

**Draft
Comments Welcome**

The Occam's razor model of growth: India 1950-2004

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Introduction

This paper is part of a larger study entitled “The miracle Indian economy: 1980-?” The study looks at the role, and interaction, of three key variables in the development process – growth, inequality, and poverty. With growth having averaged 3.6 percent per capita for the last twenty-five years, and with no evidence (yet) of any worsening in inequality, the Indian experience can conservatively be described as a miracle, and certainly in the same league as the high growth experiences of several countries in the last fifty years. Why this miracle has not been recognized as such may largely be due to the political economy of research poverty, and its reduction. This present paper is only on the growth aspects of the Indian story.

There is a considerable, and very old, interest in understanding the growth process in developing economies, and especially successful growth economies like Korea, China, and now India. Recent research, through use of both inter-temporal and cross-country analysis, has highlighted the role of various factors that help explain growth, (in addition to the traditional role of factor accumulation). Today, discussion of growth is not complete without reference to the role of climate, geography, institutions, the rule of law etc. There are very few growth papers analyzing the role of policy and/or factor accumulation. Indeed, one recent paper by two leading growth scholars (Easterly – Levine (2002)) contends that policy has no role to play in explaining growth: “Still, we are struck by the way that endowments and policies have no independent effect once we control for institutions, contrary to a number of stories, and that institutional quality seems to be a *sufficient* statistic for accounting for economic development” (emphasis added, p.33)¹.

This paper examines the growth experience of India for the post-independence period 1947 to the present. Particular emphasis is given to the developments over the last twenty-five years, a period during which the GDP growth rate has averaged 5.6 percent per annum, a full 2 percentage points above the average growth during the previous 30 years. Growth during the first period was much slower than the global average, while the

¹ I have long held the view that economists should not pronounce on financial markets until they have spent at least six months on Wall Street; and that they should not pronounce on development until they have spent six months not in any developing country but in India. This is clearly a self-serving view because it will remove a substantial amount of competition (for me and my ilk). In this paper, I hope to show that even without staying in India, the correct interpretation is that policy does have a substantial role in affecting the quality of life (freedom) and in enhancing (or subtracting) growth.

second period growth has the hallmarks of a “miracle”. According to many, and certainly according to the casual observer, the second high growth period should be dated since the institution of economic reforms in 1991, and after the crisis year of 1991-92 when GDP growth averaged only 0.9 percent.

The periodization, and causation, of growth is the central issue examined in this paper. A simple decade analysis suggests that (i) there was an acceleration in India’s growth rate in the eighties and (ii) that the average growth rate, post 1980s, and post major economic reforms, stayed the same as the pre-reform decade of 1980s². Thus, there are two important questions that need to be addressed: first, what caused India’s growth to *accelerate* in the 80s and second, what *prevented* India’s growth from accelerating in the nineties. While there are several analysis of the first question, very few attempts have been made to answer the second. This paper does both.

A review of research on India’s growth can help put the debate about causation, and reforms, in perspective. Until the end of nineties, all economic research on India (e.g. Virmani(1997), Ahluwalia and other papers in the Bajpai-Sachs volume (1999)) had highlighted the important causative role of 1991 reforms in accelerating India’s growth. The common assumption among researchers was that since India had a major economic crisis in 1990-91, and since growth had clearly jumped since that year, it was unlikely that growth in the eighties was anywhere near the post-reform growth. The first paper to highlight the constancy of India’s growth rate post the 1970s was Bhalla et. al. in Feb 2000³. In the paper entitled, “*Start of India’s decade*”, the paper highlighted the fact that there was not one, but several “Hindu growth” constants. For example, the consolidated (state plus central) fiscal deficit of the Indian economy had stayed in a narrow range of 8 to 10 percent for two decades! Or that India’s money supply growth had never wandered much from an average growth rate of 17 percent during the entire 20 year period.⁴ Or that, surprisingly, industrial production growth had also not wandered much beyond 7 percent per annum.

² A decade wise analysis is okay since the dating of India’s growth acceleration has converged onto the period 1979-81 (see Virmani(2003a) for a detailed attempt, and Panagariya and Rodrik-Subramniam).

³ It is possible that other articles highlighted this fact before; the important point is about the nature of research and how “collective” its mind-set is i.e. until Bhalla(2000) (or another paper), no researcher had pointed to the lack of acceleration of growth post the 1991 reforms.

⁴ The paper also pointed out that the volatility of money supply growth rate in India was the lowest in the world, and that the volatility of “no 2” (Thailand) was three times higher!

Amongst the important conclusions reached in the 2000 paper: first, that fiscal deficits were high, constant, and higher than they “should” be because of the misguided policy of administered interest rates:

“the consolidated (State plus Center) fiscal deficit has stayed constant around 9-10% of GDP for the last twenty years. Abnormally high interest rates (no arbitrage with world rates possible because of a closed capital account) have resulted in higher cost of borrowings, and a higher proportion of interest payments for financing the fiscal deficit. As a share of GDP, interest payments have increased from 3% of GDP in the early eighties to almost 8% of GDP today; as a proportion of the fiscal deficit, the percentage is 35% in the early eighties, and more than 75 per cent today. High interest rates are a major cause for the high fiscal deficits in India”. (p. 2).

The second major conclusion pertained to the constancy of the growth rate despite the major reforms of the nineties:

“The Indian economy has been growing at a steady rate of 5.5% to 6.5% for the last twenty years – a fact ignored by most analysts. Excluding the crisis year of 1991-92, the lowest GDP growth rate observed in Indian economy has been 3.0% witnessed in 1982-83. In spite of continuous economic reforms, there has been no acceleration in the growth rate. This presents a key question for both analysts and policy makers. (p.2).

This paper makes an attempt to address the “key question”. Several recent papers have also noted the paradoxes in India’s growth and reforms story. Prominent in this debate are: DeLong(2001), Panagariya(2004), Rodrik and Subramniam (2004a) and Virmani (2004a).

DeLong: “Since the late 1980s India does not look ordinary at all. It has been one of the fastest-growing economies in the world, with a doubling time for average GDP per capita of only sixteen years. Conventional wisdom traces the growth acceleration to neoliberal economic reforms implemented under the government of Narasimha Rao. Yet the timing of the growth acceleration suggests an earlier start for the current Indian boom under the government of Rajiv Gandhi”... There’s lack of hard evidence to support the view that in the absence of the second wave of reforms in the 1990s, it is unlikely that the rapid growth of the second half of the 1980s could be sustained.”

