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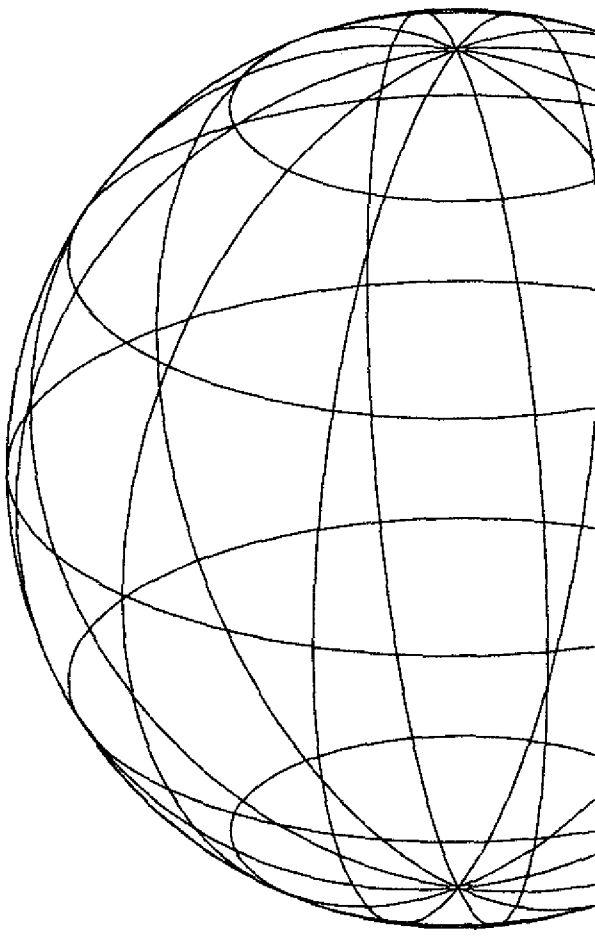
UNIDO RESEARCH PROGRAMME

Productivity Performance in Developing Countries

Country Case Studies

India



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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
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Executive summary

The objective of this paper is to study the aggregate economic growth and productivity performance of the Indian economy for the forty-year period 1960-2000, based on Penn World Tables (supplied by UNIDO), and attempt to explain their trends in terms of the "deep" (rather than proximate) determinants of growth and productivity, namely, institutions; investment in physical capital, human capital, and research and development (R&D); technology and technological absorptive capacities and capabilities; the physical and financial infrastructure; international integration; and others using Indian data sources, mainly National Accounts Statistics (NAS).

Year-to-year growth rates for aggregate GDP at constant prices for the period 1960-2000 from both the UNIDO and the NAS data sets are directionally broadly consistent although marginally different in numerical magnitudes. Both the series track the two major phases of the Indian growth process from low-income-slow-growing (1960-80) to one of the top ten fastest growing developing economies (1980-2000). The average of the annual growth rates from the UNIDO series was 3.78 percent for the period of 1960-80 and 5.7 percent for the period of 1980-2000, indicating a clear acceleration in GDP in the last two decades of the 20th century.

As expected, the time path of the index of labour productivity from the UNIDO data lies below but traverses broadly the same track as aggregate GDP. Labour productivity growth at 1.67 percent accounted for 44 percent of the aggregate growth rate during the slow-growth phase (1960-80) while its contribution to aggregate growth rose to 64 percent with more than a doubling of its growth during the second and rapid-growth phase (1980-2000).

Total factor productivity growth fluctuated around a negligible level during the slow-growth phase (1960-80) but was positive but low at 0.9 percent during the rapid-growth phase and accounted for a little less than 25 percent of the growth of labour productivity. In other words, more than three-fourths of the stepped-up growth in labour productivity was due to a rise in capital deepening, which grew at an average of 3.76 percent per annum during the rapid-growth phase as against an average of 2.79 percent per annum in the slow-growth phase.

The stagnation in total factor productivity till the middle of the 1960s was due to stagnation in both of its components, namely, technical change and technical efficiency. The stagnation in the following years of the slow-growth phase was due to the opposite movements in the component indices. The decade of 1981-91 was marked by an upward trend, small but significant, in total factor productivity, 1.8%, with 1.2 percent per annum growth in technical efficiency and an unstable and low 0.6% growth in technical change. The post-1991 period is marked by a stagnation of total factor productivity, which is composed of a significant 5.71 percent per annum growth in technical change offset by the negative growth of 5.83 percent per annum in technical efficiency.

This paper argues that the most plausible and "deep" determinant of the Indian economic growth and productivity performance has been the major transformation in the incentive structure embedded in the institutional matrix. Independent India's development strategy,

based on economic nationalism and a socialist philosophy and the associated policies, generated an institutional matrix that consisted of (a) autarkic industrialisation; (b) indiscriminate expansion of the public sector into the commercial domain; and (c) heavy handed discretionary regulation of functioning markets and large private industry. In a democratic society and a predominantly private enterprise economy, this institutional matrix generated an incentive structure that favoured unproductive rent-seeking activities and placed the economy on a slow-growth path of 3.78 percent per annum during 1960-80.

A reassessment of the development strategy and policies was started, partly due to international events such as the first oil price hike in 1973 and partly due to a growing realisation of their counterproductive effects by the perceptive observers within and outside the government. It led, in the 1980s, to a limited deregulation of trade controls, a more wide-ranging relaxation of controls on domestic industry controls, and partial autonomy for public sector enterprises. These hesitant deregulations lifted the supply constraints on the private industry while the demand stimulus for the industry came from a good agricultural growth and fiscal expansion, which together provided incentives to perform better. This situation enabled the economy to grow at an average 5.7 percent per annum in the 80s and lifted it out of the slow-growth path. However, the growing fiscal deficits and current account deficits caused by the rising claims of the interest groups on the exchequer and increasing import requirements pushed the economy into an external payments crisis and made higher growth unsustainable.

The external payments crisis in 1990 led to a paradigm shift in the economic policies toward a greater integration with the world economy and a wider scope for private initiatives and market forces: quantitative restrictions (QRs) on trade were removed along with a substantial reduction in tariffs and their dispersion; domestic and foreign investment was liberalised; and the public sector exposed to market competition. These reforms unleashed the dynamic impulses of competitive market forces and thus created strong incentives for economic agents to better their performance. This constellation took growth to further heights, to an average of 6.48 percent per annum for the 90s, and also made it more stable.

Productive performance at the aggregate level is the outcome of the interaction between intra-sectoral productivity change and an inter-sectoral shift in resources. For the purpose of analysis, three sectors are considered. These are: a natural-resource (land) intensive agriculture (A) Sector, a reproducible, tangible capital-intensive industry (I) sector that includes manufacturing, and a residual set of services (S) sector. The Indian economy still remains predominantly agricultural with over 60 percent of the workforce absorbed in this sector in the year 1999-2000.

During the slow-growth phase, where the economic environment was inimical to economic growth and hence to productivity improvements, economy-wide labour productivity grew at a rate of 1.22 percent per annum (1961-83). Even labour productivity in manufacturing, although higher than the national average, was no higher than 1.5 percent per annum. A-sector, with as high as 68.5 percent of the workforce in 1983 and labour productivity growth of 0.42 percent per annum, was the dominant proximate factor underlying the sluggish aggregate labour productivity growth. It reflected, in reality, the inability of an autarkic, public-sector-dominated and private-sector-constraining industrialisation strategy to absorb a growing labour force at a rising level of labour

productivity in non-agricultural sectors. Both inter-sectoral workforce shifts and intra-sectoral productivity improvements were marginal in this period. While state activism succeeded in stepping-up the growth rate of capital deepening in manufacturing at 3.25 percent and in the I-sector at 2.93 percent, the incentive structure did not permit its translation into high labour productivity growth.

The stagnation in total factor productivity shown by UNIDO data is expected as growth in capital deepening exceeded that in labour productivity growth. As regards the components of total factor productivity growth, negative growth of 2.8 percent in technical change (1961-80) was the result of the autarkic policy that severely restricted the imports of technology. Improvements in technical efficiency at 3.00 percent per annum appear to have been brought about by the gradual realisation of the potential of technology imported in the 1950s and 1960s due to rising profitability in a shortage economy.

In the 1980s hesitant liberalisation in the provision of incentives to improve productivity stepped up labour productivity growth, shared by all sectors, to 3.45 percent per annum in this decade (1983-94),. The growth rate of labour productivity in the manufacturing sector rose to 4.34 percent per annum. Thus, intra-sectoral productivity growth contributed to 75 percent of aggregate productivity growth during 1983-94. The rate of growth of capital deepening at 2.16 percent, although higher than that during 1961-83, was lower than that of labour productivity. More important is the performance of the S-sector, where capital deepening declined during 1983-94 while labour productivity rose to 3.22 percent and labour absorption increased at a faster rate of 3.77 percent. The S-sector absorbed 2.80 additional percentage points of a 4.5 percentage point decline in the A-sector share of the workforce. The manufacturing sector showed a remarkable growth rate of 4.34 percent in labour productivity, more than double the growth in its labour absorption rate. Economy-wide total factor productivity growth rose to 1.8 percent and was composed of a tiny and fluctuating 0.58 percent growth in technical change and 1.21 percent growth in technical efficiency. Domestic market expansion, triggered by strong growth in agriculture and services in a still closed economy, provided incentives for efficiency improvements but did not give scope for technical progress.

The last decade of the 20th century was marked by India carrying out systemic reforms which made the macroeconomic environment more stable and less distorted, gave better access to technology and capital goods and made their imports cheaper through reduced tariffs, provided easier access to finance, and intensified competition. During 1994-2000 this led to a considerably higher, almost double, growth of capital deepening than that of labour productivity for the manufacturing as well as the industry sectors. Intensified competition and the easy availability of cheaper imported capital and intermediate goods provided a favourable environment for technical change in the context of a backlog of technology created by the earlier policy restrictions. The result was the stepped-up growth in technological change to 5.71 percent per annum. But the time-lag in realising the full potential of imported technologies and the slow-down in domestic economic growth in the second half of the 90s, by restricting the growth of the domestic market, appear to have acted as a brake on efficiency improvements and brought down the rate of growth of technical efficiency to a negative 5.83 percent, leading to stagnation in total factor productivity growth during 1991-2000.

In our scheme of explanation, the most critical determinant of growth transformation in India has been the change in the incentive structure resulting from the shift in the institutional matrix. Given the incentive structure that rewarded productive investment, the intensification of competition and the degree of integration are the two interconnected factors that shaped productivity performance. Taken together, these three factors formed a set of both necessary and sufficient conditions for explaining growth performance. In the absence of the critical determinants that we have identified, the other 'deep' determinants, though necessary, would not by themselves have been able to bring about the growth transformation. In our view, they would have played a constraining role. We discuss constraining factors below. We hasten to add at this point that we attribute the poor productivity performance of the Indian economy to political economy factors, inadequacies in physical infrastructure and institutional rigidities.

The factor that has a direct bearing on productivity is technology provided there is a favourable incentive structure. Severe policy restrictions on the import of technology and capital goods (i.e., embodied technology), that had continued till the policy reforms of the 90s, did not leave any scope for technological change. Policy encouraged the domestic capital goods industry to save foreign exchange rather than save domestic resource costs or improve quality and thus created a high cost and low quality industry. R&D expenditure as a percent of GDP was hardly 0.5 percent in 1980-81, and only a fourth of this was industrial R&D. Although there has been a step-up in the growth rate of R&D expenditure by industry over time, indigenous R&D has always been of an adaptive rather than an innovative variety. Another variable related to technology is the supply of scientists, engineers and technicians (SET). The stock of SET per 1000 population rose from 2.6 in 1980 to 3.8 in 1990 and almost doubled to 7.3 in 1999. But the SET engaged in R&D as a percent of the total stock of SET, though it showed a rise from 3.8 percent in 1980 to 5.9 percent in 1990, declined to 1.4 percent by 1999. This is broadly indicative of supply outpacing demand for such personnel.

As regards the status of human capital, which facilitates productivity performance, in the year 1999-2000 two-thirds of the estimated 400 million strong workforce was either illiterate or literate with less than four years of primary schooling. Those with graduate or higher degrees, constituting over 6 percent of the total workforce, remained under-utilised till the 1990s, in the sense that hardly 9 percent of these were in design and development and only about 16 percent were in direct production operation and maintenance. The remainder were engaged in university-level teaching and research with little interaction with business and industry, or engaged in sales, marketing and administration.

Physical infrastructure in the form of an adequate supply of energy, telecommunication facilities and a transport network at affordable cost constitutes the indispensable complement to realising the gains from the globalisation and liberalisation policies that changed the incentive structure. In this respect, persistent power shortages with an unpredictable supply quality have been the most serious infrastructural constraints on production. Although the telecom sector improved its performance over time, it has not been adequate to take care of the increasing production activities of the economy.

Railways and roadways are still unable to ensure the timely delivery of goods and thus have an adverse influence on productivity.

Some of the important institutional constraints on productivity performance are labour and bankruptcy laws, which, by being rigid, do not permit the reallocation of capital and labour and thus affect productivity negatively. The policies relating to the public sector are yet to be changed in an efficiency promoting direction.

