qualitative attributes of the growth process. For the second consecutive year, South Asia was the fastest growing developing region, averaging 5.4 percent GDP growth in 1999 and up from 5.2 percent in 1998. However, based on the dollar-a-day benchmark, the region remains home to 40 percent of the world's poor, some half a billion people. The incidence of poverty (the share of the population living in poverty) throughout South Asia has declined moderately through the 1990s but not sufficiently to reduce the absolute numbers.

With a given rate of economic growth, poverty falls faster in those countries where inequality of income is lower. Analysis of developing countries in the 15 years between 1985 and 2000, showed that they fell into two groups. In the low income-inequality countries (average Gini coefficient = 0.34), 10% economic growth was associated with a fall in the proportion of people

[14] A model with quadratic trend is fitted and lags in the equation were chosen using the AIC and Scwharz criterion.

below the poverty line by 9 percentage points. In the high income-inequality countries (average Gini coefficient = 0.55) 10% growth was associated with only a 3 percentage point reduction.

Against this backdrop, income disparities in South Asia are one of the largest in the world. All the countries in the region have a high concentration of wealth and power among their richest members. The highest income-earning layer of 20 percent owns 40 percent of the total income in the region while the lowest 20 percent bracket owns only 10 percent. Even though GDP per capita has been rising annually at around 2.5 percent, between 1960-1995, the average income of the richest 10 percent is still six times the average of the poorest 10 percent. The biggest gap is in Nepal. There the richest 10 percent earn 10 times the poorest 10 percent. The ratio is seven in Pakistan, six in India and Sri Lanka and five in Bangladesh.

We examined in some detail the nature of poverty and inequality particularly in Pakistan, and to some extent for India and Bangladesh as well. Our findings point to certain shortcomings in the growth generation process that have prevented poverty and inequality from coming down more significantly in the region.

Pakistan

An interesting feature of the income distribution in Pakistan is that urban inequality is generally higher than rural income inequality. However, the movements over time in the Gini coefficient in the two areas have not been uniform. While rural income distribution improved markedly between 1963/64 to 1969/70, the urban income distribution did not improve much during the same period. The decline in the urban Gini coefficient was much more moderate and it increased during 1963/64 to 1966/67.

Since 1970/71, the movements in rural and urban income inequalities have, however, been broadly similar. The Gini coefficients for both areas rose between 1970/71 and 1984/85 (from 0.273 to 0.345 and from 0.359 to 0.379, respectively) and the differences between the two narrowed significantly. Between 1984/85 and 1987/88, both rural and urban inequalities were

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The model with the maximum likelihood value and the minimum AIC value was chosen for each country.

reduced. However, the inequality during 1987/88 to 1990/91 again increased sharply, both overall and sectorally. The rise in rural inequality, however, was sharper, rising from 0.307 to 0.410 and exceeding the urban inequality ratio of 0.39.

One can hypothesize several reasons for changes in income distribution in the rural areas over time. However, it is very difficult to be certain about the degree to which these factors have contributed to changes in income distribution over time. During 1963/64 to 1970/71, one reason for the decline in rural income inequalities might be attributed to the green revolution, which was generally scale-neutral in its initial period. In the period 1970/71 to 1984/85, the rise in rural income inequalities could be due to adverse changes in agrarian structure arising from the resumption of self-cultivation by landlords and the
increasing mechanization of agriculture in the wake of ineffective land reforms. The increase in inequality in the period 1987/88 to 1990/91 could be traced to the structural adjustment programs which included a more realistic exchange rate and higher output prices for major crops that tended to benefit the larger farmers. The poorer sections in the rural areas could, on the other hand, have suffered because of increasing prices of food and other basic necessities, as well as by continuing mechanization of agriculture.

The changes in urban income distribution indicated a different pattern. There were significant increases in urban inequality during 1963/64 to 1966/67 when rural inequality declined. Thereafter until 1970/71, there was a decline in urban inequality in line with declining rural inequality, but year-to-year changes between 1971/72 and 1984/85 were very small, after having jumped between 1970/71 and 1971/72. This rise in urban inequality between 1984/85 and 1990/91 in the urban areas can be attributed to the structural adjustment programs.

Assessing trends in poverty after 1990/91 is difficult because no data on the distribution of household consumption (or income) are available at this time. In the three-year period from 1990/91 to 1993/94, the annual rate of increase of private per capita consumption in real terms was about 3 percent according to the national accounts. If the household distribution of consumption had remained unchanged after 1990/91, growth of private per capita consumption at this rate would have resulted in a decline in poverty (as per the previous reference poverty line). Poverty incidence may have declined substantially, because in 1990/91 there were many

households below but in the vicinity of the poverty line. The limited data available on wages of unskilled workers suggest that these wages may have increased somewhat, in real terms but not significantly, after 1990/91. In fact, wages of unskilled construction workers in Karachi appear to have declined (World Bank 1995). The evidence appears to be mixed.

Attempts have been made to relate the incidence of poverty to the employment profile as well as to an asset profile of the households. Poverty head-counts correspond well with level of asset holdings within both the wage-earning and self-employed groups. White-collar workers have the lowest incidence of poverty (22.1 percent) among the wage earners, which is very close to that of the self-employed with assets worth Rs 10,000 or more. The skilled/semi-skilled workers have a higher incidence (28.1percent), and casual/manual laborers higher still (38.3 percent). The self-employed are an even more diverse category, within which ownership of capital appears to make all the difference, though there are probably other correlated factors at work including human capital. Those with assets valued at under Rs 1,000 had the highest incidence of poverty among all groups (51.2 percent). This group, which comprises about 9 percent of the urban sample, are worse off than even casual laborers. The results indicate the importance of both human and physical capital in determining the incidence of poverty.

In the rural sample, 64 percent of the households are classified as agriculturists, with owner cultivators as the largest group (36.6 percent). Tenants, with 13.6 percent of the rural sample, have a high incidence (43.8 percent). Agricultural laborers, who constituted 7 percent of the rural sample, were even worse off. Among the nonagricultural rural households, casual workers have the highest incidence (45.1 percent) as do self-employed with less than Rs 1,000 in assets (46.3 percent). The incidence of poverty among wage earner and self-employed households is remarkably similar in urban and rural areas.

India

GDP growth in India since 1980 has been among the fastest in the world; social indicators for literacy, education enrollment, disease and mortality, and gender have steadily improved; and

poverty has fallen since the mid-1970s. Despite this progress, in absolute terms, India's poverty situation remains a serious concern: the poor still number over 300 million, twice as many as in Sub-Saharan Africa. Moreover, the recently released National Sample Survey data suggest that poverty has declined only marginally since the early 1990s, an experience that is similar to that of Pakistan. Household surveys suggest that poverty reduction has been particularly sluggish over the 1990s in India's rural areas, which contain more than 70 percent of the poor. A wide disparity in poverty across and within Indian states and their uneven poverty reduction is a key feature of the evolution of poverty in India.

Bangladesh

Following a period of stagnating poverty reduction in the 1980s, Bangladesh has made strong progress in the 1990s. The incidence of the very poor fell from 43 percent of the population in 1991-92 to 36 percent in 1995-96; the incidence of the poor declined from 59 to 53 percent during the same period. Although poverty has declined in both rural and urban areas, rural poverty is still higher than urban poverty. Reducing the poverty of the very poor living in rural areas-still at 40 percent of the rural population in 1995-96-remains a massive challenge. Sustained economic growth, increased spending on social sectors, rising school enrollment rates, the expansion of microcredit and other NGO activities, and available data all suggest that the declining trend of poverty incidence has continued into the second half of the 1990s. While higher growth rates have contributed to the decline in poverty, rising inequality has reduced the overall rate of poverty reduction.