Panagariya: “At the same time, reforms played a significant role in spurring growth in the 1980s...The difference between the reforms in the 1980s and those in the 1990s is that the former were limited in scope and without a clear road map whereas the latter were systematic and systemic. This said the reforms in the 1980s must be viewed as

precursor to those in the 1990s rather than a part of the isolated and sporadic liberalizing actions during the 1960s and 1970s, which were often reversed within a short period”.

Virmani: “The growth performance of India since 1950 has been remarkably stable. Statistically, there are only two phases of growth during the 55-year history of modern India. The first phase, characterized as the ‘Hindu’ rate of growth (HRG), starts at independence (1947) and lasts to the end of the seventies. The second phase, which started in 1980-1981, is characterized as the phase of the ‘Bharatiya’ rate of growth (BRG), is still going on, and has seen a sharp and statistically significant acceleration in the growth rate”.

Virmani on why no acceleration in growth post the reforms: “Four reasons are found to be most compelling: Gaps in the reform process, the failure of public monopolies to provide critical infrastructure services like electricity and rail transport, the deterioration of government supply of public and quasi public goods (quantity and quality), and dissension within the ruling coalition/party/organization that undermine credibility of reform.”(p.75)

Rodrik-Subramaiam on why growth accelerated in the eighties: “India’s growth transition began in the early 1980s rather than after the crisis of 1991. The performance of the 1980s appears to have been triggered by a perception on the part of the private sector that the government’s attitude toward it had changed, a perception that was subsequently (in the mid-to-late 1980s), mildly validated by piecemeal reforms of the industrial licensing system. The attitudinal shift signaled by the Congress governments in the 1980s elicited a large productivity response”.

The most important analytical difference between the studies is that only Virmani attempts to incorporate the effect of rainfall on the growth pattern observed. A decade is too small a time-period to assume that “rainfall” is normal; and the effects of rainfall on output, and output change, can be significant in the short-run. Interestingly, *none* of the studies discuss the role of factor accumulation in explaining the India story. Only Rodrik-Subramaniam note it, in passing, and state a conclusion opposite to that reached in this paper: “We begin this paper by documenting India’s growth transition in the 1980s and placing this experience in a comparative context. We show that this transition is grounded in an impressive increase in factor productivity (*rather than in factor accumulation*)” (p.3, emphasis added).

The Indian story is *both* factor accumulation, and productivity growth. There are three aspects to the India story, aspects that collectively answer a large set of questions related to Indian growth. The first noteworthy fact is that the 1970s growth was

significantly below trend – and lower because of essentially two factors, bad weather and bad oil prices. Non-incorporation of this fact means that analysts have been trying to explain the increase in the 1980s (2.6 percentage points or ppt) when in reality they should have been trying to explain the increase since prior to 1970 (1.7 ppt). Factor accumulation (particularly capital) helps explain 1.3 ppt of the 1.7 ppt higher growth in the eighties i.e. factor accumulation is the major story for explaining the growth acceleration in the eighties. This is the second noteworthy fact

The lack of acceleration in the 1990s is the third fact, and it is a factor productivity story. Most of the economic reforms instituted in 1991-93 related to trade, and exchange rates. A specific variable meant to accurately capture the impact of these reforms suggests that growth should have been higher by 1 ppt in the nineties; increased factor accumulation added another 0.3 percent. What one observes is not a 1.3 ppt acceleration but only a 0.3 percentage point increase in the nineties growth rate. So were the trade reforms ineffective? No, they were very effective i.e. they raised the potential growth rate by a full percentage point. What depressed the 1990s growth rate was a bad monetary/fiscal policy. Inflation fell in India (as in the rest of the world) and the government did not respond adequately (or at all) to this new phenomenon. Nominal rates were left unadjusted (India has a corny and “scam” administered interest rate regime) with the consequence that real interest rates increased and proved to be the “other” side of financial repression (too high rather than too low real interest rates). Investment rates stayed constrained, profitability was dampened and somewhere between 0.4 and 0.8 percentage points of GDP growth were lost.

So what was the contribution, the value-added of the 1991 reforms? About 1.3 percent extra growth per annum, if normal weather, and stable oil prices is the benchmark. It is not clear whether this is too much, or too little. For a “base” investment rate of only 23 percent, this estimate is slightly better than what should have been expected. In that context, the 1991 reforms have to be considered a huge success.

The plan of the paper is as follows. Section 2 is a brief summary of the data used, with emphasis on rainfall data, and the construction of rain indices. Section 3 reports the data, and results, for the fifty year period. Section 4 concludes.

Section 2: **Data and rainfall**

The basic macro-economic data used here pertains to the 1993-94 series of the national accounts. The 1993-94 base represented a major overhaul in India's national accounts; somewhat unusually, nominal income for 1993-94 was also increased by a largish 14 percent compared to the estimates obtained by the previous base (1980-81) method. That all of the base induced growth changes for the 1960 to 1993 period may not have been "smooth" is discussed in Bhalla(2002a). However, for the important period under consideration, 1980 and thereafter, the growth rate according to both the bases (1980-81 and 1993-94) are very similar; hence, the "changed base" explanation for researchers missing the high growth experience of the eighties can be ruled out.

Rainfall data has been obtained from www.tropmet.res.in. Monthly data on rainfall for a network of rain gauge stations has been collected since the middle of the 19th century. As the website states:

"While selecting the network of rain-gauge stations, an effort was made to select a network which would provide one representative station per district having a reliable record for the longest possible period. The network selected under these constraints consist of 306 almost uniformly distributed stations for which rainfall data are available from 1871. The hilly regions consisting of four meteorological subdivisions of India which are parallel to Himalayan mountain range have not been considered in view of the meager rain-gauge network and low areal representation of a rain-gauge in a hilly area. Two island subdivisions far away from mainland have also not been included. Thus, the contiguous area having network of 306 stations over 29 meteorological subdivisions measures about 2,880,000 sq. km., which is about 90 percent of the total area of the country."

The monthly (January – December) area weighted rainfall series for each of the 29 meteorological subdivisions have been prepared by assigning the district area as the weight for each rain-gauge station in that subdivision. Similarly assigning the subdivision area as the weight to each of the subdivisions in the region, area weighted monthly rainfall series are prepared for Homogeneous regions of India as well as for all India".

The rainfall index was constructed as follows: For each month, and for each rainfall station, the standard deviation was computed. The average of these standard deviations for the four months, June through September, is the index. Different aggregations were attempted, but none proved as "explanatory" as this average of four month series.

Rainfall primarily affects agricultural output, and when the share of agricultural output was high, it, by definition, affected agricultural output more. From a share of over fifty percent in the early 1950s, agriculture accounts for only twenty percent today. Bad, or good rainfall, can also have some ripple effects on the rest of the economy. The direct, and indirect, effects are efficiently modeled by weighting current, and lagged rainfall, by the lagged share of agricultural output.