With regard to policies directly bearing on productivity, we argue that during the slow-growth phase forced import-substitution did lead to the development of a widespread technological capability but without much regard to productivity and cost-competitiveness. It was driven by scarcities in the low-volume high-margin environment. In the 1980s imported capital goods became more easily accessible, but the changing of quantitative restrictions to tariffs raised their costs. Given the backlog of technology from two decades of autarkic policy, the productivity of relatively cheap old vintage imported capital goods may have been higher than that of domestically produced capital goods. This may explain the virtual stagnation in technical change while positive growth in efficiency improvements was driven by the higher profitability arising from the stepped-up growth rate.

Easier and cheaper imports of technology and capital goods, due to tariff reductions in the 1990s, made for positive growth in technical change, but a lag in the realisation of their full potential and the slow-down in growth resulted in negative efficiency growth.

Among the broad policies facilitating economic growth, the two structural adjustment policies of investment and trade liberalisation were argued to be important in decisively changing the incentive structure. It was pointed out that wide ranging but *de facto* domestic investment liberalisation took place in the 1980s and was formalised in the 1990s. Private foreign investment liberalisation started in the 1990s but was not as sweeping as its domestic counterpart. As regards the liberalisation of international trade in goods and services, changing of quantitative restrictions (QRs) to tariffs on non-competing capital goods and some intermediates was undertaken in the 1980s while the 1990s saw the virtual abolition of QRs on most capital and intermediate goods in July 1991 and those on consumer goods in three big steps between 1999 and 20001. There was also a progressive reduction in the average rates of tariffs as well as their standard deviation. However, the Indian tariff rates, whether bound or applied, are higher than those in other countries so that the Indian industries continue to be protected and, consequently, their exports discriminated against.

Within the rubric of broad growth-promoting macroeconomic policies, we discussed macroeconomic stabilisation policies relating to fiscal adjustments, balance of payments and inflation. We noted that during the slow-growth phase these were mostly of a distortion-creating nature but that these distortions have been gradually reduced since the 1980s with the rationalisation of direct and indirect tax rates. With or without creating distortions, these policies have managed to maintain broad macroeconomic stability and hence been instrumental in the achievement of uninterrupted growth. A transition has also taken place from a repressed credit regime with administered interest rates till the end of the1980s to the liberalisation of interest rates along with the creation and integration of money, capital and foreign exchange markets. This has expanded the variety of financial intermediation instruments and contributed to efficiency improvements.

Finally, to raise the productivity of the Indian manufacturing sector, we suggested efforts to reform the legal framework for restructuring and bankruptcy to help efficient

management of physical infrastructure in general and that of the power sector in particular and to finally raise the productivity of the Indian machine tools industry.

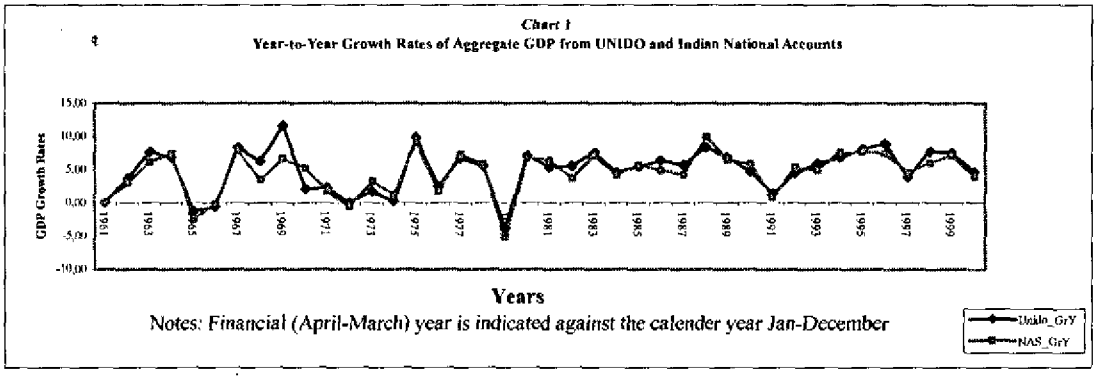
I. Indian Productivity Growth: Stylised Facts and Framework for Exploring Determinants

I.1 Stylised Facts Relating to Growth in Aggregate Output and Productivity: 1960-2000

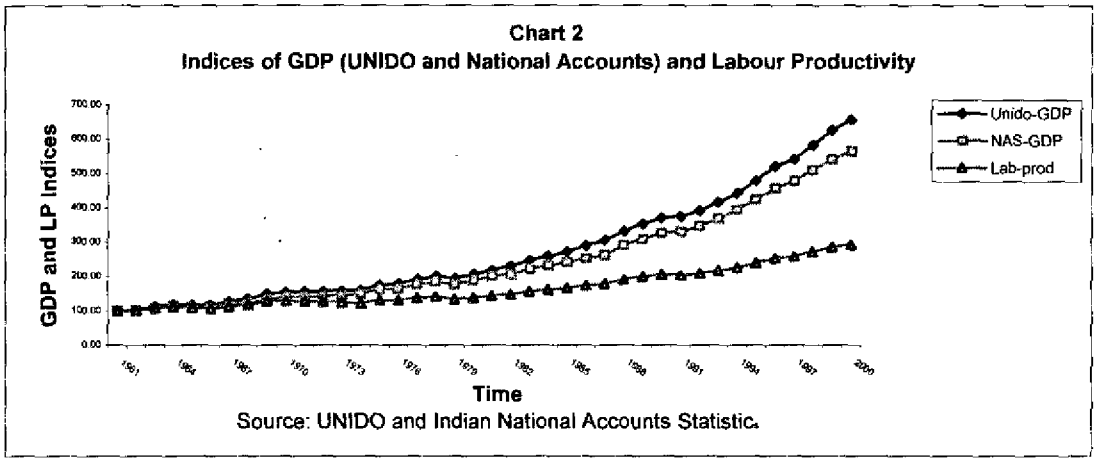
International comparisons of growth experiences among developing countries for the post-Second World War period [Easterly and Levine (2001)] show that economic growth has been "remarkably unstable" over time across countries (p. 195). Given this perspective, it is important to note that the Indian growth process has not experienced disastrous disruptions since Independence in 1947. This is not to deny that, with an initially high share of GDP accounted by a heavily monsoon-dependent agriculture, four severe droughts since 1950-51 caused temporary dips in per capita real GDP, but recoveries have been equally quick.

Moreover, over time, the share of agriculture in GDP has declined with the expansion of the industrial and services sectors in the economy. Other international comparisons bring out another interesting fact. While India remained a 'low-income, slow-growing' developing country during 1950-80 [Reynolds (1985)], it has been among the top ten fastest growing developing economies in the world in the last two decades of the 20th century. Relative to productivity per worker in the United States, India has reduced the gap from 6.32 percent of the U.S. level in 1961 to 8.66 percent in 2000 (data supplied by UNIDO). The task before us is to explain the 'deep' forces behind this transformation along with the role played by productivity growth in achieving it.

While the UNIDO data draw on the World Bank–United Nations sponsored International Comparisons Project, our explanatory story will be based on the Indian data sources. It is, therefore, useful to compare the aggregate GDP at constant prices from the two sources. Chart 1 presents year-to-year growth rates from UNIDO and the Indian National Accounts Statistics (NAS) between 1960 and 2000 for aggregate GDP at constant 1993-94 prices. Barring a few aberrations, the growth rates from the two sources appear *directionally* broadly consistent although different in numerical magnitude.



Alternatively, the UNIDO-supplied year-to-year growth rates from 1960 to 2000 have been recast to an index with 1960=100. Similarly, the Indian GDP (at 1993-94 prices) at factor cost has also been converted to an index with (April-March) 1960-61=100. These graphs appear in Chart 2. While the UNIDO index has been uniformly above that from NAS, both series successfully track the two major phases (1960-80 and 1980-2000) of the Indian growth process that have also been noted in the international comparisons discussed above. Not surprisingly, average or trend exponential growth rates[1] (per annum) for the UNIDO series turn out to be higher at 3.78 percent (1960-80) and 5.71 percent (1980-2000) than those based on the NAS series at 3.39 percent and 5.53 percent respectively. There has thus been a clear acceleration in GDP in the last two decades of the 20th century (Table 1).



[1] Our interpretation and derivation of trend exponential growth rate may be noted at this point. Following the evolutionary framework of Douglass North (Section II below), we take each country's economic performance indicator (GDP in this case) to traverse an historically unique, non-repetitive time path. As assumed in standard statistical testing of hypotheses, it cannot be regarded as a random draw from repetitive samples from a given universe. Hence, we cannot apply standard statistical tests of significance. Consequently, under a prior specification of constancy of growth rates over a given period, we derive the trend exponential growth rate as a *descriptive statistic* given by the least-square estimated slope parameter that represents a scatter of a natural logarithmic transformation of GDP against time. We use the squared correlation coefficient corresponding to this regression as a descriptive indicator of stability of the least-square-estimated growth rate.

Table 1: Trend Rates of GDP, Capital Deepening and Performance Indicators

Variable	Time Period	No. of Observation	Coefficient of Time	R-Square
NAS-GDP				
	1960-00	40	0.0441	0.9829
	1960-80	20	0.0339	0.9814
	1980-2000	21	0.0553	0.9965
	1981-91	11	0.0533	0.9886
	1991-2000	10	0.0618	0.9970
UNIDO-GDP				
	1960-00	40	0.0470	0.9866
	1960-80	20	0.0378	0.9746
	1980-2000	21	0.0571	0.9966
	1981-91	11	0.0573	0.9939
	1991-2000	10	0.0648	0.9963
Capital Deepening				
	1960-00	40	0.0298	0.9765
	1960-80	20	0.0279	0.9409
	1980-2000	21	0.0376	0.9759
	1981-91	11	0.0323	0.9630
	1991-2000	10	0.0500	0.9786
Labour Productivity				
	1960-00	40	0.0263	0.9596
	1960-80	20	0.0167	0.8704
	1980-2000	21	0.0367	0.9925
	1981-91	11	0.0386	0.9847
	1991-2000	10	0.0426	0.9915
Technical Efficiency				
	1960-00	40	0.0156	0.5129
	1960-80	20	0.0305	0.8790
	1980-2000	21	-0.0144	0.3580
	1981-91	11	0.0121	0.6884
	1991-2000	10	-0.0583	0.9137
Technical Change				
	1960-00	40	-0.0080	0.2250
	1960-80	20	-0.0276	0.8407
	1980-2000	21	0.0228	0.7361
	1981-91	11	0.0058	0.3338
	1991-2000	10	0.0571	0.9659
Total Factor Productivity				
	1960-00	40	0.0076	0.7986
	1960-80	20	0.0031	0.1686
	1980-2000	21	0.0086	0.6145
	1981-91	11	0.0180	0.8584
	1991-2000	10	-0.0009	0.0116

Source: UNIDO and National Accounts Statistics

Given that the worker-population ratio over time varies in a narrow range between zero and unity, shaped by slow-changing demographic factors and labour force participation practices, it is not surprising that the time path of the index of GDP per worker (or labour productivity) from UNIDO data lies below but traverses broadly the same track as aggregate GDP (Chart 2). Since the exponential growth rate of aggregate GDP is the sum of the exponential growth rates of labour productivity and total workers, it can be easily checked that the growth rates of estimated total workers were not very different during the two phases of 1960-80 and 1980-2000. Labour productivity growth at 1.67 percent accounted for 44 percent of the aggregate growth rate during the slow-growth (1960-80) phase while, during the second and rapid-growth phase, its importance rose to 64 percent with more than a doubling of its growth rate to 3.67 percent during 1980-2000 (Table 1).

Assuming a neoclassical aggregate production function, productivity per worker becomes a function of capital deepening (rise in capital-intensity) and total factor productivity (TFP). TFP growth fluctuated around a negligible level during the 1960-80 slow growth phase with a very low value of squared correlation coefficient (Table 1). During the rapid growth phase of 1980-2000, it was positive but stood at a very low level of 0.9 percent and accounted for hardly 25 percent of the growth of 3.67 percent in productivity per worker during the period. In other words, more than three-fourths of the stepped-up growth in per-worker productivity was due to the rise in capital intensity, which grew at 3.76 percent per annum during the rapid growth phase, compared to 2.79 percent during the slow growth phase (Table 1 and Chart 3).

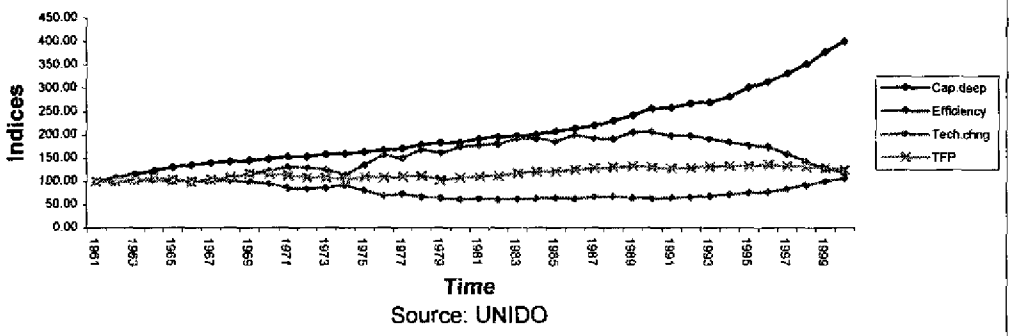
Total factor productivity (TFP) change, in turn, is decomposed into two multiplicative components, namely, change in technical efficiency (TE) and technical change (TC), i.e.