If we were to ask if growth has been good for the poor in South Asia, the answer is generally in the affirmative because the countries that have experienced sustained high growth over the last few decades have also reduced their absolute poverty levels. However, there are sharp differences at disaggregated levels, such as between the rural and urban population, skilled and unskilled workers, land owners and the land-less and so on. But there is no case in South Asia where absolute poverty levels have declined significantly without accompanying high growth rates. However, as noted before, the incidence of poverty is still the highest in South Asia and the rate at which it seems to be declining is not commensurate with the admirable aggregate growth rates of some of the countries.

Thus, a central question for South Asian governments is to decide whether their respective economic reform strategies should have a more explicit poverty focus or not. There are several good reasons for it. First, policies that are effective in increasing the incomes of the poor-such as investments in primary education, rural infrastructure, health, and nutrition-are also policies that enhance the productivity of the economy on the whole. Therefore, any reform agenda with the usual emphasis on macroeconomic stability, microeconomic efficiency, and institutional quality that aims at raising output levels can only strengthen itself by also including a poverty focus. Second, democratically elected governments are expected to place a greater welfare weight on the well-being of the poor than on that of the rich. A policy that increases the income of the poor by one dollar can be worthwhile at the margin even if it costs the rest of society more than a dollar. Even if the welfare of the poor does not receive extra weight, interventions targeted at the poor may well be the most effective way of raising average incomes. There is a simple reason for this. Poverty, it is natural to assume, is associated with market imperfections and incompleteness. The poor remain poor because they cannot borrow against future earnings to invest in education, skills, new crops, and entrepreneurial activities. They are cut off from economic activity because many collective goods (such as property rights, public safety, and infrastructure) are under-provided. They lack information about market opportunities. It is a standard tenet of economic theory that raising real average incomes requires interventions targeted at closing gaps between private and social costs. There will be a preponderance of such opportunities where there is a preponderance of poverty. Finally, a poverty focus is also warranted from the perspective of a broader, capabilities-oriented approach to development. An exclusive emphasis on consumption or income levels constitutes too narrow an approach to development. As Amartya Sen has emphasized, the overarching goal of development is to maximize people's capabilities--that is, their ability to lead the kind of life they value. Here it is probably the obstacles facing the poor that are the greatest, and therefore the most deserving of urgent policy attention. The gap between the capabilities of rural and urban classes, asset-holders and non-asset-holders, skilled and unskilled labor, land owners and the land-less will have to be closed.

Analogously, closing the knowledge gap between developed and developing countries is one of the most important strategies for development. In order to close the knowledge gap a country must have the skills to absorb that knowledge. It is important to ensure that all the people achieve

the basic level of literacy and technical skills that is essential for a modern society. The second part of the approach is openness, being part of the world community. Openness, we found, is one of the factors behind the difference in the growth rates of GDP as well as TFP between South and East Asia. An essential aspect of East Asian openness, particularly that of Korea was not only openness but actual aggressive attempts to acquire knowledge. A government must be prepared to do everything it can to transfer better foreign technology. Export promotion is vital, because it will ensure that the domestic firms, including the very large ones, become competitive meet international standards, and eventually import technology. The gains from trade really come from these technology spillovers, and not so much from inter-sectoral reallocation of resources. Therefore, closing the knowledge gap has two distinct dimensions. The first is the domestic knowledge gap, the only bridging solution to which is universal primary and secondary education. This will create the power to absorb superior foreign technology and know how, which can become available due to a open trade policy. In our regressions for the 1990s we found no evidence of trade openness having a positive impact on growth rates in South Asia. Notwithstanding the limited time-period for the sample and many other studies that do find a positive relationship between the two, we conjecture that one of the possible reasons for our finding may be this lack of "homework" in South Asian countries before opening up. We conclude that growth, poverty and social development form a complex nexus, without necessarily having any unidirectional causality.

Section 7: Conclusions

Almost one fifth of humanity lives in South Asia, which also houses a large number of the poor of the world. It is important for us to understand a) how South Asia has grown in the past, b) how it compares and contrasts with success stories, and c) how we can improve its performance. D) what has growth done to poverty reduction?

The main purpose of this report was to examine the determinants of growth in South Asia. Attention was restricted to broad macroeconomic data to the exclusion of sectoral or micro level data, as the latter will be analyzed in a different paper of the Global Research Project in South Asia.. To explore the long run determinants of growth in South Asia, we performed growth accounting, and estimated cross-section as well as time series models.

In Section 2 we did the growth decomposition which not only brought out the relative contributions of the various factors of production, but also the degree to which technological progress has been important in the growth process. The role of capital accumulation came out pretty strongly. We also found that TFP, if not very large, is significant enough to merit further teasing out through cross-country and longitudinal regressions. Notably, we found that across countries and periods, *higher growth rates of TFP were associated with higher GDP growth rates.*

Here the conclusions are not very different from studies on East Asia. Capital accumulation is very important though not as important as in East Asia, and TFP growth usually is the second most important factor. We do not find human capital or labor to be the major contributors. TFP growth has risen in the last couple of decades. This change coincides with the period of liberalization in most of the South Asian economies. India and Bangladesh have, in the last two decades, had improved output growth rates, and higher TFP contributions. Pakistan had similar experience till the late eighties, but its output growth rates have faltered in the 1990s.

The factors that have contributed to higher growth in East Asia, but in which South Asia have been lagging behind, include schooling, openness, strength of institutions, and government spending. This is brought out in Section 3, where we used the estimates from studies that use large samples of developing countries for cross-country regression to estimate the importance of economic policy and environmental factors in explaining growth differences. Some South Asian countries have higher and rising fertility rates compared to the others. High Fertility rates are negatively correlated with growth. Since fertility rates tend to be higher for low-income groups, the adverse effect on the overall quality of the labor force due to lower investments in human capital is likely to be more pronounced for them . Also, persistently high shares of government consumption to GDP negatively affect growth, especially through the capital-accumulation channel, as was revealed by the comparative analysis with East Asia.

Section 4 examined the role of reforms and measures of institutional quality in South Asian growth with panel data from the 1990s. Some of the findings seem to run against well-documented evidence on the positive relation between openness and growth. Given that our sample is restricted in size, we cannot claim to overrun such existing evidence on the basis of a single regression. However, we tried to reexamine the relationship between openness and growth by using certain *ex ante* measures of the former, such as actual trade and FDI flows and found (see Section 5) that FDI flows and TFPG are co-integrated for Pakistan and Sri Lanka.

Restricted trade and banking regimes seem to be positively associated with growth in South Asia. Also, an open foreign investment regime, less controls on wages and prices, less regulation and higher black market activity are positively associated with growth. The positive association between black market activity and growth is thought provoking. Black market activity is dominant in economies, which are tightly regulated. The Heritage Foundation ranks countries according to the relative sizes of their formal and black markets. There could be two categories of regulated economies. One where corruption is rampant and one where it is not. The latter suffers from the inefficiencies introduced by regulation. The former is able to offset at least a part of these inefficiencies through black market activities, which bypass regulation and control and are more in the spirit of free market, efficient transactions. What black markets and the implicit corruption do to income distribution is a different question, but crudely speaking, they do not seem logically inconsistent with higher aggregate growth rates. South Asian countries are

still relatively more regulated and not known for corruption-free societies. That may explain the positive association between growth and black market activity in these countries.

The only argument that is made to suggest that corruption might help growth is the 'greasing of the wheels' argument. If a system is very heavily regulated, corruption can allow growth enhancement by allowing transactions that are legally forbidden or that require long sanction procedures. For this to occur corruption networks have to be predictable and fairly organized. For highly regulated societies, corruption can thus have a positive and significant coefficient. But this coefficient should decline as societies are liberalized and deregulated. Our regression, given South Asia in general, and India in particular, have been highly regulated societies, might be picking up some of this effect.