Capital Stock

Nehru-Dhareshwar(1993) construct a capital stock series, on a uniform basis, for over ninety countries for the period 1950-90. The initial stock level for 1950, about twice the GDP of India at that time, was used to construct a capital stock series (perpetual inventory method) for the period 1950-2003. When an investment price deflator was not available, the GDP deflator was used. Different depreciation rates were experimented with – 3, 4, 5 , 7.5 and 10 percent. For the first three, the estimated share of capital was above 80 percent - simple Cobb-Douglas regression model with growth in output/worker as the dependent variable and rainfall (current and lagged rainfall weighted by lagged share of agricultural output) and growth in the capital labor ratio as the independent variables. This estimate appears to be “too high”; for a depreciation rate of 7.5 percent, the share of capital was estimated to be 0.66, and this estimate of depreciation, and capital stock, was chosen as being more “appropriate”.⁵

Just recently Mr. Sivasubramonian’s book on the sources of Indian growth has been published. His data on capital stock suggests a capital elasticity somewhat lower than the 0.66 elasticity obtained by the perpetual inventory method and a depreciation rate of 7.5 percent. Since his construction of capital stock is much more detailed, we have chosen his capital stock series as the “representative” series on capital stock.

⁵ None of the results presented here are qualitatively affected by the choice of the capital stock series. Further, it should be noted, and emphasized, that this simple capital stock model is sensitive to inclusion/exclusion of years post 2000, and especially 2003. For the 5 percent depreciation rate, and period-1950-2000, a capital elasticity of 0.72 is obtained; for the 7.5 percent depreciation assumption, the capital elasticity is 0.6.

Data on labor force

Obtaining data on labor force is difficult for most developing countries. India is no exception. Even more difficult is obtaining data on employment, the variable needed for the estimation of a production function. Access to National Sample Survey (NSS) Employment and Unemployment survey yields estimates of employment according to three different definitions: usual status (usually one month) , weekly status and daily status. The international norm is weekly status, and is the one chosen here. The 1983 and 1993 surveys are used to derive employment growth for the decade, and the 1993 and 1999 surveys for employment growth post 1993. For years prior to 1983, the labor force *growth* as obtained from World Bank, World Development Indicators is used and grafted on to the estimate of employment in 1983.

Labor force (and associated results) are reported in Table 1. While World Bank labor force data shows a marginal increase in labor force growth in the nineties (2 to 2.2 percent), the NSS data shows a large decline (2.9 to 1.4 percent annual rate). Sivasubramonian also uses the NSS data to construct his labor force series; hence, in addition to his capital stock series, his labor force series is also used. The data for 2000 to 2003 are updated using investment data for capital and the same labor force growth (1.3 percent per annum) is assumed for 2000 to 2003 as was observed for 1993-1999.

Monetary Policy – Interest Rates

A long time-series on interest rates is difficult to obtain. Data on the corporate borrowing rate (or prime rate of lending) are available from 1978. Data on the call money rate (overnight rate of the Central Bank) are available from 1957 onwards (the Mumbai call money rate). Attempts to obtain some interest rate data for the first seven years of the analysis, 1950 to 1956, have so far been unsuccessful. Use of either series yields similar results; the longer time-series of the call-money rate is used for calculations. To arrive at a real interest rate, inflation, as measured by the CPI, is subtracted from the nominal rate. In growth models, the lagged real interest rate is used .

**Table 1: NSS Employment & Unemployment Survey - 1983-84, 1993-94, 1999-00
(annualized growth rates)**

	1983-93	1993-99	1983-99
Enrollment and Labour force	3.2	1.7	2.6
Enrollment	5.5	3.5	4.8
Mean education years	1.7	2.3	1.9
Labour force	2.9	1.4	2.4
Labour force, World Bank data	2.0	2.2	2.1
Employment	3.0	1.3	2.4
Unemployment	1.6	5	2.9
Wages All occupations	1.8	4.4	2.8
Wage rate, All Occupations	1.7	4.5	2.7
Wages, Full time workers	1.9	5.8	3.3
Wage rate, Full time workers	1.9	5.8	3.3
Per capita GDP, NSS	1.2	1.8	1.4
Per capita GDP, NA	2.7	4.0	3.2
Per capita consumption, NSS	2.6	4.7	3.4
Per capita consumption, NA	3.0	4.7	3.7

Source: Reserve Bank of India (RBI), WDI2004 CD, Economic and Political Weekly (EPW), Central Statistical Organization (CSO) and Chandok (1989).

Note:

1. All indicators other than per capita indicators are calculated for the age group 15-60.
2. Wage per capita income and expenditure are in real terms, 1993/94 base.

Over/Under valuation of the exchange rate

In several papers (e.g. Bhalla(1996), Bhalla(1997), Bhalla(1998), Bhalla(2000b), Bhalla(2003b) I have argued about the importance of the exchange rate in determining economic growth – more specifically, about how under-valuation of currencies (the East Asia tested growth model) helps a country to achieve a faster growth rate. Several papers on trade and growth (e.g. World Bank, World Development Report(1991), Dollar-Kraay(2001)) have emphasized the importance of trade and openness for (faster) economic growth. These studies have been criticized on econometric grounds and on causality grounds – perhaps countries achieve faster growth and therefore trade more and therefore the share of trade in output increases. Ultimately, the interest is in the *causes* of growth.

If under-valuation of currency causes growth, then the question arises: how does one measure under-valuation? There are several methods. The most popular method is to either take a basket of currencies, or the US dollar, and derive inflation adjusted exchange rates with respect to a “base” year. An extension of this method (see Bhalla(1997)) is to adjust real exchange rate values for both differences in inflation rates and differences in productivity growth (measured as growth in per capita GDP). Yet another method is to define the real exchange rate in terms of the ratio of the prices of tradeables to non-tradeables, a method employed by Lal et. al. [2003] and Virmani[2004b].

The deficiencies in the above different measures of under-valuation of currencies are well known. This paper follows Bhalla(2002) and computes a *profitability* related measure of undervaluation. Assume that GDP per capita, *measured in current US dollars*, is a proxy for the average **cost** of labor. Assume further that GDP per capita, *measured in current PPP dollars*, is a proxy for the average **productivity** of labor. A crude proxy for (international) profitability of production is the (log) ratio of the productivity and cost proxies. Exchange rate policy can change the denominator of this ratio, at least in the short term e.g. it can devalue (reduce dollar costs) or revalue (increase dollar costs)⁶. In the long run, a devaluation may not pay, especially if extra

⁶ The assumption is that the *nominal* exchange rate is a policy variable and can be changed by the government. The accumulation of reserves by Asian economies certainly testifies to the policy induced, rather than market induced, nature of the nominal exchange rate.

domestic inflation eats up the cost advantage. While this may have been true decades ago, it is empirically the case that even large changes in exchange rates have had very little effect on domestic inflation, or deflation. The empirical magnitude of 0.1 is what was found by Goldfajn in a recent paper for several devaluation experiences.