TFP Change = (Change in TE) * (TC)

Change in technical efficiency is given by the ratio of two distances, namely, (i) distance between actual and maximum potential output for input combination and technology frontier of a given period t and (ii) same distances in (i) for input combination and technology frontier of a previous period t-1. If this ratio exceeds unity, it reflects the degree of improvement in realising the potential in a given year in relation to that year's frontier in comparison with the same for the previous year.

Chart 3

Indices of Capital Deepening and Productivity Indicators



Source: UNIDO

Technical change, on the other hand, indicates the change in the technology frontier (that yields maximum potential output) from one year to the next. It is measured as a geometric mean of the following two ratios: (a) first fix the input combination of a given year, then take the ratio of the maximum potential output corresponding to the given year's frontier to the maximum potential output corresponding to the previous year's frontier; and (b) take the same ratio as in (a) but now fix the previous year's input combination. If the geometric mean of (a) and (b) exceeds unity, it represents an improvement in the technology frontier from one year to the next.

It should be obvious that TFP change becomes significant when both the components reinforce each other. On the other hand, TFP change may stagnate when both the

components undergo negligible changes, or change in the two components in opposite directions offset each other.

Chart 3 provides the indices of total factor productivity change and its component indices, namely, indices of efficiency changes and indices of technical change. Visually, it is obvious that stagnation in TFP till the mid-1960s was due to stagnation in both efficiency and technical change. The stagnation in the following years till 1980 is due to component indices changing in opposite directions, small improvements in efficiency being offset by adverse movements in technical change. The decade 1981 to 1991 was marked by an upward march of TFP due to dominating efficiency improvements offsetting stagnation or deterioration in technical change. This is the only decade over the entire period when the exponential trend growth of TFP becomes relatively significant although its magnitude of 1.8 percent per annum remains quite small, but the growth rate shows reasonable stability with a squared correlation coefficient of 0.8584. It was composed of 1.2 percent per annum growth in technical efficiency and an unstable and low 0.6 percent growth (with a low squared correlation coefficient of 0.3337) in technical change. The post-1991 period is marked by stagnation in TFP composed of a very significant and steady 5.71 percent per annum growth in technical change (squared correlation coefficient of 0.9659) offset by a deterioration in efficiency at the rate of –5.83 percent per annum (with a squared correlation coefficient of 0.9137).

Our task is to provide an explanation of these foregoing movements in productivity, along with the transformation in the growth performance, in terms of the major underlying factors. With this objective, the next section discusses the framework for exploring determinants of growth and productivity, drawing on Douglass North (1990, 1994) and Baumol (1990). Section II.1 explores the institutional determinants of the two phases of the Indian growth process. This is followed by an examination of the structural transformation and productivity performance of the Indian economy during 1960-2000 (Section II.2). The next section (II.3) provides an overall assessment of the determinants of productivity. Section III focuses on policies for productivity growth.

I.2 Framework for Exploring Determinants of Growth and Productivity

The stylised facts noted above clearly bring out that the Indian economy has undergone a major transformation in terms of growth performance over the forty-year period 1960-2000. It was among the low-income, slow-growing economies in the world during 1960-80. It became one of the ten fastest growing economies in the world over the next two decades. We clearly need a unified framework to explain not just both these contrasting phases but also the continuing absence of growth in many other countries in the world, in the context of exploring the "deep" determinants of the underlying productivity performance and going beyond the 'proximate' sources of factor accumulation and of productivity in standard growth accounting exercises. We find this framework in the historical evolutionary approach to institutional change and the resulting economic performance (a neutral term covering economic stagnation as well as growth) over time suggested by Douglass North (1990, 1994). His thesis is that "economic history is overwhelmingly a story of economies that failed to produce a set of economic rules of the game (with enforcement) that sustain economic growth" [North (1991): 98]. In the absence of 'a theory of economic dynamics comparable in precision to general equilibrium theory', North offers '***an initial scaffolding of an analytical framework***' that

helps us develop ***'an analytical understanding of the way economies evolve over time'*** [North (1994): 359].

Very briefly, central to the evolutionary framework of North is the notion of an ***Institutional Matrix*** that consists of an interdependent web of formal (written procedures, legal contracts, laws and statutes, constitution) and informal (conventions, codes of conduct, customs, behavioural norms) rules of the game in a society along with their enforcement characteristics. This may be regarded as the society-specific, unique, path-dependent customised institutional software.

We interpret a given institutional matrix to constitute also the ***governance structure*** of that society in the sense of providing broadly predictable and legally or socially acceptable rules of interaction for cooperation and competition in the inter-connected social, political and economic domains. Embedded in a given institutional matrix is the ***incentive structure*** in the society in terms of opportunities for gain in different domains. Social, political and economic ***organisations*** and ***entrepreneurs*** come into existence to reap the gains from the incentive structure embedded in the institutional matrix. However, the definition of entrepreneurs in this context needs to be wider than that normally used by economists. We draw on Baumol (1990) for this purpose. Economists generally recognise only *productive* entrepreneurship in the sense of devising innovative products, inputs and processes that help enhance welfare and the productivity of resources. Baumol widens the definition to include all those who use creative, novel and ingenious methods to gain social recognition, power, prestige or wealth. This definition has the advantage of covering unproductive (rent-seeking or directly unproductive profit-making) and destructive (discovering more deadly weapons) as well as economically productive activities and also includes entrepreneurs in the social and political domains. Given that we know little about determinants of supply of entrepreneurs, Baumol poses a more tractable and interesting problem of *allocation* of the available (unknown and *ex ante* unknowable) supply of entrepreneurship into three types of productive, unproductive and destructive activities. This allocation is generated by the relative payoffs to these activities, which are driven by the incentive structure in the society that is embedded in the institutional matrix in the North's sense.

We interpret entrepreneurs in the Baumol sense not only as bringing into existence innovative organisations to reap the gains from the existing incentive structure but also as being proactive agents who bring about a change in the institutional matrix itself so as to gain social recognition, prestige, power or wealth. In this general framework, micro level productive entrepreneurs may be expected to respond to the given incentive structure by seeking to bring about shop-floor improvements, major innovators may be perceived as pushing the technology frontier itself to earn supernormal profits, while reformist political, social and industrial leaders may be seen as entrepreneurs attempting a change in the institutional matrix itself. Needless to add, depending on the incentive structure and the motivations of the leaders in different domains, they may push productivity in opposite direction as well.

North and Wallis (1994) offer an interesting re-definition of the term 'augmenting' ('attenuating') in the literature on technical change to refer to a positive (or negative) effect of a change in techniques or institutions on the partial derivative of output with respect to an input. Using this definition and taking the total unit resource costs to be composed of transformation and transaction costs, productive entrepreneurs are seen as

bringing about transformation-augmenting technical change while social and political leaders bring about transaction-augmenting (attenuating) institutional change in a mutually interactive fashion.

Whereas transformation-augmenting technical change could be incremental as well as proceeding in discrete large steps, transaction-augmenting institutional change is necessarily an incremental process in which 'the short-run profitable opportunities cumulatively create the long-run path of change' [North (1997): 8]. North notes that long-run effects are often unintended for two reasons.

Entrepreneurs are seldom interested in the larger consequences external to their motivating forces. Secondly, significant divergence between outcomes and intentions also arises because of the inevitably imperfect understanding of entrepreneurs regarding the complexity of the problems to be solved and the intervention of unanticipated exogenous forces beyond their control. In the subsequent discussion, we use this framework to explore the "deep" determinants behind the growth and productivity performance of the Indian economy in the two phases.

II. India's Growth, Structural Transformation and Productivity: Deep Determinants

II.1 Growth Performance and its Genesis

II.1.1 Slow-Growth Phase, 1960-80: Historical Legacy of Development Strategy

At the time of Independence from British colonial rule in 1947, the culturally diverse[2] Indian society was predominantly rural, traditional and feudal with a few elements of modernity pervading the tiny urban educated minority in interaction with the British colonial bureaucracy. The economy was dominated by mostly-subsistence agricultural and allied primary activities, which provided a means of livelihood to eighty percent of the population. While functioning markets remained mostly an urban phenomenon, the rural population connected with isolated pockets of commercial crop production, and plantations remained integrated with international markets, as were urban modern industries. The political leadership that emerged during the non-violent struggle for Independence adopted a parliamentary democratic polity and set about grappling with the triple challenge of (a) building a modern nation state, (b) nurturing a newly established democracy, and (c) engineering economic development.

Historically, this was a unique multidimensional challenge not taken up by any country till then. If one were to judge by the outcomes, the political leadership more or less succeeded in meeting the first two challenges of building a nation state and democratic polity but failed in getting its economic act together for more than three decades after Independence in 1947, as the stylised facts set out in Section I show.

Why did the efforts of a developmental activist state, under the charismatic leadership of the first Prime Minister Jawaharlal Nehru, not succeed for more than three decades? In our view, the most plausible answer lies in the historical legacy of the widespread belief in the ideology of economic nationalism and socialism that dated back into the pre-Independence struggle against the British colonial rule. This was basically a reaction to the colonial regime's policy of *laissez faire* and free trade, that was identified (wrongly in retrospect) as *the* basic cause of India's economic underdevelopment by the pre-Independence political leadership who assumed power after 1947 and who, in the process, totally ignored the structural weaknesses in the economy (heavy reliance on monsoon-dependent agriculture) and in the social institutions [Srinivasan (1996) and Srinivasan and Tendulkar (2003)]. This prevailing belief received reinforcement from the then perceived success of the Soviet experiment in centralised industrial planning and the crisis of the Great Depression in the 1930s in the advanced capitalist world. Self-reliance under economic nationalism, founded in the deep-rooted suspicion of international trade[3]

[2] The multi-religious, multi-ethnic and multi-lingual character of the Indian society has been well known. The multiplicity of castes and sub-castes in the majority Hindu religion add further to diversity.

[3] The first Prime Minister, Nehru (1946: 403), who was in the forefront in the independence movement observes: "The objective for the country as a whole was the attainment as far as possible of *national self-sufficiency*. International trade was certainly not excluded, but we were anxious to avoid being drawn into a *whirlpool of economic imperialism*. We wanted neither to be victims of imperial power, nor to develop such tendencies ourselves." (emphasis added)

and private capitalists[4], was narrowly interpreted as self-sufficiency [Nayar (2001)]. Markets were believed to always produce iniquitous outcomes in a traditional society and an underdeveloped economy. Innocent faith in a benevolent state, axiomatically always acting in the 'public interest', followed. The corollary was the belief in the expansion of the public sector to counter a private capitalism motivated by private profit rather than societal gains.[5]

Consequently, expansion of the public sector (described as 'modern temples' by Nehru) became integral to the Nehruvian notion of the 'Socialist Pattern of Society' under a democratic constitution[6] and was wrongly elevated and equated to the socialist goal. The firm grip of the ideology of economic nationalism produced India's autarkic industrialization strategy well before Nurkse, Prebisch and Singer made an import-substituting strategy popular in most underdeveloped countries after the Second World War.[7]

Thus, an idealistic and activist state in the post-Independence development strategy sought to bring about major changes in the formal rules of the game, aimed at modernisation of a traditional society and an underdeveloped economy.

The experiment started with the good intentions of 'governing' the believed iniquitous outcomes of the unregulated domestic and international markets. The result was ***the autarkic, public-sector-dominated and basic- and heavy-industry-oriented centrally planned investment planning for state-initiated industrialisation[8] in an economy where, paradoxically, functioning markets had been gradually expanding with monetisation, and private property had a constitutional sanction.*** This strategy produced what the World Bank (1992) described as 'one of the most closed and heavily regulated *market* economies' in the world. It broadly prevailed in varying intensities during 1950-80. It gave rise to a new institutional matrix consisting of (a) heavy-handed direct discretionary quantitative controls on modern private industries and functioning markets; (b) financing public sector investment through government-mobilised private household savings, and indiscriminately extending the scope of public sector enterprises well beyond the provision of *public* goods and trespassing into the production and distribution of *private* goods and services;[9] and (c) stringent bureaucratic controls on the allocation of foreign exchange and quantitative restrictions on imports in a regime of foreign exchange shortages resulting from a deliberately maintained overvalued exchange rate under the

[4] Nehru (1946: 417), while mentioning the prosperity in the textile mill industry that came up in competition with the British mills, disapprovingly brackets the prosperous mill owners with 'war contractors, hoarders and profiteers', while making (justifiably) laudatory references to Tatas, who established the first steel mill in India in 1909.' (This second closing quotation mark seems incorrect) We quote Nehru not only as the most influential political leader of the pre- and post-Independent India but also because of his tremendous hold over the Indian intelligentsia.

[5] These honourable intentions held complete sway among the intelligentsia under the charismatic leadership of the first Prime Minister, Jawaharlal Nehru, whose democratic socialist convictions were held beyond doubt.

[6] That sanctified private ownership of means of production.

[7] There was widespread social consensus on this strategy from the pre-Independence period among intellectuals and businessmen as well as trade unions [Srinivasan (1996)].

[8] With its inspiration from the Soviet experiment.