The above argument, by no means, suggests that corruption is good for growth. It is meant to emphasize that corruption, black markets, growth and even human capital possibly form a complex nexus in South Asian countries that is worth exploring in detail at the country level.
For instance, corruption in education (in terms of appointment of teachers, conduct of examinations, choice of students and so forth) can easily affect the quality of education. Hence, mere enrollment rates may very well be misleading indicators of the quality of human capital in these countries.

In explaining TFPG differential *vis-à-vis* East Asia, the most significant contribution comes from the openness variable, followed by natural resource endowments. It is worth noting that although East Asia started with a higher natural resource export to GDP ratio and experienced a negative terms of trade shock compared to South Asia, their negative effects on TFPG are far outweighed by its *high degree of openness* during 1960-90. In the capital accumulation regression, *high government spending* and low institutional quality account for most of the predicted difference.

The openness factor is fairly complex. When the composite Sachs-Warner index is taken as the measure of openness, the majority of TFPG differential between East and South Asia is explained by this factor. This index is largely invariant in the earlier decades for South Asia. In light of the fact that trade reforms are a more recent phenomenon in the region, we examined the significance of an alternative measure provided by the Heritage Foundation. We used a panel

regression framework to utilize the maximum possible information across countries but over a limited time-period for which the data is available. We found that restricted trade regimes (in the sense of high tariffs) are positively associated with growth, but a liberal foreign investment regime promotes growth. This led us to delving into more selected indicators of openness such as the export and import GDP ratios as well as the FDI-GDP ratio. We found that the FDI-GDP ratio is indeed cointegrated with TFPG for Pakistan and Sri Lanka. Apart from providing at least a partial explanation for the apparently conflicting findings from the Sachs-Warner and the Heritage Foundation datasets, the findings from Section 5 open up an interesting issue: Could it be possible that the sectoral flows of FDI in South Asia are such that they can still promote growth even if the average tariff walls are higher than other developing regions?

A detailed analysis of the role of FDI in individual countries is warranted to answer this question. In any event, South Asia's prospects for attracting FDI is currently not as high as, say, China, which is the overwhelming success story in this regard. The reason being, most of China's FDI is accounted for by its expatriate community, and not necessarily MNCs. Expatriate investment is driven by this community's (which is based mainly in Hong Kong) familiarity with domestic labor laws and other business norms in mainland China. In contrast, with the majority of the South Asian expatriate community based in the West, its hope for attracting FDI rests with MNCs, which require comprehensive reforms in this respect at the national policy levels.

School enrollment rates may be misleading indicators of the level of human capital. The indirect indicators of quality of education show that South Asia made little progress since 1960, compared to East Asia. In the latter, the pupil to teacher ratios, salaries of teachers, dropout rates etc., moved in the direction that points towards higher quality of education. South Asia has lagged far behind.

The incidence of poverty (the share of the population living in poverty) throughout South Asia has declined moderately through the 1990s but not sufficiently to reduce the absolute numbers. There are sharp differences in poverty and income inequality reductions at disaggregated levels, such as between the rural and urban population, skilled and unskilled workers, land owners and the land-less and so on. A more explicit focus on poverty reduction is necessary, which should aim at narrowing the gap in education, skill and other capabilities, especially between the rural

and urban classes and also those between land and other asset holders and the land-less. This will serve the twin purpose of enhancing aggregate productivity within the country itself, and the capacity to absorb better foreign technology and knowledge that will be presenting themselves with increasing openness to which the region seems committed.

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Appendix

Table 2.1

Total factor productivity growth by region

(Median average annual percentage change (source: Nehru and Dhareshwar, 1993)

	1960-90	1960-73	1973-90	1980-90
High Income Countries	1.1	1.8	1.0	1.1
Developing Countries				
East Asia	1.2	1.2	1.2	1.8
South Asia	0.8	0.3	1.6	1.3
Latin America	0.2	1.4	-0.9	-0.7
Sub-Saharan Africa	-0.2	0.2	-0.9	-0.7
MENA	0.4	2.3	-0.5	-0.7
Europe	1.6	3.2	0.7	1.2

Table 2.2: Growth decompositions across regions

	Growth of TFP	Contribution of Capital	Labor	Total GDP Growth	Growth of TFP	Contribution of Capital	Labor	Total GDP Growth
	Period: 1960-73				period: 1974-86			
Latin America	1.1	2.8	0.2	5.0	-1.4	2.5	1.3	2.4
Africa	0.5	2.3	1.3	4.1	-1.0	1.7	1.4	2.2
East Asia	0.6	4.9	1.4	6.8	0.0	4.5	1.3	5.9
South Asia	0.2	2.7	0.9	3.7	1.3	3.1	1.1	5.5
Industrial	0.7	4.1	0.2	5.1	-0.2	2.3	0.3	2.5
World	0.7	3.3	0.9	5.0	-0.6	2.8	1.0	3.2
	Period: 1987-94				period: 1960-94			
Latin America	0.0	1.3	1.2	2.5	0.0	2.3	1.2	3.4
Africa	-0.6	1.0	1.5	1.9	-0.3	1.8	1.3	2.8
East Asia	2.1	3.9	1.0	7.0	0.7	4.5	1.3	6.5
South Asia	1.0	2.8	1.0	4.7	0.8	2.8	1.0	4.7
Industrial	0.2	1.8	0.2	2.2	0.3	2.9	0.3	3.4
World	0.1	1.8	1.0	2.9	0.1	2.8	1.0	3.8

Source: Senhadji(1999) as reported in De Gregorio and Lee (1999)

Table 2.3

Region and Period	Growth of output per worker	Physical Capital per worker	Education Per worker	TFP
East Asia				
1960-94	4.2	2.5	0.6	1.1
1960-73	4.2	2.3	0.5	1.3
1973-84	4.0	2.8	0.6	0.5
1984-96	4.4	2.2	0.6	1.6
South Asia				
1960-94	2.3	1.1	0.3	0.8
1960-73	1.8	1.4	0.3	0.1
1973-84	2.5	0.9	0.4	1.2
1984-96	2.7	1.0	0.3	1.5
Africa				
1960-94	0.3	0.8	0.2	-0.6
1960-73	1.9	1.3	0.2	0.3
1973-84	-0.6	1.2	0.2	-2.0
1984-96	-0.6	-0.4	0.3	-0.4
Latin America				
1960-94	1.5	0.9	0.4	0.2
1960-73	3.4	1.3	0.3	1.8
1973-84	0.4	1.1	0.4	-1.1
1984-96	0.1	0.1	0.4	-0.4

Table 2.4: Solow Residuals from First dataset

TFP was calculated using annual growth rates of GDP (g), labor force (l), physical capital stock (k) and total mean years of schooling of the total population (e). The formula used was: $TFP = g - 0.33l - 0.33k - 0.33e$.