The profitability index (ratio of PPP productivity to US dollar productivity) is nothing more than the ratio of the inverse of the respective exchange rates. A depreciation of the local currency means an increase in the ratio, and an increase in profitability.⁷ If an undervaluation of the exchange rate has an impact on output growth, then we should expect the profitability ratio to have a positive effect on GDP growth.

⁷ The Balassa proposition states that with development, the two exchange rates (\$ and PPP) should converge to unity. While this has occurred for the industrialized countries, the story for developing, especially Asian economies, is one of divergence, huge divergence. Research on why the approach to parity is being blocked, and by which countries, is presently underway.

Section 3: **The Indian growth experience**

This section attempts an explanation for the Indian growth experience, in *both* factor accumulation and policy terms. The model estimated for growth is straightforward: a Cobb-Douglas specification with growth in output per worker as the dependent variable and growth in capital per worker and rainfall (current and lagged rainfall in standard deviation terms, and both weighted by lagged agricultural output).⁸ This specification yields the result that the capital elasticity is 0.44 (Model 3, Table 2). Total factor productivity growth (TFPG) is derived from this model, and adjusted for the contribution of rainfall. This adjusted TFPG is then regressed on growth in oil prices, the undervaluation of the exchange rate, and real (overnight) interest rates, lagged one period (Model 4).

⁸ The weighting does not change any of the quantitative or qualitative results.

Table 2: Models of GDP/worker & total factor productivity growth, India 1950-2004

	Constant	Rainfall	Rainfall (lagged)	Capital-labour ratio	Oil price	Undervaluation	Interest rates	No. of observations	R-Squared
Dependent variable: Growth in GDP per worker									
Model1									
Coefficient	2.66	0.15	-0.09					53	0.31
t-value	7.9	4.2	-2.4						
Model2									
Coefficient	1.93			0.41				53	0.06
t-value	3.7			2.15					
Model3									
Coefficient	1.86	0.15	-0.18	0.44				53	0.40
t-value	4.43	4.7	-2.4	2.90					
Dependent variable: TFPG derived from Model3 above									
Model4									
Coefficient	-1.45				-0.03	2.82	-0.14	33	0.17
t-value	-0.87				-1.99	2.11	-1.56		

Source: Reserve Bank of India (RBI), WDI2004 CD, Economic and Political Weekly (EPW), Central Statistical Organization (CSO), Chandok (1989) and Sivasubramoniam (2004)

Tables 3a and 3b summarizes some of the available estimates on the elasticity of capital for different countries of the world. The 0.44 estimate for India is in line with most estimates, but somewhat below the estimates for developing countries. The analysis of the differences is a subject of the ongoing research on the Indian economy.

Tables 4a and 4b summarize the results in decade terms, as well as in periods. Four periods are identified – growth between 1950 and 1980, the years post 1980, the 1980s themselves, and the 1990s excluding the 1991-92 crisis year. This exclusion does not change any of the qualitative results; the quantitative results are affected marginally e.g. the economy growth rate is 5.9 percent post 1980s rather than 5.6 percent per annum.

The facts about the Indian growth experience – the facts we are trying to explain – are as follows. GDP growth during both the 50s and 60s was exactly the same, 4 percent per annum.⁹ The next decade saw the average growth rate fall by a full percentage point to 3 percent per annum. This decade was a period of turmoil worldwide, with oil prices first quadrupling in 1973 and then doubling in 1979. The 1980s was the first time that India experienced above 5 percent growth – actually, a high 5.6 percent per annum. This is the acceleration analysts are rightfully seized by i.e. what caused the growth rate to so sharply accelerate, in fact almost a doubling. There is a debate whether the 1980s growth was sustainable, because the eighties ended in a crisis in 1990-91, with growth of that year being an exceptionally low (3 standard deviations away), but still positive, growth of 0.9 percent per annum.

The crisis led to the introduction of major economic reforms in 1991 by the new government led by Mr. Narasimha Rao and with Manmohan Singh as the Finance Minister. Mr. Singh today is the Prime Minister. The reforms involved a 20 plus depreciation of the exchange rate, a very large reduction in tariffs, and a removal of quantitative controls on production and trade. Growth recovered to 5.1 percent in 1992-93 and stayed close to the 5 percent mark the next year. The next three years, 1994-95 to 1996-1997, are the only period in Indian history to record above 7 percent growth in *each* of the three years. This acceleration seemed to be the efficiency gains of reforms

⁹ The decades are defined as 1951-1960, 1961-1970 etc.

Table 3a: Capital elasticity, various estimates

Country	Capital elasticity	
	Easterly & Levine	Kim & Lau
OECD		
France	0.40	0.31
Germany	0.39	0.28*
Italy	0.39	
Japan	0.39	0.32
United Kingdom	0.38	0.29
United States	0.4	0.23
Latin America		
Argentina	0.54	
Brazil	0.45	
Chile	0.52	
Mexico	0.69	
Venezuela	0.55	
Asia		
Hong Kong	0.37	0.46
Singapore	0.53	0.50
S. Korea		0.49
Taiwan		0.51

Table 3b: Capital elasticity & TFPG for India & China

	Capital elasticity	TFPG 1950-80
India		
Virmani	0.43	0.7
Bhalla (7.5 % depreciation)	0.65	-0.2
Bhalla (this paper)	0.44	1.4
China		
Hu & Khan	0.59	1.1

Source: Reserve Bank of India (RBI), WDI2004 CD, Economic and Political Weekly (EPW), Central Statistical Organization (CSO), Chandok (1989) and Subramoniam(2004).