[9] In the standard concept of public economics, private goods possess the twin properties of (legal and/or physical) excludability and rivalry in consumption. Public goods are non-excludable and/or non-rival in different degrees.

untested premise of export pessimism[10] and accentuated further by an autarkic focus on highly import- and foreign-exchange-intensive basic and heavy industries. The incentive structure embedded in the new institutional matrix ended up stifling the dynamic impulses of private enterprise and functioning markets and, instead, favoured unproductive entrepreneurship and rent-seeking activities in an environment where private firms were insulated from domestic and external competition and where *commercial* public sector enterprises came to be treated as extensions of the government's *welfare* activities with commercial norms for assessing their performance disregarded.

The result was import-substitution driven by shortages and without regard to cost, quality and productivity, and growing inefficiencies in indiscriminately expanded public sector activities. The honest intention of the dirigiste developmental state was to bring about, in a traditional agrarian economy, a modernising institutional change that was favourable to economic development. However, it unintentionally ended up fostering [in the terminology of North and Wallis (1994)] transaction-attenuating institutional change, that turned out to be inimical to transformation-augmenting technical change in a predominantly market economy.

The macroeconomic outcome of the strategy was slow growth despite a doubling of the rates of savings and investment and high implicit incremental capital-output ratios during 1950-80. [Table 2, columns (6), (7) (2) and (3)]. The average of the annual growth rates from UNIDO data works out to be 3.79 percent between 1960-1980.

It may be noted that the constraints on growth arose from the strategy and the policies arising from that strategy, and not from 'resources' as the development literature of the 1950s would have us believe.[11] The primary resource constraints on growth were perceived to be two: foreign exchange and low capacity to save at a low level of per capita income. Of these, persistent foreign exchange shortages flowed directly from the then pervasive influence of the ideology of economic nationalism in terms of a deliberately maintained over-valued exchange rate and a reliance on quantitative import controls to regulate shortages, as argued above, and the refusal to use a price-based foreign exchange rate as an instrument for this purpose. The doubling of the *ex post* rate of gross domestic savings (Table 2) indicated a success of the government in mobilising the savings so that low capacity to save could not be deemed to be a constraint.

II.1.2 Rapid Growth Phase, 1980-2000: Strategy Reassessment and the Paradigm Shift

The problems with the earlier strategy came to be recognised by the perceptive observers after the mid-1960s. The eminent academic, and then Deputy Chairman of the Indian Planning Commission, had pointed out that inefficiencies in the public sector, the inability of the government to control activities in the private sector, and lack of competition were the primary factors underlying what he called 'an extremely high-cost economy' [Gadgil (1968, 1973): 258]. He advocated partial domestic liberalisation but not relaxation of regulations on external trade.

[10] Under this doctrine, attributed to Nurkse, Prebisch and Singer, exports of underdeveloped countries were taken to be constrained by the markets in the developed world and hence inelastic with respect to price and incomes in developed countries.

[11] Chenery and Strout (1962) exemplify the dominant view of that period.

Bhagawati and Desai (1970), as well as Bhagawati and Srinivasan (1976), had also argued the well-documented case for domestic as well as external liberalisation. The present Prime Minister of India had, back in 1972, on taking over as the Chief Economic Adviser to the Ministry of Finance, suggested liberalisation of the controls on the private sector to the then Prime Minister, Indira Gandhi[12]. Civil servants L.K. Jha (1985) and P.N. Dhar (1989) had also made similar pleas in their writings in the 1980s. Apart from the above academic assessments, one major international event that appears to have hastened the slow process of re-thinking the policy of insulation from the world economy was the first oil hike of 1973. Because of its almost total dependence on imported oil, the quadrupling of the oil price by the OPEC cartel provided a jolt to India's current account deficit and forced the reluctant entry of the Indian economy into the turbulent floating exchange rate regime following the breakdown earlier of the Bretton Woods system of fixed exchange rates. However, unlike other oil-import-dependent countries, the latter fortuitously proved to be an unexpected boon in disguise for India rather than a disaster.

One, it offered an opportunity for exchange rate depreciation without formally announcing devaluation, which had become a political taboo following the 1966 devaluation.[13] By linking the rupee to the pound sterling, which was falling in relation to the U.S. dollar, the covert rupee depreciation in the 1970s provided a boost to general exports, as did the locational proximity, which facilitated penetration into the petro-dollar-rich Middle East market. Secondly, the Middle East also opened up its job market to Indian migrant labour with middle level skills, whose remittances kept on adding to the foreign exchange reserves. As a consequence, after the second oil price hike in 1979, the government did not resort to stringent import controls as it had after the 1973 oil price hike. In fact, rising remittances in the 1980s possibly opened up the window for the hesitant trade liberalisation that was undertaken in the 1980s. Thirdly, India managed to get soft loans to overcome the temporary balance of payments problems caused by the oil price hikes [Mitra and Tendulkar 1994].

[12] Interview published in the *Indian Express*, May 23, 2004, p. 7.
[13] Bhagawati and Srinivasan (1976: Ch. 10); Bhagawati *et. al.* (1972); and Sundaram (1972 a and b).

Table 2: Growth Performance and Macroeconomic Indicators, 1950-51 to 2002-03

(Period Averages in Percent)

Time Period (1)	Rate of GDCF Current Prices (2)	Rate of GDS at current prices (3)	Rate of Net Capital Inflow (+) (current prices) (4)	Rate of GDCF (1993-94 prices) (5)	Rate of Growth of GDP(fc) (1993-94 prices) (6)	Implicit ICOR Col.(5)/(6) (7)	WPI –All Commodities (8)	CPI – Industrial Workers (9)	GFD/GDP - Centre (10)	GFD/GDP – Centre+ States (11)	RD/GDP (12)	CAD/GDP (13)
1950-51 to 1954-55	9.04	8.76	0.28	13.90	3.88	3.59	-0.43	-1.42	N.A	N.A	N.A	0.0
1955-56 to 1959-60	13.30	11.18	2.12	17.98	3.36	5.34	3.88	4.54	N.A	N.A	N.A	-1.8
1960-61 to 1964-65	14.26	12.04	2.22	18.26	4.99	3.66	5.55	5.11	N.A	5.7	N.A	-1.8
1965-66 to 1972-73	15.23	13.84	1.39	20.44	2.54	8.04	6.90	6.19	N.A	5.4	N.A	-1.4
1973-74 to 1979-80	18.54	18.69	-0.14	21.61	3.39	6.37	9.81	8.73	3.94	5.9	-0.41	0.24
1980-81 to 1984-85	19.76	18.44	1.32	21.16	5.64	3.75	9.28	10.12	5.92	7.2	1.04	-1.52
1985-86 to 1989-90	22.70	20.38	2.32	22.44	5.96	3.77	6.66	7.96	7.73	8.9	2.43	-2.16
1990-91	26.30	23.10	3.20	25.40	5.57	4.56	10.30	11.16	7.85	9.4	3.26	-3.10
1991-92	22.60	22.00	0.60	22.00	1.30	16.95	13.70	13.50	5.56	7.0	2.49	-0.30
1992-93 to 1996-97	24.80	23.48	1.32	24.94	6.69	3.73	8.74	9.36	5.61	7.1	2.85	-1.2
1997-98 to 2002-03	23.97	23.38	0.58	25.90	5.25	4.93	4.63	5.90	5.92	9.1	3.87	-0.53

Notes: 1. GDCF = Gross Domestic Capital Formation
2. GDS = Gross Domestic Savings
3. GDP (fc) = Gross Domestic Product at factor cost
4. ICOR = Incremental Capital-Output Ratio
5. AV-WPI = Average Annual Variation (%) in Wholesale Price Index
6. AV-CPI = Average Annual Variation (%) in Consumer Price Index
7. GFD = Gross Fiscal Deficit
8. RD = Revenue Deficit
9. CAD = Current Account Deficit

Source: 1. Central Statistical organisation: National Accounts Statistics Back series 1950-51 to 1992-93 (2001).
2. Central Statistical organisation: National Accounts Statistics 2002.
3. Handbook of Statistics on the Indian Economy 2003-04, Tables No. 224-226, 230, pp.478-80 486 Reserve Bank of India, Mumbai
4. Handbook of Industrial Policy and Statistics 2001
5. Joshi Vijay and I.M.D. Little (1994): *India: Macroeconomics and Political Economy*, World Bank, Washington D.C.

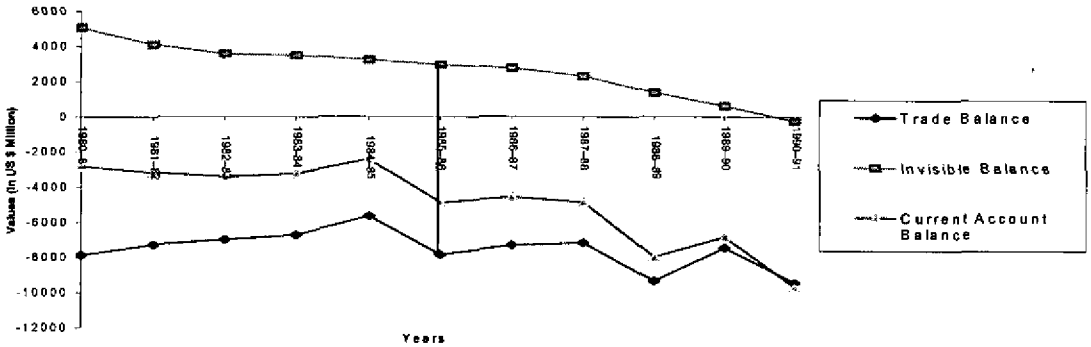
The intention of reassessing the three key elements of control in the earlier strategy, namely, industrial controls, trade regulations and public sector expansion, was also reflected in the five official committees appointed for this purpose toward the end of the 1970s and the beginning of the 1980s. All of them recommended a partial and cautious liberalisation, which came in handy when Rajiv Gandhi took over as the Prime Minister after the tragic assassination of his mother in 1984 and his subsequent election with a massive sympathy vote. Rajiv Gandhi belonged to the post-Independence generation that did not carry the hangover of socialism and was eager to usher modernised India into the 21st century. Acting on the recommendations of the official committees that had submitted reports earlier, he introduced a reasonably wide ranging *de facto* domestic industrial liberalisation but moved cautiously with trade liberalisation.

He merely replaced quantitative restrictions on imports of (mostly non-competing) capital goods with tariffs and provided export-incentives across the board [Panagariya (2004)]. These measures coincided with real exchange rate depreciation in the second half of the 1980s when exports accelerated to a double-digit growth. The liberalised domestic industry also received a stimulus but not from the export market since the share of exports in the sales of the domestic corporations remained tiny in the face of the very limited opening up of the economy, which did not dent the much higher profitability of selling in the domestic rather than in the external markets because of the stringent import and foreign exchange controls. In fact, trade to GDP ratio declined from 13.1 percent in the first half to 12.4 percent in the second half of the 1980s. The stimulus to efficiency improvements came from the domestic market expansion triggered by agriculture posting a healthy 4.4 percent average annual growth and from rising fiscal deficits of the central and state governments from 6.3 percent of GDP in 1981-82 to 9.4 percent in 1990-91. The consequence was a step-up in the trend growth rate of GDP from 3.78 percent to 5.73 percent per annum in the 1980s. As Table 2 [Columns (5) and (7)] brings out, this was brought about much more through a significant reduction in incremental capital-output ratio than by raising the rate of investment.

The existing firms whose supply constraints were relaxed in the 1980s through the liberalisation of controls on domestic industry improved their efficiency to bring about an accelerated growth in industrial output from an average of 6.0 percent in the first half to 7.6 percent in the second half of the 1980s. By the end of the decade, however, growing fiscal deficits (Chart 4D) and widening current account deficits (Chart 4A) made the stepped-up growth unsustainable, ending in a serious external payments crisis with the spectre of default on short-term foreign borrowings, which had risen to an alarming level of 146 percent of foreign exchange reserves by the end of March 1991.

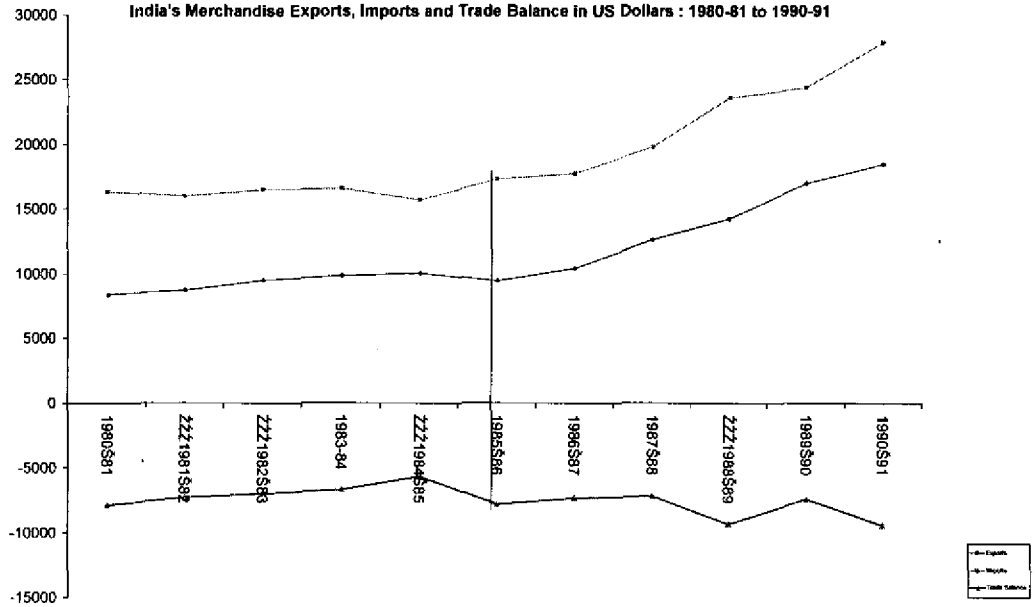
The external payments crisis of 1990 shook the polity, and the crisis-gripped atmosphere made possible a very sharp fiscal contraction of 2.3 percentage points of GDP in 1991 and 1992 combined with a savage compression of imports.