Bangladesh					
Averages	GDP growth rate	K-growth	L-growth	Schooling-growth	Residual
1960s	3.84	1.44	0.58	0.09	1.71
1970s	1.79	0.55	0.73	0.73	-1.89
1980s	5.43	1.21	0.82	0.82	2.32
Overall	3.31	1.02	0.69	1.25	0.33
India					
Average	GDP growth rate	K-growth	L-growth	Schooling-growth	Residual
1960s	4.55	1.70	0.62	1.02	1.20
1970s	3.05	1.49	0.75	1.20	-0.40
1980s	5.37	1.54	0.56	0.76	2.50
Overall	4.01	1.55	0.67	1.05	0.72
Pakistan					
Average	GDP growth rate	K-growth	L-growth	Schooling-growth	Residual
1960s	7.37	2.61	0.96	2.66	1.13
1970s	4.72	1.74	1.04	0.11	1.82
1980s	6.77	1.85	1.10	0.65	3.16
Overall	5.82	1.95	1.04	0.79	2.03
Sri Lanka					
Averages	GDP growth rate	K-growth	L-growth	Schooling-growth	Residual
1960s	4.58	1.20	0.69	1.23	1.44
1970s	4.42	2.43	0.73	0.15	1.11
1980s	4.95	2.90	0.65	0.23	1.14
Overall	4.59	2.03	0.70	0.60	1.25

Table 2.5: Solow Residuals from second dataset

Human capital stock (e) is estimated by total mean years of schooling. Instead of using labor force, N&D use population between ages 15 and 64. Annual growth rates are calculated for the variables and then the following formula used to calculate the residuals:

$$TFP = g - 0.33k - 0.33l - 0.33e$$

Bangladesh					
Average	GDP	K	P	S	Res
1960s	3.77	1.34	0.60	0.38	1.44
1970s	1.70	0.55	0.86	0.41	-0.13
1980s	5.00	1.13	0.81	0.63	2.42
Overall	3.32	0.99	0.75	0.46	1.11
India					
Averages	GDP	K	P	S	Res
1960s	3.98	1.88	0.71	1.22	0.15
1970s	3.09	1.49	0.84	1.24	-0.49
1980s	5.17	1.55	0.79	0.93	1.88
Overall	3.96	1.65	0.78	1.15	0.36
Pakistan					
Averages	GDP	K	P	S	Res
1960s	7.24	4.55	0.83	0.88	0.96
1970s	4.73	1.74	1.18	0.99	0.81
1980s	6.54	1.88	1.05	0.88	2.72
Overall	6.13	2.81	1.02	0.92	1.36
Sri Lanka					
Averages	GDP	K	P	S	Res
1960s	4.56	1.20	0.79	0.66	1.89
1970s	4.60	2.43	0.89	0.48	0.78
1980s	4.51	2.63	0.59	0.47	0.81
Overall	4.56	2.03	0.77	0.54	1.20

Table 2.6: Solow Residuals from third dataset

TFP was calculated using GDP (g), capital stock (k), and human capital stock (h), based on years of schooling and labor (l). The annual growth rates for GDP/l and k/l were calculated and then used in the following formula:

$$TFP = g/l - 0.35(k/l) - 0.65h$$

Bangladesh				
Averages	GDP/L	K/L	H	Res
1960s	2.20	0.79	0.17	1.23
1970s	-5.07	-1.80	0.68	-3.95
1980s	1.83	0.22	0.18	1.42
1990s	2.08	0.88	0.16	1.03
Overall	0.06	-0.07	0.31	-0.18
India				
Averages	GDP/L	K/L	H	Res
1960s	2.30	1.30	0.27	0.72
1970s	0.09	0.48	0.58	-0.97
1980s	3.89	1.12	0.32	2.44
1990s	3.40	1.45	0.33	1.61
Overall	2.31	1.05	0.38	0.87
Pakistan				
Averages	GDP/L	K/L	H	Res
1960s	4.98	3.99	0.52	0.46
1970s	-0.20	0.10	0.21	-0.52
1980s	3.21	0.89	1.06	1.26
1990s	1.39	0.61	1.75	-0.97
Overall	2.45	1.48	0.79	0.17
Sri Lanka				
Averages	GDP/L	K/L	H	Res
1960s	2.46	0.28	0.37	1.80
1970s	2.31	1.58	0.39	0.33
1980s	2.09	1.81	0.16	0.11
1990s	2.51	1.02	0.16	1.33
Overall	2.32	1.19	0.28	0.84

Table 2.7: Solow Residuals using the King-Levine Capital stock series

The formula used is the same as Table 2.6, but with the King-Levine capital stock estimates

Bangladesh

Averages	GDP/L	K/L	H	Res
1960s	1.94	0.87	0.19	0.87
1970s	-4.08	-1.15	0.62	-3.54
1980s	1.13	0.87	0.29	-0.03
Overall	-0.66	0.06	0.38	-1.11

Data is till 1985

India

Averages	GDP/L	K/L	H	Res
1960s	2.17	1.04	0.27	0.86
1970s	0.09	0.72	0.54	-1.17
1980s	3.80	0.42	0.36	3.02
Overall	1.95	0.72	0.40	0.83

Data unto 1988

Pakistan

Averages	GDP/L	K/L	H	Res
1960s	4.54	2.29	0.50	1.75
1970s	0.17	-0.20	0.25	0.12
1980s	3.80	-0.79	0.80	3.79
Overall	2.74	0.41	0.51	1.82

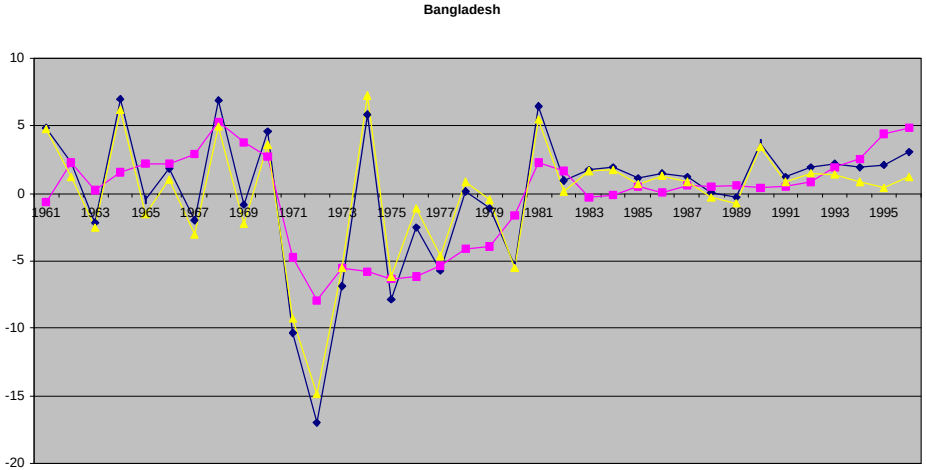
Data unto 1988

Sri Lanka

Average	GDP/L	K/L	H	Res
1960s	2.62	0.65	0.35	1.62
1970s	2.07	1.46	0.38	0.23
1980s	2.53	1.47	0.24	0.82
Overall	2.39	1.19	0.33	0.87