Table 4a: Growth over the decades

	Decade					
	1950s	1960s	1970s	1980s	1990s	2000s
Growth						
Output	4.0	3.9	3.0	5.6	5.4	5.8
Capital	0.3	3.2	3.7	4.2	5.7	5.9
Human capital	4.1	2.7	3.6	3.0	2.6	2.5
Labour	1.8	1.9	2.2	2.7	1.8	1.3
Population	1.7	2.3	2.3	2.1	1.8	1.6
Investment	11.7	15.5	18.6	22.6	22.9	22.5
Output/Labour	2.4	2.2	0.6	3.6	4.0	4.4
Capital/Labour	-1.2	1.5	1.4	2.2	4.3	4.5
Per capita output	2.3	1.6	0.7	3.5	3.6	4.2
Contribution to growth						
Capital	0.2	1.4	1.6	1.9	2.5	2.6
Labour	0.9	1.0	1.3	1.1	0.8	0.8
Capital + Labour	1.0	2.4	3.0	3.0	3.3	3.3
Total factor productivity	2.8	1.4	0.1	2.7	2.1	2.7
Rainfall	0.2	0.1	-0.1	-0.1	0.0	-0.2
Oil prices	0.0	0.0	-0.5	0.1	-0.1	0.1
Exogenous effect	0.2	0.1	-0.6	0.0	-0.1	-0.1
Exchange rate		0.0	-0.1	0.5	1.2	0.3
Interest rate	0.1	0.2	-0.1	-0.1	-0.5	-0.4
Policy effect	0.1	0.2	-0.2	0.4	0.7	-0.1

Source: Reserve Bank of India (RBI), WDI2004 CD, Economic and Political Weekly (EPW), Central Statistical Organization (CSO), Chandok (1989) and Subramoniam(2004).

Notes:

The share of capital (and labour) is as obtained from Model 3; the effect of exogenous (rainfall, oil price) and policy (interest rate and exchange rate) is as obtained from Model 4, Table 2.

Table 4b: Different phases of growth, 1950-2004

	1950-80	Post 1980	1980-90	Post 1990
Growth				
Output	3.6	5.5	5.5	5.9
Capital	4.8	5.4	5.3	5.9
Human capital	3.5	2.8	2.8	2.6
Labour	1.9	2.1	2.3	1.3
Population	2.1	1.9	2.0	1.7
Investment	15.3	22.7	22.8	22.9
Output/Labour	1.7	3.4	3.3	4.5
Capital/Labour	0.5	3.3	3.1	4.6
Per capita output	1.5	3.6	3.6	4.1
Contribution to growth				
Capital	1.1	2.2	1.9	2.6
Labour	1.1	0.9	1.1	0.7
Capital + Labour	2.1	3.1	3.0	3.3
Total factor productivity	1.3	2.4	2.7	2.6
Rainfall	0.1	0.0	-0.1	0.0
Oil prices	-0.1	0.0	0.1	-0.1
Exogenous effect	0.0	0.0	0.0	-0.1
Exchange rate	-0.03	1.2	0.5	1.3
Interest rate	0.0	-0.3	-0.1	-0.4
Policy effect	0.0	0.9	0.4	0.9

Source: Reserve Bank of India (RBI), WDI2004 CD, Economic and Political Weekly (EPW), Central Statistical Organization (CSO), Chandok (1989) and Subramoniam(2004).

Notes:

1. The share of capital (and labour) is as obtained from Model 1; the effect of exogenous (rainfall, oil price) and policy (interest rate and exchange rate) is as obtained from Model 4, Table 2.

2. The column for 1990 excludes 1991-1992

with TFPG accelerating to 3.5 percent per annum¹⁰. This was expected to continue; surprisingly, this has not happened and the average growth rate over the next seven years (1997-98 to 2003/4) averaged, with very low volatility, 5.54 percent only a whisker away from the post 1970s twenty-four year average growth rate of 5.59 percent a year!

This paper will attempt to provide an explanation for the following. The sharp 2.6 percent per annum acceleration in GDP growth in the decade of the eighties is the first event driven question, Question 1. Question 2 is the *lack* of any sustained acceleration in GDP growth post the economic reforms of 1991-92. The model employed is parsimonious – rainfall, factor (capital and labor) inputs, exogenous factors (e.g. oil prices) and economic policy. Policy is captured by variables pertaining to monetary policy (real interest rates) and exchange rate policy (over-valuation of the exchange rate). Other variables were also tried e.g. fiscal policy, but such variables failed to be statistically significant. In a paper explaining cross-country growth patterns (Bhalla(2003c)), the fiscal deficit variable was almost always significant, and of the right sign (negative i.e. higher fiscal deficits lead to lower growth), but of a very low magnitude. Our inter-temporal result on India should not be taken as indicative of the non-relevance of the fiscal deficit to the Indian growth process; just that in our simple model, the growth rate was unaffected by changes in the fiscal deficit.¹¹

¹⁰ For those who would equate electoral performance with economic performance, here is a lesson: the Congress party brought about reforms, accelerated growth, and yet lost the 1996 elections by a landslide!

¹¹ As shown later, part of this insignificance could be due to the presence of very low variation in either the fiscal deficit or the GDP growth rate for the post-seventies growth experience.

Section 4: Empirical Results in terms of Q&A

1. India's growth pattern, 1950-2003

India's growth pattern for the last fifty years can simply be described as one consisting of two and half stages – the first stage consisting of GDP growth of 4.0 percent (1950-1970), the half stage when growth decelerated to only 3 percent per annum (1970s) and the third (post 1970s) stage when GDP growth averaged 5.6 percent. About half (1.2 ppt) of the 2.3 ppt increase in the growth rate (1950 to 1980 compared to post 1970s) was due to the efficiency of growth, or TFPG.

Despite two successive droughts in 1965-66 and 1966-67, India's growth rate in the sixties stayed constant at the previous decade growth rate of 4 percent. This is somewhat of a surprise, but not really since bad droughts in the two years were balanced by good weather in other years. So much so that for the decade, rainfall *added* 0.07 ppt to GDP growth. Factor accumulation alone added 1.4 ppt to the 50s growth. But the constant growth rate was a reflection of the interventionist policies that had been set in motion. TFPG declined by 1.4 ppt in this decade, from a positive 2.8 percentage points to only 1.4 ppt.

2. Decline in growth rate, 1970-1980

The first noticeable result is of a decline in the growth rate in the seventies, to 3 percent per annum from the 4 percent experience of the earlier two decades. It is this decline that makes the acceleration to a near-doubling of growth rate in the eighties so dramatic. The 1970s were also affected by two external shocks – bad weather, which accounted for a 0.05 percent per annum decline, and rising oil prices, which accounted for a largish 0.54 percent per annum decline. While in absolute terms real interest rates were not very high during the decade, only 0.2 percent, they had begun their trend upwards, and doing so in the face of the large oil shock was perhaps not good monetary policy (at least in hindsight). For the four years 1975-78 real short-term interest rates averaged more than 7 percent. The effect on growth was large – a swing of almost 0.5 percent from the previous decade; more precisely, interest rates added 0.31 ppt to the growth rate in the sixties, and subtracted 0.18 ppt in the seventies. Thus, almost the entire decline in growth rate in the seventies is explained by oil prices, and the policy response

to them. TFPG declined precipitously in the decade to only 0.1 percent per annum, subtracting 1.3 ppt from the growth rate of the previous decade.