Chart 4A
India's Trade Balance, Invisible Balance and Current Account Balance:1980-81 to 1990-91



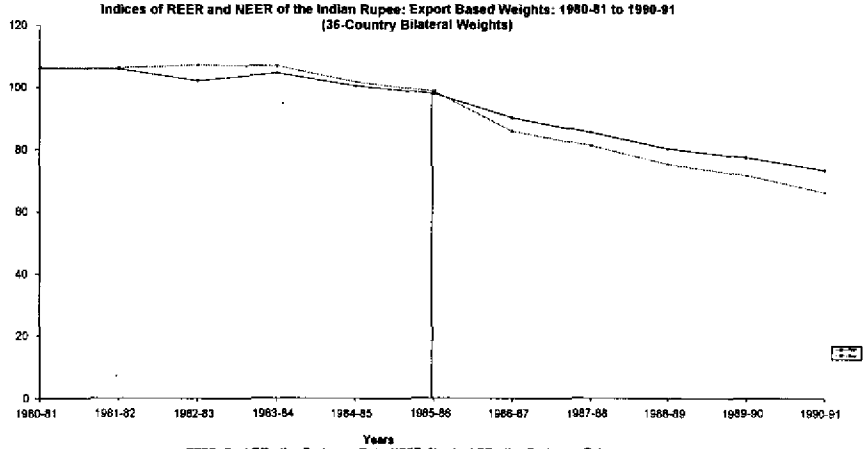
Source: RBI (2002-03), Handbook of Statistics on the Indian Economy, Table 135.

Chart 4B
India's Merchandise Exports, Imports and Trade Balance in US Dollars : 1980-81 to 1990-91

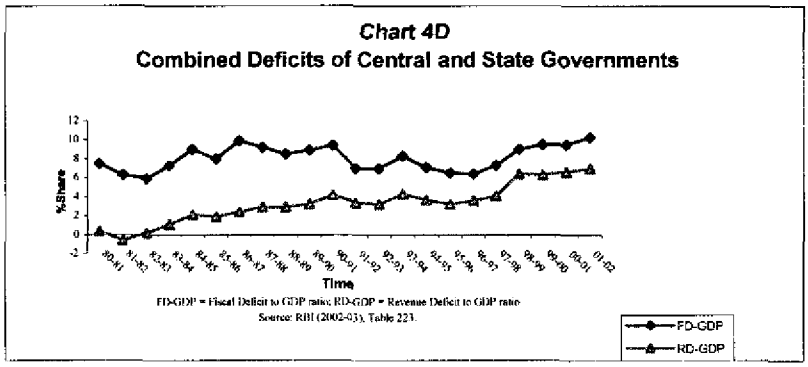


Source: RBI (2002-03), Handbook of Statistics on the Indian Economy, Table 136.

Chart 4C
Indices of REER and NEER of the Indian Rupee: Export Based Weights: 1980-81 to 1990-91
(36-Country Bilateral Weights)

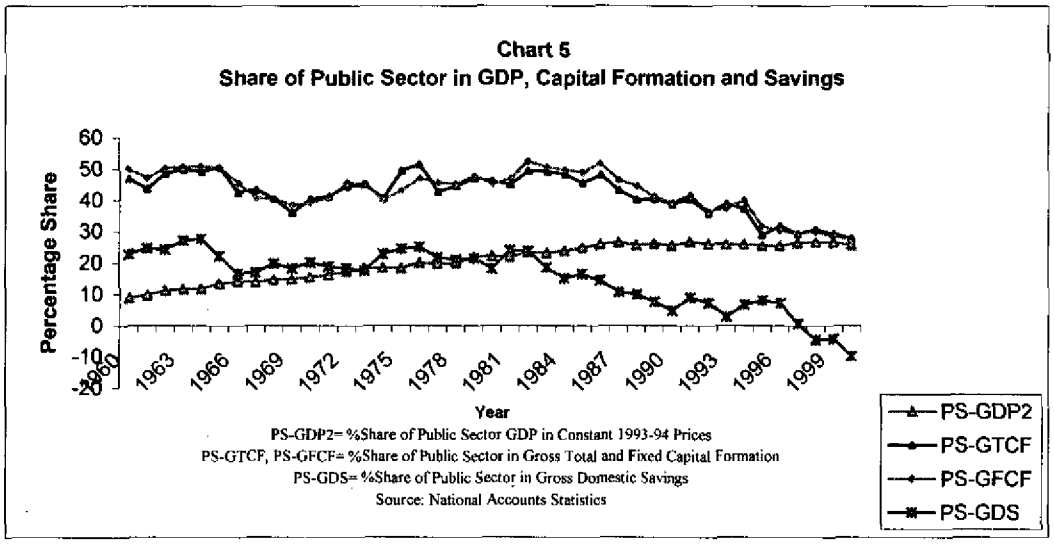


REER: Real Effective Exchange Rate, NEER: Nominal Effective Exchnage Rate
Source: RBI (2002-03), Handbook of Statistics on the Indian Economy, Table 142.



This macroeconomic adjustment was preceded by a sharp devaluation of the currency (14 percent in real terms) and was combined with wide ranging systemic reforms toward liberalisation of industrial, trade, financial and private foreign investment controls. Customs tariffs and excise duty rates were not only lowered but also rationalised by considerably reducing the dispersion in rates. The trade to GDP ratio also increased substantially from an average of 12.5 percent during the 1980s to 20.3 percent during 1992-2000 [Tendulkar and Bhavani (2005)]. The outcome was a step-up in the trend GDP growth rate (UNIDO) from 5.7 percent (1981-91) to 6.5 percent (1991-2000), which was sustainable due to the less-distorted and more competitive environment and a reasonable macroeconomic stability.

There has thus been a gradual paradigm shift in the development strategy away from autarky toward integration with the global economy, away from the dominance of the public sector toward greater reliance on private initiative, and away from heavy-handed regulation of the markets and large industry toward greater liberalisation and market-friendly policies. The pace of change in these three elements has, indeed, varied considerably. Thus, the acceleration of domestic industrial liberalisation of the 1980s preceded the wide-ranging external liberalisation in the 1990s. The fiscal profligacy of the 1980s resulted in a downhill movement in the share of public savings in gross domestic savings in the early 1980s and forced a decline in the public sector share in gross fixed as well as gross domestic capital formation (Chart 5).



The movements in labour productivity as well as in total factor productivity and its components have to be examined in this overall perspective. For this purpose, we take the following self-evident propositions for granted.

One, in the Harrod-Domar growth model framework, we take the rate of investment as well as the efficiency of utilisation of capital (as reflected in the implicit incremental capital-output ratio) to be jointly and endogenously determined by the incentive structure embedded in the institutional matrix in a given society. This follows from the evolutionary framework of Douglass North, discussed in Section II. The (changing) institutional matrix is also taken to govern what Kravis (1970) called the internal mainsprings of the growth process, which consist of 'social factors that influence a society's capacity to transform itself, such as those that determine attitudes towards work and reward' (p.855) and 'which must be sought in the land and the people and in the system of social and economic organisation' (p.858). In our view, the existence of an institutional matrix that permits a reasonably smooth functioning of the mainsprings of the growth process is an indispensable pre-requisite for economic growth and hence for productivity improvements. Needless to add, growth can take place without productivity improvements, but productivity improvements cannot take place in the absence of economic growth.

Two, public investment is taken to be autonomous whereas private investment is taken to be induced by the profitability, and hence by the size, of the domestic as well as the external market (depending on the degree of integration and barriers to trade).

Three, micro-level total factor productivity (TFP) improvements are taken to be proximately determined by the intensity of competition as well as the size of the potential domestic and external markets, these two factors together governing the profitability of long-term investment. Turning to its components, efficiency improvements are generally undertaken mostly by the existing producers in gradually realising the full potential of the adopted technology whereas new entrants generally embark on introducing new technology.

Scarcities generated by rapid growth in the size of the market (both domestic and external) are seen to provide major incentives for efficiency improvements. This has to be distinguished from scarcities generated by competition-restricting and autarkic policies, where growth in the size of the domestic market tends to be slow. The former stimulate high-volume low-margin competition-induced activities. An additional condition of easier access to and reduction in relative prices of capital goods and technology is required for rapid technical change, the other component of total factor productivity change. It follows that rapid economic growth constitutes the necessary pre-requisite for productivity growth.

Four, at the economy-wide level, total factor productivity change is proximately determined by intra-sectoral TFP change and inter-sectoral shifts in resources, which together are influenced by the incentive structure in a society, and the social, physical and financial infrastructures.

II.2 Structural Transformation and Labour Productivity Performance: 1960-2000

We start with an examination of the changes in the sectoral growth rates of GDP, the workforce and reproducible tangible capital; and the derived growth rates of capital-deepening and labour productivity, based on annually available National Accounts Statistics and periodical National Sample Surveys of Employment and Unemployment.

Following Kuznets (1966), we divide the economy into three broad sectors of agriculture and allied sectors (A); industry (I), comprising manufacturing[14] and industries *mostly* (but not exclusively) linked to it, namely, (i) mining and quarrying[15], (ii) construction, (iii) electricity, gas and water and (iv) transport, storage and communications; and the residual services (S). Services of electricity, gas, water, transport and communication are in the nature of physical infrastructure used by all the sectors.

To explain the logic very briefly, A-sector is a natural-resource-using (geography) sector. A-sector productivity per worker is known to be lower than the national average productivity because of its dependence on an agro-climate-specific non-expanding natural resource, namely, land and the inherent limitations of the technology that could enhance it [Hayami and Ruttan (1971)]. I-sector is reproducible, tangible capital-using with higher than average national productivity per worker. S-sector is heterogeneous in composition, including (a) mostly unskilled labour-using trade, hotels and restaurants, (b) mostly skill-intensive banking, finance and insurance, (c) highly capital-using real estate and (d) a diverse mix of community, social and personal services consisting of some market-based and many others (government and community services) using non-market criteria for production and distribution.

[14] This component is separately indicated in view of the emphasis by UNIDO.

[15] Even though natural-resource-intensive, Kuznets included mining and quarrying as part of I-sector because of the use of modern technology and its critical role as input-supplier to the I–sector.

We present in Table 3 the sectoral composition of the total and incremental workforce for four time points:[16] 1961, 1983, 1993-94 and 1999-2000. While the share of A-sector declined by over 15 percentage points over the 40-year period, the Indian economy still remains predominantly agricultural with over 60 percent workforce absorption in 1999-2000. The remaining 40 percent is almost equally divided between industry (I) and services (S) with the share of the former a shade higher than the latter. The share of the manufacturing sector rose by a tiny 2.5 points over the 40 years. The composition of the incremental workforce brings out the fact that an overwhelming 56 percent was absorbed in A-sector during the slow-growth phase (1961-83) with lower than average productivity per worker.

During the rapid growth phase (1983 to 1999-2000), the share of the A-sector came down, and, in the last decade of the 20th century, the I-sector absorbed 56 percent of the incremental workforce, of which manufacturing accounted for 20 percent.

We use Table 3 along with the National Accounts Statistics to work out sectoral and overall productivity per worker as well as capital-labour ratios (or capital deepening[17]). Table 4 presents point-to-point compound annual growth rates of real output (GDP) originating in the sector at 1993-94 prices, the number of workers reported to be working in a sector on the usual principal as well as subsidiary basis,[18] and per worker productivity as well as reproducible tangible capital stock per worker (i.e. capital deepening). Additive decomposition of point-to-point aggregate productivity change is given in Table 5. Productivity change is decomposed into (a) that due to inter-sectoral workforce composition shifts weighted by base year sectoral output shares; (b) that due to intra-sectoral productivity changes weighted by base year sectoral workforce shares; and (c) interaction between inter- and intra-sectoral shifts.

During the slow-growth phase (1960-80), we argue that the incentive structure embedded in the *persistently*[19] autarkic industrialisation strategy (the trade ratio remaining in single-digits till the mid-1970s) created insulated non-competitive markets, and a direct discretionary control regime encouraged unproductive rent-seeking activities in the private sector while expanding commercial public sector units operated virtually without commercial norms. The overall economic environment was thus inimical to economic growth and hence to productivity improvements. It is, therefore, no surprise, that the point-to-point compound growth rate of aggregate labour productivity was a paltry 1.22 percent per annum between 1961-83 (Table 4).