Data is up to 1987

Chart 2.1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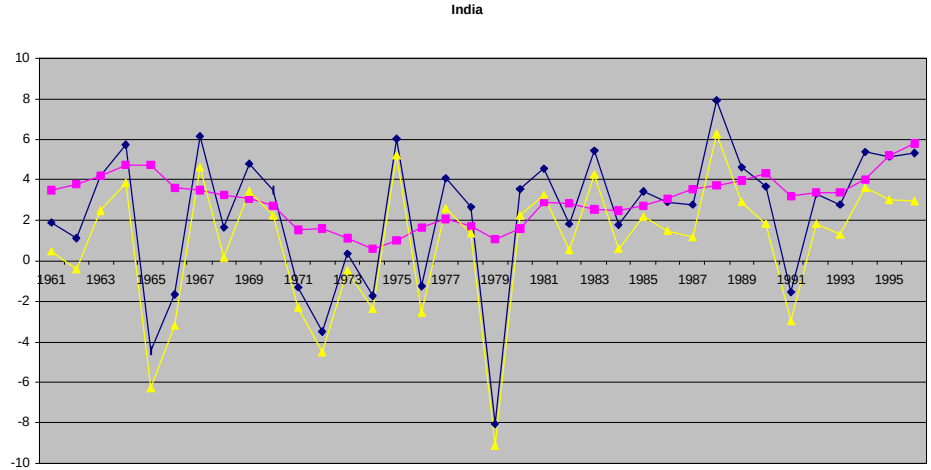
India
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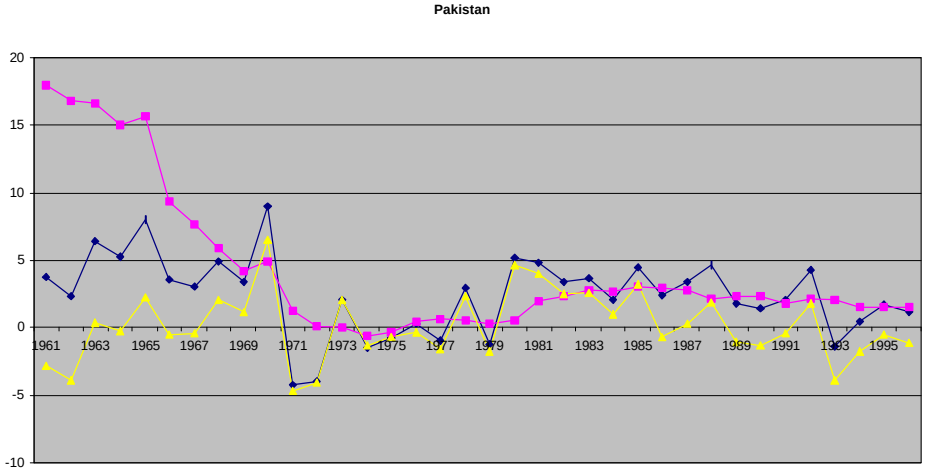
Pakistan
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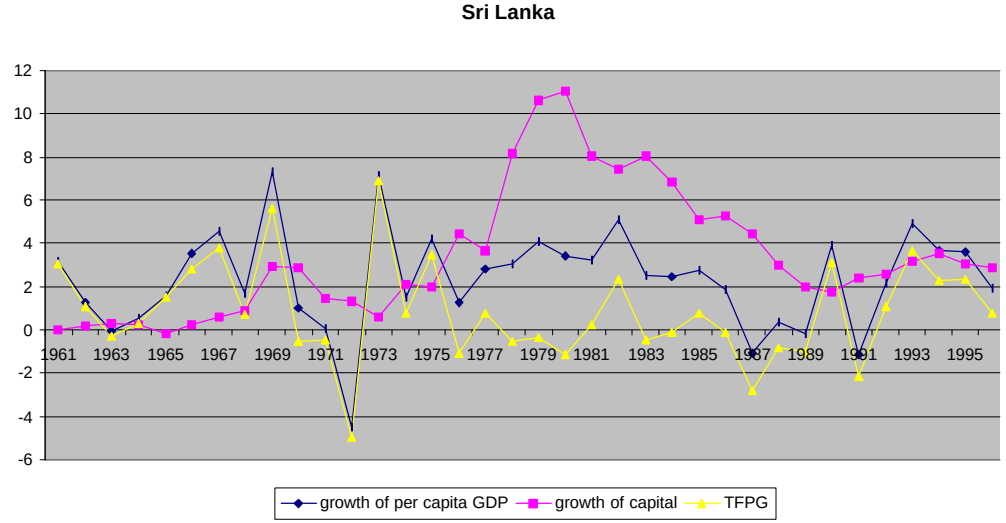
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growth of per capita GDP
growth of capital
TFPG

Table 3.1
Decade-wise growth estimates for South Asian countries using Barro's coefficients

	Life exp.	Fert.	Inf.	Govt. cons.	Terms of Trade	Initial GDP	Law	School Enrl.	Freedom	Inter(Col6*Col8)	Est.Growth	Act.growth
BARRO'S COEFF.	0.04	-0.02	-0.04	-0.14	0.14	-0.03	0.03	0.01	0.09	-0.01		
VALUE OF EXPLANATORY												
VARIABLES.												
India												
1970-1980	46.17	6.21	0.92	0.09	0.08	6.69		0.11	2.56	0.70	1.50	0.79
1980-1990	50.20	5.49	1.15	0.11	1.05	6.78	2.50	0.32	2.50	2.14	3.35	4.03
1990-1997	55.13	4.63	0.92	0.11	1.07	7.14	3.38	0.65	3.38	4.64	4.39	4.25
B'desh												
1970-1980	41.45	6.75	4.10	0.01	1.00	7.15		0.22	4.50	1.57	3.02	2.47
1980-1990	44.67	6.71	1.56	0.03	1.08	6.99	1.00	0.27	4.56	1.89	4.62	2.09
1990-1997	49.85	5.61	0.33	0.04	0.27	7.23	2.00	0.51	3.21	3.69	3.01	1.99
Nepal												
1970-80	39.60	5.76	0.82	0.08	0.19	5.73		0.02	5.50	0.12	4.57	-0.95
1980-90	43.40	6.16	1.42	0.09	1.27	6.22		0.03	3.56	0.19	3.93	2.24
1990-97	49.06	5.96	0.93	0.09	0.97	6.79		0.10	3.50	0.68	3.57	3.92
Pakistan												
1970-1980	45.80	6.95	1.82	0.11	1.06	6.93		0.19	4.75	1.31	4.29	1.64
1980-1990	50.45	6.95	0.80	0.13	1.17	7.01	2.00	0.62	4.95	4.35	5.50	3.90
1990-1997	55.80	6.68	1.09	0.13	0.89	7.25	3.00	0.64	4.25	4.64	4.63	2.09
Sri Lanka												
1970-1980	63.01	4.92	0.82	0.11	1.60	7.12		0.71	2.50	5.06	3.40	2.60
1980-1990	64.60	4.01	1.62	0.09	1.18	7.40	0.82	1.05	3.30	7.77	3.32	3.16
1990-1997	68.45	3.10	1.07	0.10	0.47	7.65	2.12	1.01	4.31	7.74	3.86	4.50

Table 3.2: East versus South Asia: comparison of actual and predicted growth

	Contribution to the Difference in per capita growth of South Asia relative to East Asia. (South Asia minus East Asia)		
	1970-1980	1980-1990	1990-1997
Difference in			
Actual Growth	-2.62	-2.27	0.23
Predicted Growth	0.52	1.26	0.55
Initial income (-0.022)	0.13	0.16	0.169
Interaction Term(-0.006)	0.42	0.64	0.72
Human Resources	-0.23	-0.31	-0.30
Schooling (0.009)	-0.10	-0.14	-0.16
Life Expectancy (0.041)	-0.09	-0.09	-0.07
Fertility (-0.031)	-0.04	-0.07	-0.08
Terms of trade (0.127)	0.99	1.49	0.93
Institution and Policy	-0.79	0.04	-0.07
Government consumption (-0.115)	0.04	0.04	0.26
Rule of Law (0.026)	-	-0.03	-0.04
Inflation rate (-0.043)	-0.57	-0.47	-0.03
Democracy (0.094)	-0.26	0.08	-0.03

Note: The Barro –Lee data set is used for the Tables.

Table 3.3
Inter-Decade growth performance of South Asian countries.