3. Acceleration in growth in eighties – a break from the past

It is this period that was first missed by analysts, and now has received the most attention. The acceleration in the 80s was about 2.6 percent per annum, but really the acceleration that one needs to explain is from the trend growth during the first twenty years of 4 percent per annum growth (1950 to 1970). Throughout the decade of the eighties, investment stayed pretty much above the 20 percent mark, averaging 22.6 percent. This level remains the same till today.

Chart 1 plots the growth in investments, from about 11 percent in the early fifties to more than 20 percent in 1980. This increase is paralleled by an increase in India's savings rate, with foreign savings accounting for a very small proportion of the increase in investment. This doubling of the savings rate goes against the tenets of the permanent income or the life cycle hypothesis of savings. But as documented in two papers (Bhalla(1978) and Bhalla(1980)) the permanent income hypothesis is not expected to hold in developing countries; indeed, what was postulated in Bhalla(1980) is that savings rate increase with development, and then approach a constant, asymptotic rate i.e. there is an initial phase when savings rate increase, and then plateau. This forecast has come out to be exceedingly true for India (Chart 1).

This near-doubling of the investment rate has been gone relatively unnoticed, and provides a more convincing explanation for the increase in GDP growth than either that reforms were incremental (Panagariya, Virmani) and/or that efficiency in production increased because the politicians were more favorable towards businessmen (Rodrik-Subramaniam). These two factors undoubtedly help the growth process, but the Occams razor explanation of an increase in investment rate causing the increase in the growth rate is more convincing.

The results reported in Table 4 suggests that there is not much mystery about the acceleration in growth rate in the eighties. Factor accumulation accounted for 1.7 percent of the growth in the 1950s and 1960s. In the seventies (and eighties) factor accumulation accounted for an extra 1.3 percent of growth. One observes an increase of

1.6 percent per annum in the growth rates of 1950s and 1960s and the 1980s – and over 80 percent of this increase is just factor accumulation.

4. Non-acceleration in growth in the nineties – why not ?

No one doubts the importance of wide-ranging economic reforms instituted by the present prime Minister and then Finance Minister, Dr. Manmohan Singh, in 1991-93. Faced with a balance of payments crisis¹², economic reforms changed the map of the Indian economy, and in the rules of doing business. The fact remains, however, that GDP growth barely accelerated for the subsequent thirteen year period. Even if crisis year 1991 is excluded from all calculations, and even if bumper year 2003/04 is included, the post 1991 growth rate is only 5.9 percent per annum, barely 0.3 % ahead of the 1980s growth rate. To be sure, the volatility of the growth rate was lower (standard deviation of 1.4) than that in the eighties (1.7). But the volatility of growth in the eighties was already almost half that of the previous thirty years (standard deviation in the pre-eighties was 3.2)¹³.

No matter how one slices the data, the nineties show only a mild acceleration of 0.3 percent, and an acceleration that is *not* statistically significant. Thus the point first emphasized by Bhalla(2000) remains valid: how come all the reforms of 1991-1993 did not provide a major push to growth? There is an answer, but first an examination of the “growth accounting” results.

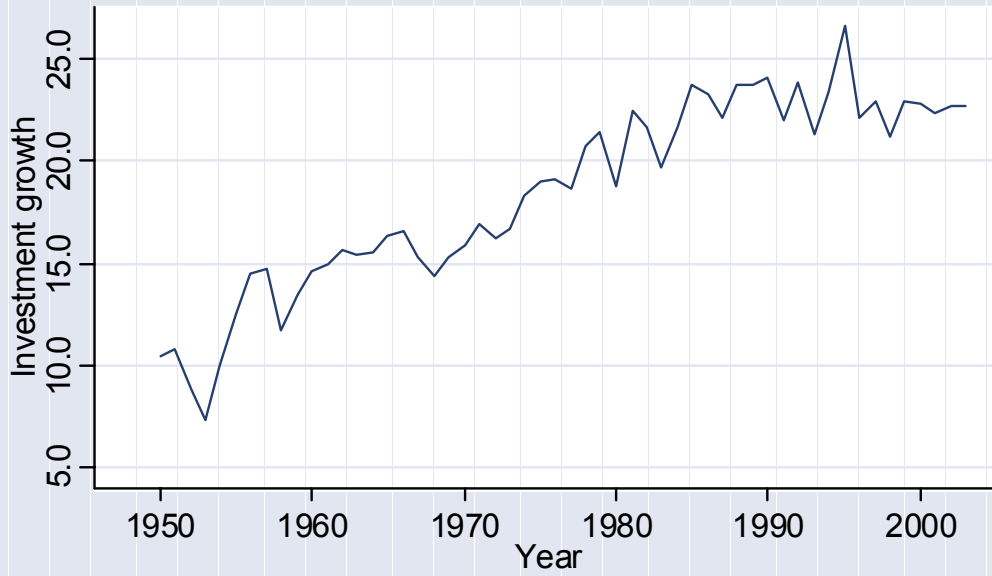
The reforms did have an impact – and should have resulted in an extra 1.0 percent growth over that which was achieved in the (high) growth sixties. The decomposition of this extra 1.0 percentage points is the extra 0.7 percent achieved because of a competitive exchange rate, and an extra 0.3 percentage points of growth which would not have been lost if real interest rates had stayed at the level of the 1980s.

¹² See Virmani(200?) for an excellent analysis of the “causes and consequences” of the 1990-1991 Indian economic crisis. It is noteworthy that in this crisis year GDP still managed to grow at 0.9 percent.

¹³ See Panagariya(2004) for a detailed discussion. Panagariya also makes a big point of the above 7 percent growth rate during the three year period 1988-90 and feels that excluding these years the growth rate of eighties would not have been that high (it would have been 5 percent rather than 5.6 percent). But the volatility would also have been lower than the nineties (sd of 1.2). If the top three years (1994-1996) are excluded from the nineties, the average growth rate is 5.4 percent and sd of 1.3.