[16] The choice of time-points is constrained by the availability of broadly comparable data from Population Census 1961 and from the three quinquennial National Sample Surveys of Employment and Unemployment.
[17] Strictly speaking, capital deepening or capital intensity refers to the ratio of capital to labour when both are measured at *optimal* levels. This is usually distinguished from the *observed* capital-labour ratio where numerator and denominator are not *necessarily* at optimal levels. In the present discussion, we use capital deepening, capital intensity and capital-labour ratio as synonymous.
[18] In the Indian National Sample Surveys on employment and unemployment, usual principal status workers are those who report themselves as gainfully employed on a major time basis during 365 days preceding the date of interview. Usual subsidiary status workers are those who report themselves as gainfully employed on a minor time basis but whose usual principal status is either unemployed or out of the labour force.
[19] It is well known that short spells of early autarkic policies helped fast growing open economies of East and South-East Asia to initiate industrialisation. It is the persistence of autarkic policy that became a major problem in the Indian context.

A-sector with as high as 68.5 percent of the workforce, even in the end-point 1983, and labour productivity growth of 0.42 percent per annum was clearly the dominant proximate factor underlying very sluggish aggregate labour productivity growth. But it reflected a deeper problem of the inability of autarkic, public-sector-dominated industrialisation to absorb a growing labour force at a time of rising labour productivity in non-agricultural sectors. Even labour productivity growth in manufacturing, though above the national average, was no higher than 1.5 percent per annum. Both inter-sectoral workforce shifts and intra-sectoral productivity increases being marginal, the decomposition indicates not very dissimilar shares of these two components during 1961-83 (Table 5). While the state activism succeeded in stepping up the growth rate of capital deepening in manufacturing at 3.25 percent and in the I-sector at 2.93 percent, the incentive structure did not permit its translation into high labour productivity growth (Table 4).

The stagnation in total factor productivity (TFPG), from UNIDO data during 1961-80 (Table 1 and Chart 3), is not unexpected, with growth in capital deepening exceeding that in labour productivity (Table 4). Turning to the components of TFPG, a negative growth of 2.8 percent in technical change (1961-80) was the result of autarkic policy becoming increasingly stringent with regard to imports of technology as well as imports of capital goods. The technical efficiency growth at 3.00 percent per annum, which shows a rising trend since the mid-1960s (Chart 3), appears to have been caused by rising profitability in a persistently shortage economy while the potential of the technology imported in the 1950s and 1960s was gradually realised.

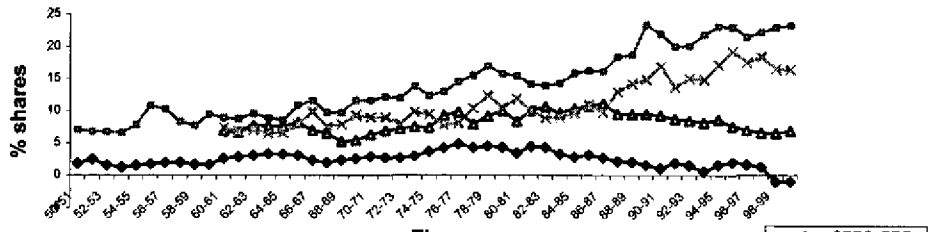
As mentioned earlier, the 1980s was a decade of *de facto* domestic industrial liberalisation combined with merely replacing quantitative restrictions with tariffs on mostly non-competing capital goods [Panagariya (2004) documents these measures]. However, the economy remained closed with the average trade ratio rising only marginally from 11.9 percent in the second half of the 1970s to 13.1 percent in the first half of the 1980s before declining to 12.4 percent in the second half of the 1980s. During this decade of rising current expenditures as well as fiscal deficits, the declining share of public sector savings in relation to GDP also forced a decline in public sector investment as a percentage of GDP, as well as a public sector share of gross domestic savings and investment (Charts 5 and 6) although the latter was partly kept up by financing through public debt. There were also efforts at marginally increasing the autonomy of the public sector undertakings (PSUs) through the instrument of a formal memorandum of understanding that set the mutually agreed monitorable targets for each PSU in return for some managerial flexibility in operations and investment decisions. It is possibly because of somewhat greater flexibility imparted to the private as well as the public sector units to adjust their supplies when combined with healthy agricultural growth and rising fiscal deficits (which provided markets) that existing units received incentives to improve efficiency and productivity. Labour productivity growth was stepped up from 1.22 percent per annum (1961-83) to 3.45 percent (1983-94), which was shared by all the sectors while that in manufacturing went up from 1.49 percent to 4.34 percent (Table 4).

As a result, intra-sectoral productivity growth contributed 75 percent to aggregate productivity growth during 1983-94 (Table 5). More importantly, the rate of growth of capital deepening, while *higher* than during 1961-83, was *lower* than that in labour productivity.

What is interesting about this period is the performance of the residual services sector, where, during 1983-94, capital deepening *declined* while labour productivity *rose* at 3.22 percent, and labour absorption at a faster rate of 3.77 percent. The S-sector absorbed 2.8 additional percentage points out of a 4.5 percentage point decline of A-sector's share in the workforce, and contributed handsomely to the intra-sectoral component in the decomposition in Table 5. The manufacturing sector was remarkable for a 4.34 percent growth rate of labour productivity, more than twice as high as growth in manufacturing labour absorption (Table 4).

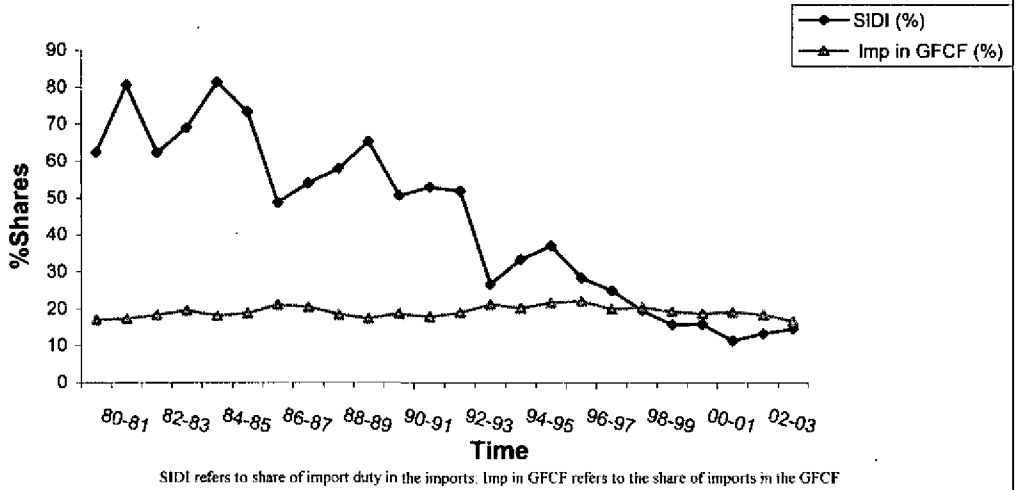
The exponential trend rate in economy-wide total factor productivity growth (UNIDO data) rose at 1.8 percent (with a high squared correlation coefficient of 0.8534), composed of a tiny and fluctuating 0.58 percent growth in technical change and 1.21 percent growth in technical efficiency. With collection rates of customs duty on capital goods in national accounts showing fluctuations with a mildly declining trend (Chart 7) and not much direct foreign investment, incentives for technical change may have been low. Our interpretation is that domestic market expansion, triggered by strong growth in agriculture and services in a virtually closed economy, may have provided incentives for efficiency improvements.

Chart 6
Shares of Public and Private Sector' Investment and Savings in GDP



SPBS-GDP and SPRS-GDP refers to share of public and private sector savings in GDP
SPBI-GDP and SPRI-GDP refers to shares of public and private sector investment in GDP
source: National Accounts Statistics

Chart 7: Import Duties and Imports of Capital Goods



SIDI refers to share of import duty in the imports. Imp in GFCF refers to the share of imports in the GFCF
Source: National Accounts Statistics

Table 3: Sectoral Composition of Workforce

Sector	Composition of Workforce (%)				Composition of Incremental Workforce (%)		
	1961	1983	1993-94	1999-2000	1961-83	1983-94	1994-2000
1. Agriculture, Forestry& Fisheries and Logging	75.94	68.49	63.99	60.36	56.15	44.94	3.26
2. Industry	12.80	17.01	18.71	20.96	23.98	25.90	56.32
Of which (Manufacturing)	(9.49)	(11.35)	(11.50)	(12.05)	(14.43)	(12.24)	(20.30)
3. Services	11.26	14.50	17.30	18.68	19.87	29.16	40.42
Total (%)	100	100	100	100	100	100	100
(Total Workforce ('000))	(188,676)	(302,703)	(374,124)	(397,928)	(5,183)	(6,802)	(3,967)

Source: Sundaram and Tendulkar (2002), Table I.3.

Notes: ***Industry*** covers mining and quarrying, manufacturing, construction, transport, storage and communications. ***Services*** include trade, hotels & restaurant; financing, insurance, real estate and business services; and community, social and personal services.

Table 4: Growth Rates of Output, Employment, Productivity and Capital Deepening

	1961-83				1983-94				1994-2000			
	G	G_L	G_P	G_{KL}	G	G_L	G_P	G_{KL}	G	G_L	G_P	G_{KL}
1.Agriculture, Forestry, Fisheries & Logging	2.12	1.69	0.42	0.98	3.32	1.38	1.92	0.74	2.80	0.05	2.74	1.61
2.Industry	4.71	3.50	1.16	2.93	6.41	2.97	3.34	3.28	7.31	2.96	4.22	5.37
Of which												
(Manufacturing)	(4.54)	(3.01)	(1.49)	3.25	(6.61)	(2.18)	(4.34)	3.73	(7.38)	(1.79)	(5.49)	(10.50)
3. Services	4.29	3.36	0.90	-0.64	7.11	3.77	3.22	-0.43	8.47	2.34	5.99	2.12
Total	3.42	2.17	1.22	1.51	5.56	2.04	3.45	2.16	6.47	1.03	5.38	4.86

Source: Sundaram and Tendulkar (2002), Table I.3; National Accounts Statistics, Various issues.

Notes: G = Average Compound Growth Rate of GDP (at factor cost at 1993-94 prices) average of the three years centred on 1961-62, 1982-83, 1993-94 and 1999-2000.
G_L = Average Compound Growth Rate of Workforce
G_P = Average Compound Growth Rate of Labour Productivity
G_{KL} = Average Compound Growth Rate of Capital - Labour Ratio.

Table 5: Decomposition of Change in Aggregate Productivity per Worker

Period	DTLP	SWFC $\Sigma y_i^0 (l_i^1 - l_i^0)$	SP $\Sigma l_i^0 (y_i^1 - y_i^0)$	Interaction	Contribution of Mfg. to aggr. Prod. Change	
					$y_{mfg.}^0 (l_{mfg.}^1 - l_{mfg.}^0)$	$l_{mfg.}^0 (y_{mfg.}^1 - y_{mfg.}^0)$
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1961-83	3445.86 (1.22%p.a)	1455.7014 (42.24)	1731.0566 (50.24)	259.1020 (7.52)	252.7852 (7.34)	496.7256 (14.42)
1983-94	62825.66 (3.45%p.a)	1165.0964 (18.54)	4711.8297 (75.00)	405.734 (6.46)	32.0022 (0.51)	1191.7778 (18.97)
1994-00	7747.36 (5.38%p.a)	1240.8176 (16.02)	6128.1429 (79.10)	378.3995 (4.88)	155.7963 (2.01)	1290.5344 (16.66)

Source: National Accounts Statistics, Various Issues.

Notes: $y^i - y^0 = \Sigma^4_{I=1} y^0_i (l^1_i - l^0_i) + \Sigma^4_{I=1} l^0_i (y^1_i - y^0_i) + \Sigma^4_{I=1} (l^1_i - l^0_i) (y^1_i - y^0_i)$
Superscripts 0 and 1 denote base and a given year.
y_i and y denote productivity per worker of sector I and aggregate economy
l_i denotes share of sector I in total workforce.
DTLP denotes changes in labour productivity.
Figures in brackets in columns (3) to (7) indicate percentage contributions to aggregate productivity change.
Figures in column (2) in brackets are the compound annual growth rates.

The last decade of the 20th century, 1991-2000, is marked by India carrying out systemic reforms in terms of a much more wide-ranging liberalisation of the private sector, significantly opening up the economy to foreign trade and foreign private investment, exposing the existing public sector enterprises to market competition, and the hesitant beginning of a withdrawal of the public sector. The intensity of both domestic and external competition is increased along with a reduction in earlier policy-induced distortions because of tax reforms leading to the gradual rationalisation of indirect taxes.

However, this period presents a major problem in terms of data. For the periods 1961-83 and 1983-94 the growth rates of labour productivity and capital deepening from UNIDO data (1960-80, 1981-91) were directionally consistent with those from the national data sources (1961-83, 1983-94) that we have been drawing on to analyse structural changes in the economy. For the post-1991 period, UNIDO data show labour productivity growth at 4.26 percent to be *lower* than growth in capital deepening at 5.00 percent (1991-2000) (Table 1) whereas, from the national data sources, point-to-point labour productivity (compound) annual growth at 5.3 percent is *higher* than that of capital deepening at 4.86 percent during 1994-2000. Although periodisation and methods of computing growth rates differ, they would imply a divergence in terms of the role played by total factor productivity growth (TFPG). We find ourselves unable to track down the sources of divergence and attempt a reconciliation.