	LIFE EXP	FERT	REAL EX. RATE	INITIAL GDP	SCHOOL ENRL	FREEDOM IND.	INTER. COL7*COL9	ESTD. DIFF (SUR METHOD)	ACTUAL DIFF.
Estimate of Barro (SUR Method)	-0.082	-0.040	0.102	-0.044	-0.003	0.019	0.005		
$\beta_i Y_{it} - \beta_i Y_{it-1}$									
India									
(80-90)-(70-80)	-0.08	-0.12	0.01	-0.004	-0.21	-0.06	**0.007**	0.46	3.24
(90-97)-(80-90)	-0.09	-0.17	0.002	-0.02	-0.33	0.88	**0.012**	0.29	0.21
B'desh									
(80-90)-(70-80)	-0.07	-0.01	0.01	0.007	-0.05	0.06	**0.001**	0.05	-0.38
(90-97)-(80-90)	-0.10	-0.18	-0.08	-0.011	-0.24	-1.35	**0.009**	2.00	-0.09
Nepal									
(80-90)-(70-80)	-0.09	0.07	0.11	0.007	-0.01	-1.94	0.004	1.85	3.19
(90-97)-(80-90)	-0.12	-0.03	-0.03	-0.01	-0.07	-0.06	0.002	0.32	1.67
Pakistan									
(80-90)-(70-80)	-0.01	0.00	0.01	-0.003	-0.43	0.20	0.015	-0.22	2.26
(90-97)-(80-90)	-0.10	-0.04	-0.02	-0.010	-0.02	-0.70	0.001	-0.89	-1.81
Sri Lanka									
(80-90)-(70-80)	-0.02	-0.20	-0.04	-0.01	-0.34	0.80	0.014	0.20	0.55
(90-97)-(80-90)	-0.06	-0.26	-0.07	-0.01	-0.04	1.01	-0.0001	0.56	1.33

Note:
β_i : Estimated coefficient by the SUR method for each explanatory variable
Y_{it}: The explanatory variable for a particular country for a decade

Table 3.4
Summary of variables for South and East Asia for the entire period 1960-1990)

	Total(E. Asia)	Total (S. Asia)	Bangladesh	India	Pakistan	Sri lanka
Initial Condition						
GDP per worker (1960 '000 dollars)	1275	903.75	952	766	638	1259
Secondary Schooling (1960 years)	0.65	0.38	0.24	0.10	0.16	1.02
Life expectancy at birth (1960, years)	56.4	47.93	43.6	42.5	43.3	62.3
Control or Policy variables						
Government Consumption (1960-1989 Avg. %of GDP)	6.4	12.97	23.85	9.03	7.39	11.61
Openness (1950-1990 %)	75.3	8.33	0	0	0	33.33
Institutional Quality (Avg. for 1980's)	6.57	1.89	0	2.94	1.63	3
Region or country specific factors						
Terms of trade Shock	-0.74	0.11	0.20	0.08	0.16	0.02
Primary Products Exports(1970 % GNP)	10	5.25	1	2	3	15

Table 3.5
Comparative analysis of TFPG and K-accumulation for East and South Asia (1960-1990)

	Initial GDP	Schooling	TOT Shock	Govt. Spending	Openness	Endowments	Inst. Quality	Estimate of Annual diff	Actual per annum diff
Coefficient of significant variables. (from Jong-il Kim &Chin Hee Hanh)	-0.99	0.32	0.19	-14.03	0.74	-1.72	0.27		
East Asia-South Asia (TFPG diff.)	-0.37	0.09	-	-	49.55	-8.17	0.39	1.38	0.74
East Asia-South Asia (Capital gr.diff.)	-0.94	0.19	-0.16	1.39	-	-	1.96	2.43	4.62

Table 3.6
Comparative analysis South Asia and Individual Countries for the entire period (1960-1990)

	Initial Income	Schooling	Openness	Endowments	Inst. Quality	Average annual TFPG diff.	Actual TFPG diff.
South Asia - Bangladesh	0.15	0.01	6.16	-7.31	0.50	-0.016	-0.31
South Asia - India	-0.06	-0.01	6.16	-5.59	-0.28	0.007	0.44
South Asia - Pakistan	-0.24	-0.06	6.16	-3.87	0.07	0.068	-0.56
South Asia - Sri Lanka	0.42	-0.38	-18.5	16.77	-0.3	0.06	-0.40

Table 3.7
Comparative analysis Between South Asia and constituent countries for 1980-1990

	Initial GDP	Schooling	Openness	Endowments	Inst.Quality	%Annual (estimated diff)	Actual
Coefficients of significant variables	-0.99	0.32	0.74	-1.72	0.27		
South Asia- Bangladesh	-0.08	0.14	6.19	-7.31	0.51	-0.05	-0.46
South Asia- India	-0.28	0.06	6.19	-5.59	-0.28	0.01	0.07
South Asia- Pakistan	-0.06	0.05	6.19	-3.87	0.07	0.23	-0.76
South Asia- Sri lanka	0.32	-0.26	-18.57	16.77	-0.30	-0.20	1.19

Table 3.8

Comparison of schooling variables between South Asia and East Asia

	Pupil to teacher (prim. 1960)	Col 1 (1990)	Pupil to teacher (sec.1960)	Col 3 (1990)	Govt. exp/pupil to per capita GDP% (prim 1960)	Col. 4 (1990)	Ratio of govt. exp/pupil to per capita GDP %(sec. 1960)	Col. 6 (1990)	Av. real salary of prim. Teachers(1960)	Col 7 (1990)	No. of school days at prim. school	No. of school hours at Prim. school	Drop out Rate at prim. School (1960)	Col. 10 (1990)
Asia	37.11	26.11	24.55	21.71	10.25	10.60	21.67	10.72	4376	16296	203.28	1029.75	16.62	10.57
Asia	36	46.5	21.45	23.96	7.83	9.43	32.10	11.90	2559.33	3507	195.4	977	43.70	36.50
desh	31	63	-	27.40	-	5.7	-	17.6	-	3507	201	-	78.8	53
dia	46.10	60.60	16	23.20	5.6	10.9	70.10	13.2	1406	-	201	-	38	38
epal	33.33	39.20	32	31.10	-	-	-	-	-	-	201	-	-	-
kistan	38.60	40.60	23.60	19	5.1	-	11.80	-	1332	-	174	754	52	52
i Lanka	31.00	29.10	14.20	19.10	12.8	11.7	14.40	4.9	4940	-	200	1200	6	3

Table 4.1

Panel regression of the effects of civil and political rights on growth

	Total	Between	Within	Random effect
Civil	-.07 (-1.09)	-0.05 (-0.61)	-0.0086 (-0.10)	-0.04 (-0.59)
Pol	0.009 (0.56)	0.01 (0.94)	0.02 (0.20)	0.01 (0.52)
GdpL	0.21 (4.85)	0.34 (4.31)	0.0028 (0.06)	0.08 (1.91)
C	3.38 (8.01)	2.69 (4.11)		3.68 (6.62)

Table 4.2

Panel regression of the effects of law, corruption and bureaucracy on growth

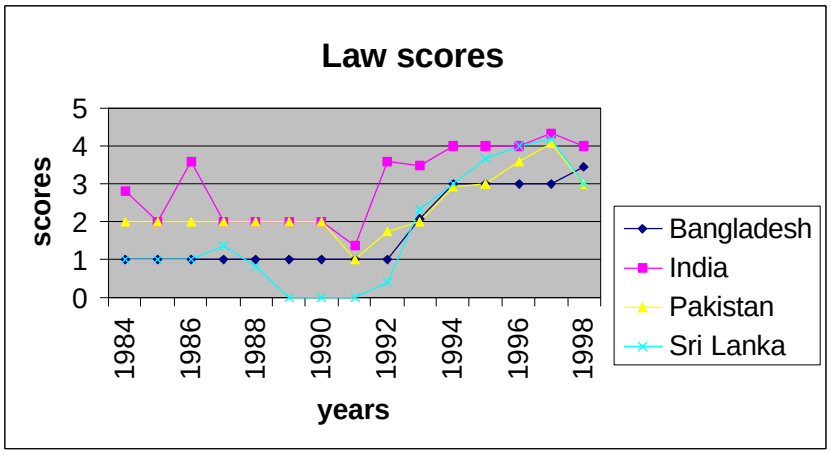
	Plain	Between	Fixed effect	Random effect
GdpL	0.21 (5.12)	0.99 (24.7)	0.05 (1.14)	0.14 (3.24)
Corr	-0.14 (0.64)	0.20 (1.84)	-0.12 (-0.35)	-0.14 (-0.54)
Law	0.46 (2.49)	-0.17 (-1.4)	0.27 (1.18)	0.40 (2.04)
Bureau	0.08 (0.37)	-0.14 (-1.37)	0.04 (0.10)	0.12 (0.44)
C	1.88 (3.04)	1.65 (6.21)		2.25 (2.89)