Growth of Investment

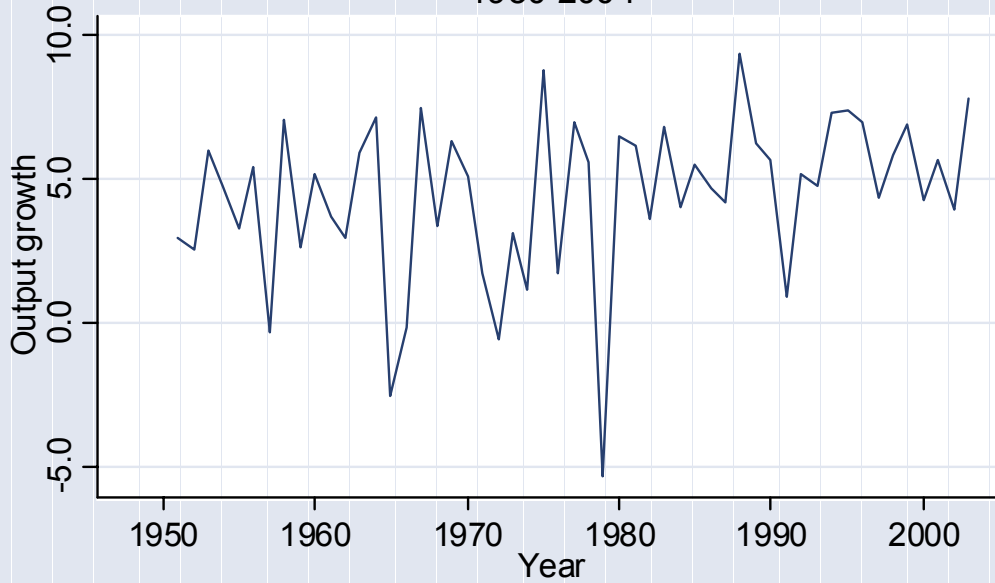
1950-2004



Source: CSO, RBI, WDI 2004, Chandok, EPW

Growth of Output

1950-2004



Source: CSO, RBI, WDI 2004, Chandok, EPW

The impact of exogenous factors (rainfall and oil prices) was not much different in the two decades. What really was different was policy. The effect of a competitive exchange rate – there was a large 21 percent devaluation in two days in July 1991 (and associated policies like a large reduction in tariffs and virtual elimination of quantitative controls¹⁴) – was immediate and large. The attempt at under-valuation of the currency¹⁵ (or a reduction in over-valuation) had a strong and lasting effect, adding as much as 1.2 percent per annum to GDP growth, and an *extra 0.7 percent per annum over the eighties*.

The overall impact was muted primarily because of the lower emphasis placed by the reformers on interest rate policy. This has been a distinguishing feature of Indian policy throughout its history and only recently began to change with the Vajpayee led (pro-industrialist or less anti-industrialist?) NDA government 1998-2004. It is curious that in his scholarly piece on past and future reforms, Panagariya makes *no* mention of interest rate policy. Ditto for other contributors in the debate - Virmani, Rodrik-Subramaniam and De Long (though Virmani briefly refers to the importance of interest rates). In several earlier papers (e.g. Bhalla(1997), Bhalla(2000) , Bhalla(2001) etc) I have emphasized the importance and non-desirability of the extremely high real rates of interest prevailing in India. In a different context, McKinnon had emphasized the importance of “financial repression” - the term was meant to emphasize the distorting effects of extremely low, and highly negative, real rates of interest. In India, it has been the prevalence of extremely high rates of interest which constitutes “financial repression” and which holds back investments, industrial and overall growth in India.

Therefore, it is not that surprising that one of the striking stories about economic growth, and economic reforms in India, is the lack-lustre performance of Indian *industry*. Data on value-added in manufacturing (industrial growth data not available on a consistent basis) suggests that more than 30 countries have achieved a decadal growth rate above 8 percent at least once since 1960. India’s position has improved compared to the pre-

¹⁴ See Panagariya(2004) for an excellent summary of the different reforms introduced in the eighties and nineties and how the latter were much wider in scope, and design.

¹⁵ To really understand the importance of under-valuation of the currency – something being approximately captured by our relative \$/PPP exchange rate – one only has to look at China, which has devalued its currency several times since 1978, most recently in the 1990-93 period. Since 1989, the Indian rupee has depreciated in real terms by

1980s, but it is still surprising that India has never registered a decadal manufacturing growth rate above 8 percent.

It is the contention of this paper that two policies affect industrial production greatly, and more than policies most often cited. It is not labour reforms, nor reservations in the small scale sector, nor the lack of effective bankruptcy laws, nor the lack of privatization¹⁶, nor the public sector character of industry that has made Indian industry a bad performer. All these good policies matter, but not as much as a competitive exchange rate and competitive real interest rates.

4. What about high fiscal deficits?

In an earlier paper (Bhalla 2003), a consistent finding was that fiscal deficits had a statistically significant, and negative effect, on GDP growth. The coefficient was around -0.1 , suggesting that each 1 percent increase in the fiscal deficit subtracted only 0.1 percent from overall GDP growth. The effect was surprisingly small i.e. if a country like India reduced its fiscal deficit from 10 to 5 percent, the total addition to GDP growth would only be 0.5 percentage points per year.

Unlike the earlier cross-section study, this paper examines the effect of fiscal policy for time series data for India. There are several problems in estimating this effect. First, there is a very close correspondence between the doubling of fiscal deficits from 5 to 10 percent of GDP (prior and post 1980) and the acceleration in growth rate (again, post 1980). Second, is the low volatility in the level of these deficits. So it is virtually impossible to obtain any significant relationship between fiscal deficits and GDP growth. And any such relationship is likely to be positive. Which is what happens. The coefficient for fiscal deficits is never significant, and mostly positive.

Does this mean that fiscal deficits do not have an impact on growth? Of course, not. The estimation complications were mentioned above. In addition, the peculiar nature of fiscal deficits in India (state deficits now form more than fifty percent of the consolidated

¹⁶ It is quite likely that Indian industry has been more than partially responsible for the lack of privatization in India. Fearing competition, it is in industry's interest to collaborate with the politicians and push back competition, and effective privatization. It is intriguing that the Congress party, in its new avatar, has taken the position that only profit making firms will be privatized. And that loss making firms will be "reformed" so that they can make profits and be ineligible for privatization!

center-state fiscal deficits) and the method of its financing most likely makes it the case that fiscal deficits are the result of administered and high interest rates, rather than fiscal deficits causing “crowding out” leading to high interest rates, and therefore low growth.

5. How are fiscal deficits financed – via market borrowings and the small savings scam

Why has India followed a policy of such aggressively high real interest rates? The answer is fiscal deficits - but not the deficits at the center as is commonly presumed. The consolidated fiscal deficit of the center and the states has stayed in the rather narrow range of 7.6 to 11.4 percent for the last twenty-five years, with a standard deviation of 1.2 percent. The decadal averages are even narrower – 10 percent in the eighties, 8.9 percent in the nineties, and 10.1 percent in the three years post 2000. What has changed between the eighties and nineties is the share of state deficits. This share reached a trough of 25 percent in 1985 – in the just concluded high growth year of 2003/4 this share reached a peak of 52 percent.