National data sources used in Table 4 show a considerably higher – almost two times higher – growth in capital deepening than in labour productivity for the manufacturing sub-sector during 1994-2000, a situation similar to that during 1961-83 but in contrast to that during 1983-94. The same directional result also holds for the I-sector as a whole. It is clear from the last line of Table 4 that rising and impressive labour productivity growth over the three periods has been resulting from both acceleration in real output growth and slowing down of growth in labour absorption in the economy resulting from changing demographic composition and workforce participation practices [Sundaram and Tendulkar (2002) and Sundaram (2004)].

The paradigm shift in the development strategy (discussed in Section III.2) with regard to the public sector is reflected in the aggregate national accounts data in terms of the changing share of public and private sectors in gross domestic product (GDP), gross domestic (fixed and total) capital formation (GFCF and GCF) and net fixed capital stock (NFCS). **Intra-sectoral** public and private sector shifts in GDP and capital formation are presented in Tables 6 and while changes in the **inter-sectoral** composition of aggregate GDP, NFCS and capital formation originating in the public and private sectors are given in Tables 8 (public sector) and 9 (private sector) for the four time-points over the forty year period under consideration.

The gradual paradigm shift in the development strategy involved reassessment of three elements of the post-Independence institutional matrix, namely, the heavy-handed regulation of private sector units and markets, the expanding role of the public sector in the economy, and the autarkic trade policy. The first two had their origins in the socialist ideology while the third was driven by the ideology of economic nationalism.

The oil price hike of 1973 forced the gradual and reluctant opening up of the economy to external trade, leading to a critical look at the autarkic trade policy after the late 1970s. The realisation of the counter productive character of discretionary controls on large private units in a predominantly market economy prompted their liberalisation in the 1980s.

The third element of indiscriminately expanding the public sector[20] in a private commercial domain, the autarkic trade policy, proved most stubborn, given the firm grip and strong appeal of the socialist ideology in the popular mind. The terms-of-trade politics of the 1980s led to the rising fiscal deficits [Tendulkar and Bhavani (2005)] of the 1980s, which forced a decline in the capital expenditure of the central and state governments consequent upon a reduction in public savings and a rise in current unproductive expenditure. The resulting shift in the role of the public sector is reflected in the aggregate national accounts data in terms of the changing shares of the public and private sectors in gross domestic product (GDP), net fixed capital stock (NFCS), and gross fixed and total capital formation (GFCF and GCF).

The share of the public sector in sectoral and aggregate GDP almost doubled during the slow-growth phase between 1961-62 and 1982-83 before slowing down later in 1993-94 and 1999-2000. In 1999-2000 it was more than a third in both I and S sectors (mainly finance, banking and insurance) and one-fourth in the aggregate GDP. Its share in the manufacturing sector declined from a peak of 19 percent in 1993-94 to 15 percent in 1999-2000. Turning to sectoral net fixed capital stock, for which data are not available before 1980-81, peak public sector shares were also reached in 1982-83 for the I sector (58 percent) as also for its manufacturing sub-component (25.8 percent) along with a doubling of the GDP shares during the activist state-led industrialisation phase. The public sector share declined thereafter due to a faster expansion of private sector NFCS and the inability of the public sector to expand, the latter due mainly to rising fiscal deficits. The public sector share in agricultural NFCS rose gradually due to the government justifiably undertaking externality-generating physical infrastructural capital formation (Table 6).

The forced decline of the public sector in the 1980s comes over more sharply in terms of flows of gross fixed and total capital formation (Table 7). The peak public sector share was reached by 1983-84 in all the sectors except GCF in manufacturing. The peak exceeded 40 percent in all the three major sectors of A, I and S while it exceeded one-fifth in manufacturing. There has been a steep decline in the years following 1983-84 (Table 7).

Inter-sectoral distribution of aggregate **Public sector** GDP by industry of origin is given in Table 8. The contribution of public sector GDP originating in S-sector rose gradually from nearly 44 percent in 1961-62 to reach 51 percent in 1999-2000. Consistent with the public-sector-dominated strategy during the slow-growth phase, public sector GDP originating in the I-sector exceeded that in the S-sector in 1961-62 and 1982-83. The two shares almost converged in 1993-94 before the S-sector forged ahead, in terms of share, in 1999-2000. The last reflects the increasing importance of government-owned banking, insurance and financial services. The allocation of publicly-owned net fixed capital stock

[20] We may recall their description as 'modern temples' by the first Prime Minister, Jawaharlal Nehru, and commercial public sector units being treated as an extension of the government's welfare activities.

by sector of destination is concentrated in the non-manufacturing component of the I-sector, mostly in physical infrastructural facilities.

Table 6: Public – Private Breakdown of Sectoral and Aggregate GDP and Net Fixed Capital Stock at Constant 1993-94 Prices

Sector	Agriculture, Forestry, Fishries & Logging		Industry		Manufacturing		Services		Aggregate	
	GDP	NFCS	GDP	NFCS	GDP	NFCS	GDP	NFCS	GDP	NFCS
3-Year Average Centred on 1961-62										
Public Setor (%)	1.78	-	20.92	-	9.85	-	17.46	-	10.25	-
Private Sector (5)	98.22	-	79.08	-	9.15	-	82.54	-	89.75	-
Aggregate Economy (%	100	-	100	-	100	-	100	-	100	-
Value (Rs.Crore)	108590.33	-	49204.33	-	24335.33	-	54538.33	-	212333	-
3-Year Average Centred on 1982-83										
Public Setor (%)	3.51	41.09	36.65	58.17	15.78	25.80	33.55	30.46	22.86	42.34
Private Sector (5)	96.49	58.91	63.35	41.83	84.22	74.20	66.45	69.54	77.14	57.66
Aggregate Economy	100	100	100	100	100	100	100	100	100	100
Value (Rs.Crore)	172266	236754.67	135317.67	417221.67	64682	194007.33	137380.67	530823	444964.33	1184798.3
3-Year Average Centred on 1993-94										
Public Setor (%)	2.83	46.98	38.37	57.89	19.44	23.35	34.53	36.26	26.00	47.43
Private Sector (5)	97.17	53.02	61.63	42.11	80.56	74.65	65.47	63.74	74.00	52.57
Aggregate Economy	100	100	100	100	100	100	100	100	100	100
Value (Rs.Crore)	242814.33	296672	259716.33	809113.67	126697.67	363978.33	282469.33	746576	785000	1852361.7
3-Year Average Centred on 1999-00										
Public Setor (%)	2.51	47.44	35.43	43.18	15.40	13.90	33.25	35.41	26.30	40.80
Private Sector (5)	97.49	53.31	64.57	56.82	84.60	86.10	66.75	64.59	73.70	59.20
Aggregate Economy	100	100	100	100	100	100	100	100	100	100
Value (Rs.Crore)	286581	327580	396631.33	737106.33	194231.33	737106.33	460023.67	972575.67	1143236	2619842

Source: Various issues of National Accounts Statistics, Central Statistical Organisation, Government of India, New Delhi

Table 7: Public-Private Breakdown of Sectoral and Aggregate Capital Formation at 1993-94 Prices

Sector	Agriculture, Forestry, Fishing & Logging		Industry		Manufacturing		Services		Aggregate	
	GFCF	GCF	GFCF	GCF	GFCF	GCF	GFCF	GCF	GFCF	GCF
3-Year Average Centred on 1961-62										
Public Sector (%)	-	47.85	-	45.46	-	25.05	-	40.61	-	44.24
Private Sector (%)	-	52.15	-	54.54	-	74.95	-	59.39	-	55.76
Aggregate Economy (%)	-	100	-	100	-	100	-	100	-	100
Value (Rs. Crore)	-	5332.67	-	22612	-	10997.33	-	13106.33	-	41051
3-Year Average Centred on 1982-83										
Public Sector (%)	57.36	49.43	47.80	45.72	21.64	21.29	44.26	43.64	47.33	45.64
Private Sector (%)	48.64	50.57	52.20	54.28	78.36	78.71	55.74	56.36	52.67	54.36
Aggregate Economy (%)	100	100	100	100	100	100	100	100	100	100
Value (Rs. Crore)	13699.67	14444.33	63966.67	70970.67	33247.33	38628.33	27834.67	29885.33	105501	115300.33
3-Year Average Centred on 1993-94										
Public Sector (%)	32.25	30.81	41.05	39.17	11.63	10.05	33.65	35.63	38.23	37.46
Private Sector (%)	67.75	69.20	58.95	60.83	88.37	89.95	66.35	64.37	61.77	62.54
Aggregate Economy (%)	100	100	100	100	100	100	100	100	100	100
Value (Rs. Crore)	15457	16077.67	119042	123005	61951.67	65944	52995.33	56288.67	187494.33	195371.33
3-Year Average Centred on 1999-2000										
Public Sector (%)	26.09	24.14	30.25	30.17	8.06	8.96	34.37	37.05	31.10	31.65
Private Sector (%)	73.91	75.86	69.75	69.63	91.94	91.04	65.63	62.95	68.90	68.35
Aggregate Economy (%)	100	100	100	100	100	100	100	100	100	100
Value (Rs. Crore)	17733.33	19101	158454	166441	94399.33	102766.33	68801.67	72167	244989	257709

Source: Various Issues of *National Account Statistics*, Central statistical Organisation, Government of India, New Delhi.

Table 8: Sectoral Composition of Public Sector GDP and NFCS (at 1993-94 Prices) Over Time

Sector	3-Year Average Period Centred on 1961-62		3-Year Average Period Centred on 1982-83		3-Year Average Period Centred on 1993-94		3-Year Average Period Centred on 1999-2000	
	GDP	**NFCS**	**GDP**	**NFCS**	**GDP**	**NFCS**	**GDP**	**NFCS**
Agriculture, Forestry, Fisheries and Logging	8.90	-	5.94	19.39	3.38	15.86	2.39	14.46
Industry	47.32	-	48.75	48.38	48.83	53.32	46.74	53.31
(Manufacturing)	(11.02)	-	(10.03)	(9.98)	(12.07)	(10.50)	(9.95)	(9.59)
Services	43.78	-	45.31	32.33	47.80	30.81	50.87	32.22
Total (%)	100	-	100	100	100	100	100	100
(Total Value in Rs.crore)	**(21757)**	-	**(101728.67)**	**(501674.67)**	**(20407.670**	**(878506)**	**(300649)**	**(1068768.3)**

NFCS refers to net fixed capital stock. Sources are as given in the previous tables.

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Table 9: Sectoral Composition of Private Sector GDP and NFCS (at 1993-94 Prices) Over Time

Sector	3-Year Average Period Centred on 1961-62		3-Year Average Period Centred on 1982-83		3-Year Average Period Centred on 1993-94		3-Year Average Period Centred on 1999-2000	
	GDP	**NFCS**	**GDP**	**NFCS**	**GDP**	**NFCS**	**GDP**	**NFCS**
Agriculture, Forestry, Fisheries and Logging	*55.96*	-	*48.43*	*20.42*	*40.61*	*16.15*	*33.16*	*11.15*
Industry	20.42	-	24.98	25.55	27.55	34.98	30.40	48.35
(Manufacturing)	(11.51)	-	(15.87)	(21.07)	(17.57)	(27.90)	(19.50)	(40.92)
Services	23.62	-	26.60	54.04	31.83	48.86	36.44	40.50
Total (%)	100	-	100	100	100	100	100	100
(Total Value in Rs.crore)	**(190576)**	-	**(343235.66)**	**(683123.67)**	**(580928.33)**	**(973855.67)**	**(842587)**	**(1551073.7)**

NFCS refers to net fixed capital stock. Private sector figures are the residual values after public sector figures are deducted from the aggregate economy values. Sources are as given in the previous table

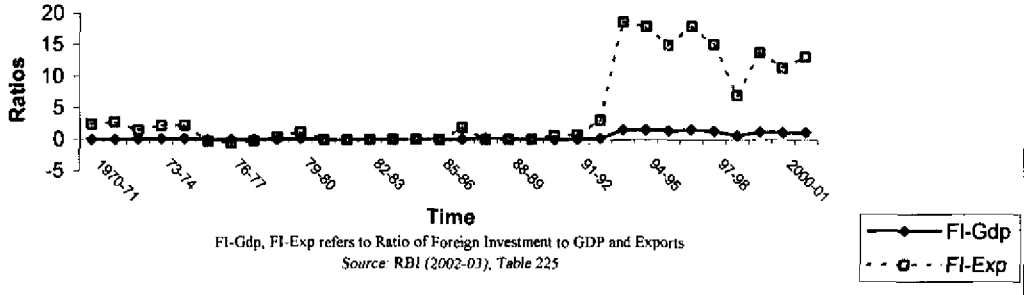
Symmetrical inter-sectoral distribution of **private sector** GDP and NFCS appears in Table 9. The pattern of private sector GDP by industry of origin over time is on expected lines – a declining share of the A-sector with lower than average productivity per worker, compensated by rising shares of the S- and I-sectors, including the latter's manufacturing sub-component with higher than average per worker productivity.

While the share of private sector GDP in manufacturing rose only marginally between 1993-94 and 1999-2000, its share of private NFCS by sector of destination went up more sharply in manufacturing – a reflection of both rising profitability and additional space being provided by the shift in the development strategy.

How did these shifts relate to the movements in total factor productivity and its components in the 1990s? As mentioned earlier, systemic reforms took place in the industrial, trade, financial and private (domestic and foreign) investment policies.