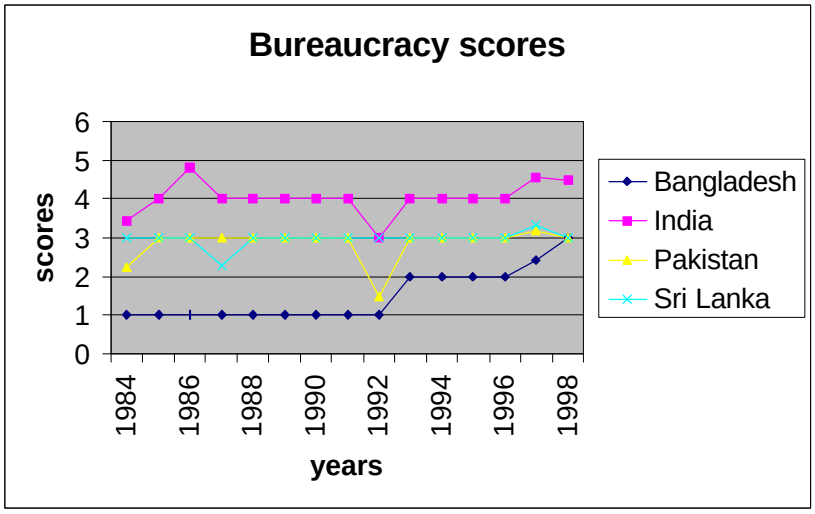
Table 4.3

Panel regression of the effects of freedom indicators on growth

Freedom Indicators	All country	South Asia
Gdplag	-0.114 (-2.21)	0.30 (0.865)
Trade	0.74 (1.96)	0.802 (0.680)
Taxation	0.87 (1.59)	-4.722 (-2.07)
G-intervention	1.08 (2.36)	0.610 (0.233)
Foreign investment	1.153 (1.39)	-7.579 (-2.062)
Banking	-1.31 (-1.96)	6.535 (3.60)
Monetary Policy	-.23 (-2.08)	-1.12 (-1.88)
Wage-Price control	-0.45 (-0.463)	-4.16 (-1.86)
Property rights	0.27 (0.365)	1.376 (0.565)
Regulation	-0.156 (-0.204)	-4.76 (-1.51)
Black market	-0.215 (-0.384)	5.07 (1.93)

Chart 4.1


Law scores
scores
0
1
2
3
4
5
1984
1986
1988
1990
1992
1994
1996
1998
years
Bangladesh
India
Pakistan
Sri Lanka


Bureaucracy scores
scores
0
1
2
3
4
5
6
1984
1986
1988
1990
1992
1994
1996
1998
years
Bangladesh
India
Pakistan
Sri Lanka

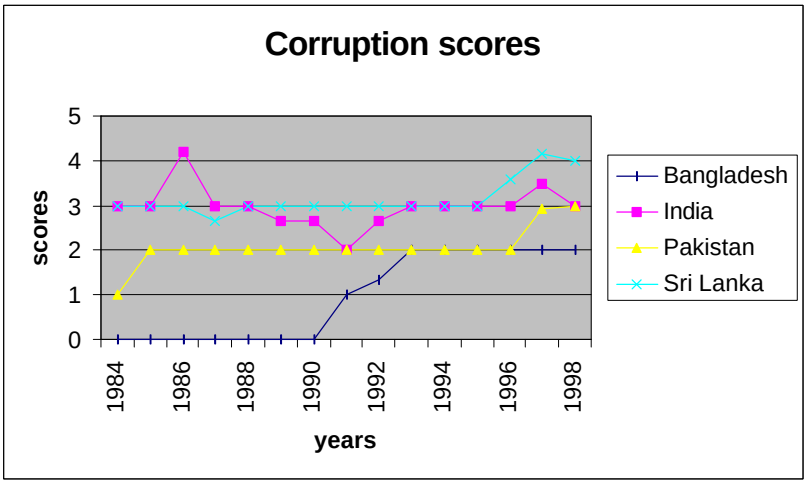
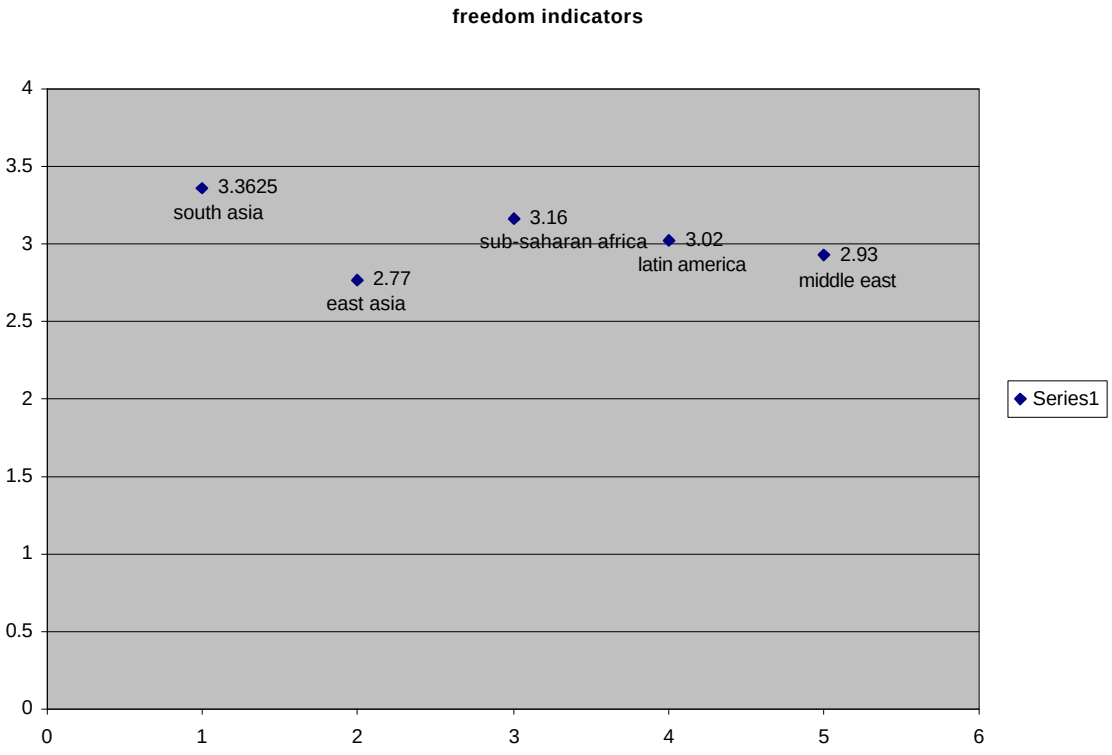

Corruption scores
scores
0
1
2
3
4
5
1984
1986
1988
1990
1992
1994
1996
1998
years
Bangladesh
India
Pakistan
Sri Lanka

Chart 4.2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3
2.5
2
1.5
1
0.5
0
0
1
2
3
4
5
6
3.3625
south asia
2.77
east asia
3.16
sub-saharan africa
3.02
latin america
2.93
middle east
Series1