While the center is maintaining some fiscal discipline, the states are unrestrained. And so because of government policy which encourages states to have as high a fiscal deficit as they so desire, subject to practically no discipline. The modus operandi of this policy is as follows. First, the states are not allowed to borrow from the Reserve Bank of India (RBI) or from the market. Technically they can borrow but only after obtaining permission from the RBI, a permission which given the large debt of the states, is not forthcoming. Second, the states are allowed to borrow from the people in the form of postal “savings”. The two diktats together form the elements of “scam savings”. Postal savings carry above average rates of interest, and are guaranteed by the central government. In effect, the central government has built a system which has a negative discipline i.e. the worst form of moral hazard possible, with states borrowing in an unrestrained fashion, with no discipline from the center, from the market, or from the people¹⁷. The states can incur as much deficits as they please, as long as they raise the revenue from postal, nee scam savings.¹⁸

¹⁷ Though conceivable, it is unlikely that a state election campaign will involve accusations from the opposition about misuse of postal savings. The issue is too complicated for elections, and all political parties are interested in getting on the gravy train.

¹⁸ See Bhalla(2001) and several journalistic pieces cited therein for an expose of this scam, and the fact that the central government was scoring an “own goal” in the process.

In order to finance their deficits i.e. pay salaries, the states have two options – either borrow on behalf of state corporations¹⁹ or borrow from scam savings. Since the interest rates on such savings are administered, there is a vested interest in keeping such rates well above “market” rates – or given declining inflation, to keep them at old nominal rates. Inflation started declining in India in 1996, a trend not different than that experienced worldwide. The growth rate in small savings or scam savings (SS) deposits since then has averaged 15.8 percent per annum, compared to a nominal GDP growth rate of 10.6 percent. Given such excess, the laws of compounding soon lead to an explosion. SS now account for fully a fifth of national savings, and more than half of the entire financial savings in the system. These fractions were 12 percent and ?? in 1996. The reason complete crowding out has not occurred is because the government, possibly because of this pre-emption, has freed up borrowing from abroad.

The government has also been pro-active in reducing the scam.²⁰ Apart from reducing interest rates on such savings, the government (RBI) set up two committees (in 2002 and 2003) to study and advise the government on policies to “rationalize” such savings deposit schemes. As pointed out in Bhalla(2001) such schemes are akin to “axing one’s own feet” or scoring an own goal. The higher the rate on postal savings, the higher the rate, *ceteris paribus*, on *other* government borrowings from the market. And given the large borrowings, fiscal deficits of the present are a large part due to interest rates of the past. So much so that more than 70 percent of the central deficit, and close to 90 percent of the state deficits, are composed of interest payments.

Section 5: Concluding Observations

The determinants of growth industry has virtually exploded in the last few years. While recognizing that growth is a complex process, the results of this paper suggest that simple, old, well known, and established determinants of growth can explain a fair amount of growth in developing countries. A detailed examination of growth in India over

¹⁹ This is the second reason (the first being opposition from domestic industrialists) for privatization to be so “unpopular” in India. The state politicians obviously do not want privatization, since it affects their source of revenue. The central government has recently caught on to this possibility and restricted such borrowing/funding by state corporations.

²⁰ See Bhalla (1999), “The Kindest Cut of All” – the article applauds the government for instituting a policy of reducing administered rates on small savings – a policy that has reduced the nominal rate on such savings from 12.5 percent in 1999 to 8 percent today. Note that the effective borrowing rates are about 2 percentage points higher because a large proportion of the interest on such savings is tax-free.

the last fifty years indicates that simple factor accumulation (capital and labor) can explain two-thirds of the growth that occurred during the first three decades (1950 to 1980). The next twenty-three years simple factor accumulation explains about 55 percent.

It is important to note that this simple factor accumulation model allows for no role for increases in human capital. In India's case, mean years of education of the labor force has increased at a rapid rate, above 3 percent per annum for the last fifty plus years. Econometrically, this change does not have an effect on growth; more accurately, we have not been able to identify any such effect. Undoubtedly it has, especially in the context of an open economy, and India has become extremely more open since 1980 – and so regardless of the definition of openness used.

Recall that the difference in the two periods was the introduction of economic reforms, and reforms which have altered the economic landscape. This experience has led to several diverse explanations of what happened, and why. From a policy makers perspective, it is the why that is important. Two policy variables were employed to understand the why – exchange rate policy and interest rate policy. The latter is a bit of an innovation for Indian “macro” since analysis of interest rates has received scant attention. The omission is just as shocking as it would be if discussions of Latin American growth was to be conducted without reference to interest rates. In any case, the introduction of these two variables increases the explanation of total factor productivity growth.

There are several qualitative and intuitive data to support the results. No matter how one defines it, the degree of openness of the Indian economy started to improve in the early eighties, and gained momentum after the 1991-93 reforms. It may be coincidence, or it may just have been animal spirits, or an alliance between politicians and industrialists – we may never be able to identify the exact why, but the co-movement of accelerated growth and reforms is too high to be casually dismissed.

The single largest difference between the growth in the eighties and nineties is the contribution of “exchange rate / trade” effect. This effect started to kick in the mid eighties, and by mid-nineties it was beginning to add almost 1.3 percent to GDP growth. In the eighties, almost 0.5 percentage points were added to the annual growth rate. This

should be convincing proof of both the efficacy of reforms, as well as the fact that the post 1991 reforms contributed much more to the growth potential of the economy.

But the growth rate did not expand by 1.0 percentage points over the level of the eighties. And did not for good reason – interest rate policy and/or the non-market method of financing state deficits extracted their pound of flesh – about 0.4 percent of growth per annum. Thus a significant expansion became only half that. Add in bad rainfall (particularly since 1998) and one gets the now oft-mentioned result that there was no difference in growth rates between the 1980s and 1990s.

What about culture, institutions, geography?

In addition to the emphasis on non-importance of traditional variables, the new growth economics has bought into “other” determinants like culture, geography and institutions. Each of these factors are important for explaining long run growth, but the Indian experience of the last twenty five years suggests that such explanations need to be accepted with a considerable degree of caution. Culture has remained the same, as has geography – what has changed is the efficacy of institutions, and these have changed for the worse.

What determines growth? Several explanations are possible, but let me offer my three *sufficient* conditions for a healthy growth rate: girl's education, a free press, and openness to the world economy. Research is underway to test the above hypothesis.

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