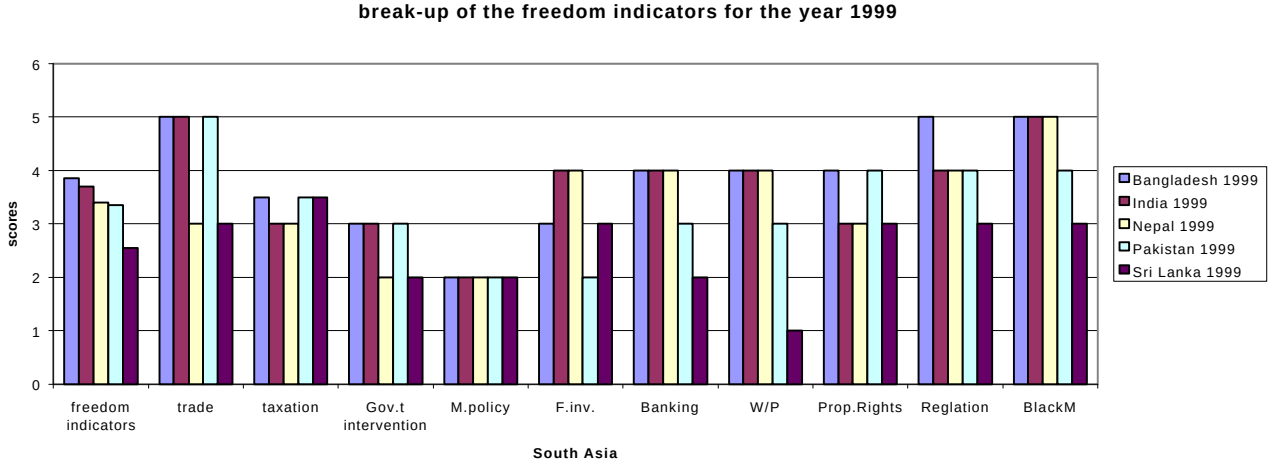
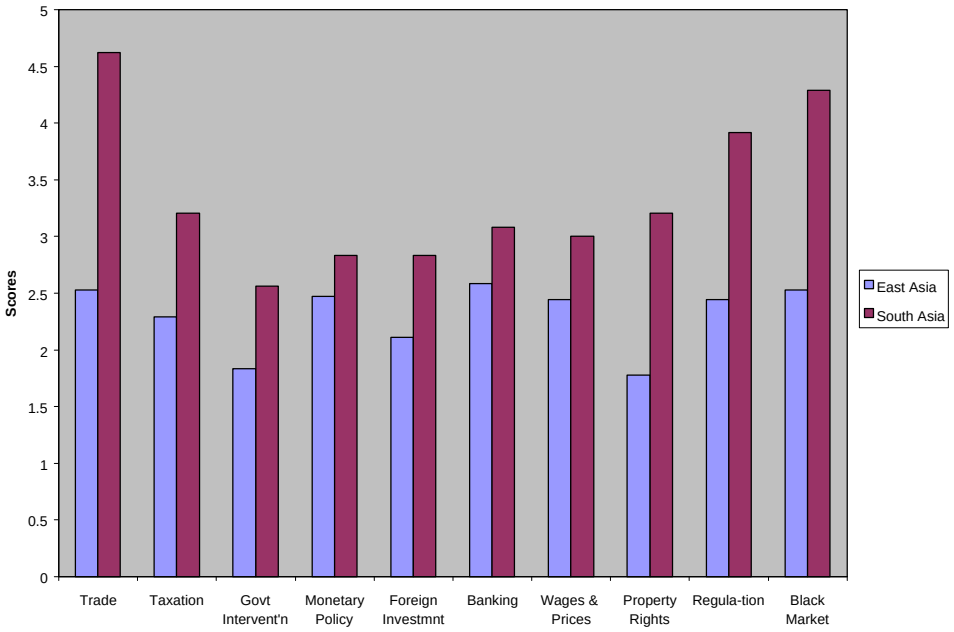

break-up of the freedom indicators for the year 1999
scores
6
5
4
3
2
1
0
freedom indicators
trade
taxation
Gov.t intervention
M.policy
F.inv.
Banking
W/P
Prop.Rights
Reglation
BlackM
South Asia
Bangladesh 1999
India 1999
Nepal 1999
Pakistan 1999
Sri Lanka 1999

Chart 4.3


Scores
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Trade
Taxation
Govt Intervent'n
Monetary Policy
Foreign Investmnt
Banking
Wages & Prices
Property Rights
Regula-tion
Black Market
East Asia
South Asia

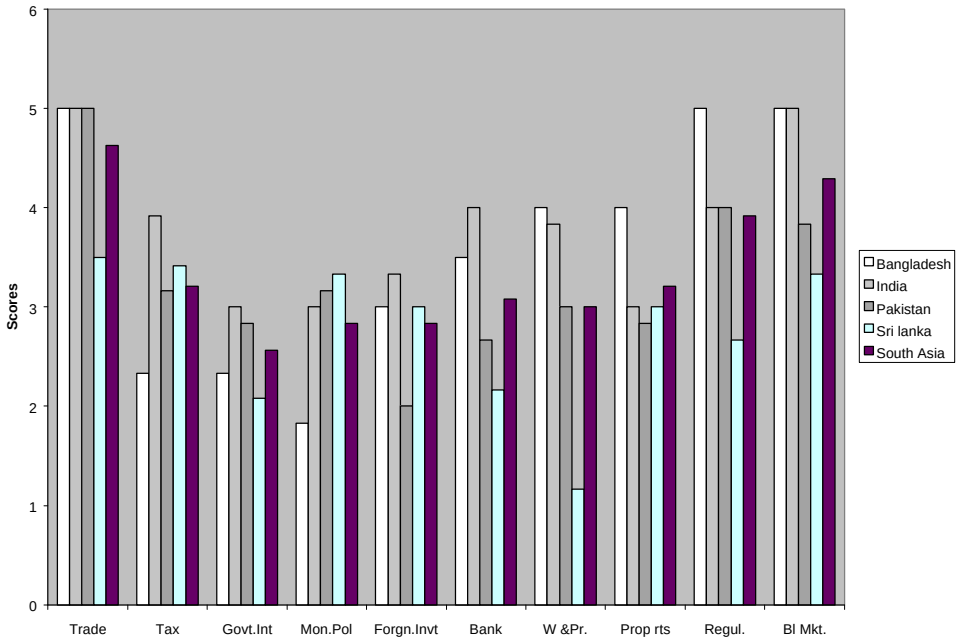

Scores
6
5
4
3
2
1
0
Trade
Tax
Govt.Int
Mon.Pol
Forgn.Invt
Bank
W &Pr.
Prop rts
Regul.
Bl Mkt.
Bangladesh
India
Pakistan
Sri lanka
South Asia

Table 5.1

Results of tests for cointegration between FDI/GDP and TFPG

Series and country name.	Augmented Dickey Fuller Test Statistic(Level and First Difference)	Critical values at 5% level of significance.	Remarks
FDI/GDP (Sri Lanka)	Level: -1.78	-3.02	First Difference Stationary.
	First Diff. : -3.45	-3.04	
FDI/GDP (Pakistan)	Level: -0.44	-3.02	First Difference Stationary.
	First Diff. : -4.00	-3.04	
FDI /GDP (India)	Level: -3.24	-3.02	Stationary at level
TFPG (Sri lanka)	Level: -2.85	-3.02	First Difference Stationary.
	First Diff. : -4.21	-3.04	
TFPG (Pakistan)	Level: -2.71	-3.02	First Difference Stationary.
	First Diff. : -7.66	-3.04	
TFPG (India)	Level: -2.80	-3.02	First Difference Stationary.
	First Diff. : -6.41	-3.04	

Co-integrated variables And countries.	Likelihood Ratio (LR) value	5% level of significance	Cointegrating coefficients of TFPG and FDI	Remarks
TFPG(endogenous) & FDI for Pakistan.	20.26	18.17	1.00, 28.11	LR indicates one cointegrating relation at 5% level of significance
TFPG(endogenous) & FDI for Sri Lanka.	26.55	18.17	1.00 ,0.35	LR indicates one cointegrating relation at 5% level of significance

Concluded