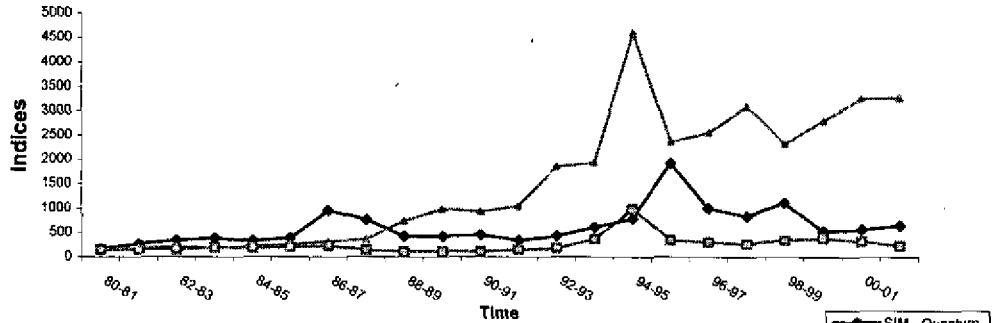
Access to foreign technology, as well as to capital goods embodying foreign technology, became much more liberal in the 1990s with the rise in private foreign direct investment (Chart 8). The quantum index of selected industrial machinery items, though fluctuating, shows a quantum jump in the first half of the 1990s compared to the 19980s (Chart 9). More importantly, quantitative restrictions on most capital and intermediate goods had been abolished in 1991. The tariff rates came down across the board in the 1990s for all commodities along with a reduction in dispersion (Chart 10) but much more so for capital goods (Chart 11) and intermediate goods [Mathur and Sachdeva (2005)]. In other words, along with favourable changes in the incentive structure, the cost of imported capital and intermediate goods came down drastically with their easy availability.

Chart 8
Foreign Investment Ratios



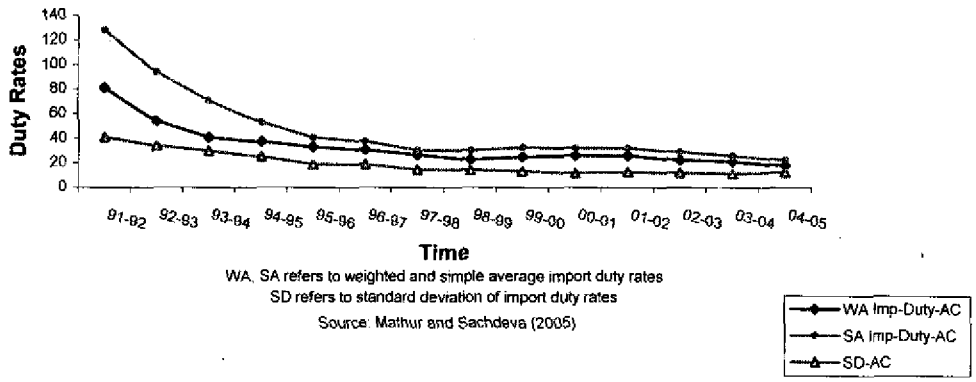
FI-Gdp, FI-Exp refers to Ratio of Foreign Investment to GDP and Exports
Source: RBI (2002-03), Table 225

Chart 9
Quantum Indices of Industrial Machinery



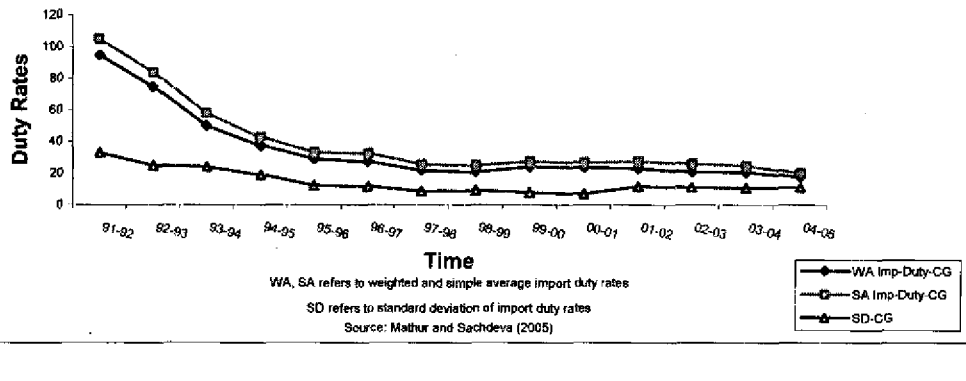
EM = Electical Machinery, GIM = General Industrial Machinery,
SIM = Specialised Machinery for Particular Industries
Source: RBI (200-03), Tale 134.

Chart 10
Import Duty Rates: All Commodities

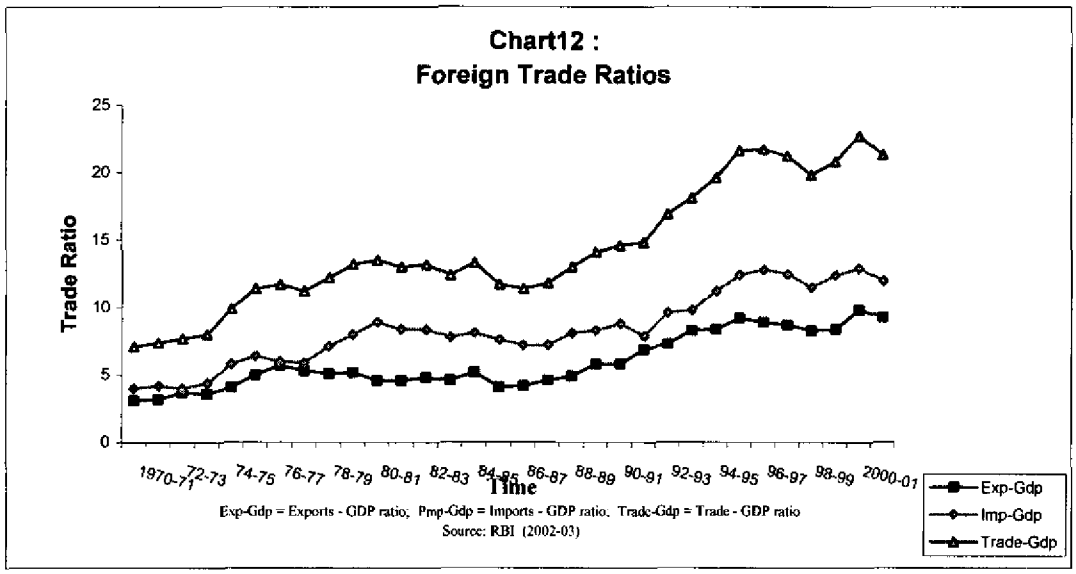


WA, SA refers to weighted and simple average import duty rates
SD refers to standard deviation of import duty rates
Source: Mathur and Sachdeva (2005)

Chart 11
Import Duty Rates: Capital Goods



WA, SA refers to weighted and simple average import duty rates
SD refers to standard deviation of import duty rates
Source: Mathur and Sachdeva (2005)



Stringent restrictions on technology imports in a regime of persistent foreign exchange shortages had created a backlog in technology till the late 1980s. In this situation, intensified competition with a reduction in barriers to entry provided a favourable environment for technical change so that technical change showed a remarkable step-up to an exponential trend growth rate of 5.71 percent (Table 1) during 1991-2000. However, the aggregate GDP growth rate, after showing a remarkable rebound from a sharp fiscal contraction in 1991, slowed down in the second half of the 1990s. Alternative explanations of the slowdown in the rate of economic growth since 1997-98 are available.

Balakrishnan (2005) attributes it to the tight monetary policy since 1995 leading to a substantial rise in real lending rates in comparison with the earlier period, as also in absolute terms in international comparison. The rising real lending rates acted as brakes on the incentive to invest. A problem with this *prima facie* plausible explanation is that the rate of gross domestic capital formation at constant prices went up by one percentage point in relation to GDP between 1992-93 to 1996-97 and 1997-98 to 2002-03 (Table 2, col.5).

Another possible explanation can be traced to a two percentage point rise (in relation to GDP) in the average gross fiscal deficits of the Centre and States and to a little over one percentage point rise in average revenue deficits (Table 2, cols. 11&12) and the associated decline in the rate of private corporate savings (not reported in the Table) implying some crowding out. However, the relationship between aggregate deficits and growth is admittedly more complex, as this explanation sits uncomfortably with the associated rise in the rate of gross domestic capital formation at constant prices, noted above. Fortunately for our present purpose of explaining the negative growth in efficiency improvement, the slowdown in growth rate is more material to our scheme of explanation than the underlying factors.

We combine this stylised fact with the limited degree of India's integration with the global economy. This may sound, *prima facie*, paradoxical as the Indian economy had opened up significantly since 1991 compared to the pre-1991 situation (Chart 12) in terms

of trade ratios as well as in terms of import tariff structure (Charts 10 and 11). However, even the reduced average level of import tariff rates was higher than those of India's competitors, and the export to GDP ratio still remained less than 10 percent. The implication is that the profitability of selling in the domestic market remained higher than that in the international market, albeit with a considerably reduced gap in comparison with the pre-1991 situation, so that domestic market growth remained critical for efficiency improvements. The slow down in domestic economic growth, by restricting the growth of the domestic market, appears to have acted as a brake on efficiency improvements in realising the full potential of the embodied technology imported in the first half of the 1990s.

Consequently, the rate of growth of efficiency change was a *negative* 5.83 percent. It is, therefore, only to be expected that these offsetting movements in technical change and efficiency change neutralised each other, resulting in a stagnation of total factor productivity growth during 1991-2000 (Table 1).

II.3. Overall Assessment of Determinants of the Indian Growth and Productive Performance

II.3.1 A Recap

Our task in this paper has been to explain the 'deep' determinants underlying the transition of the Indian economy from low-income, slow-growing during 1950-80 to one of the ten fastest growing developing economies during 1980-2000 and the associated movements in total factor productivity growth along with its two components of growth in technical change and that in efficiency improvements. Following North, we have argued that the most plausible key 'deep' determinant in the Indian context has been the change in the incentive structure embedded in the changing institutional matrix during the two phases. Even though the mainsprings of economic growth had been functioning well throughout the period, the incentive structure changed gradually from being inimical to growth-promoting activities to one that stimulated productive investment.

The change in incentive structure resulted from a gradual but radical shift in the strategy of economic development and management since the mid-1970s. This shift involved three potentially growth-promoting elements: (a) greater integration with the global economy; (b) a policy regime that was friendly toward the freer operation of domestic and external markets and enterprises; and (c) a gradual (partly forced) reduction of public sector units in the production of private goods and services. All three elements contributed to faster economic growth through the intensification of competition, a reduction in distortions in resource allocation, and unshackling and stimulating the dynamic impulses of productive entrepreneurship.

At the core of changing the incentive structure has been the liberalisation of private domestic and foreign investment, reinforced by the three growth-promoting elements mentioned above. The main thrust of our explanation has thus been the changing institutions and the associated embedded incentive structure as the critical 'deep' determinant or driving force of the Indian growth and productivity performance. In this process, the activist Indian state played an unintentionally counterproductive role during 1950-80 while a politically lightweight minority of reformers manoeuvred a proactive

role during 1980-2000.[21] The other "deep" determinants noted in the terms of reference are, in our view, necessary but not sufficient. They provide a passive environment but not the driving force.

II.3.2 Technology

Technology and technological absorptive capacities and capabilities are widely regarded as providing a potential for productivity improvements. However, in the absence of an incentive structure stimulating this potential, they are likely to remain under-utilised.

Research and development (R&D) expenditures in India provide an interesting case in this context. Systematic data on industrial R&D expenditures are not easily available. The available data from the department of Science and Technology (S&T) on R&D expenditure is sketchy. At the aggregate level, R&D expenditure as a percentage of GDP at factor cost rose from 0.58 percent in 1980-81 to 0.79 percent in 1990-91. The average of the annual R&D expenditure as a percentage of GDP for the nine-year period from 1990-91 to 1998-99 was of the order of 0.76 percent. Only about a fourth of this was devoted to R&D in public and private sector industry together, the remaining 75 percent being spent on the government account, presumably for defence.

Confining ourselves to R&D expenditure by private and public sector industry (thus excluding that on the non-industry government account), we find that available information for certain years between 1980-81 and 1993-94 indicates that the public sector accounted for about one-fourth and the private industry for about three-fourths. It is interesting to note that, despite acceleration in industrial output in the 1980s in relation to aggregate national R&D expenditure, that by the private sector *declined* in the same period from 15.9 percent in 1980-81 to 13.8 percent in 1990-91. After the systemic reforms of 1991, however, this ratio showed a continuous rise to 26.2 percent in 1996-97 before declining to 21.6 percent in 1998-99, mostly on the private account. In the face of the intensification of competition consequent upon domestic and external liberalisation and the reduction of distortions, we observe a phenomenal step-up in the (point-to-point compound) growth rate of R&D expenditure by private industry at constant prices from 6.7 percent during 1981-82 and 1991-92 to 13.9 percent during 1991-92 and 1998-99.[22] The significant change in the incentive structure for private investment in the 1990s is thus obvious.

How did expenditure on R&D square up with the technically trained manpower availability? The total stock of scientists and engineers (the degree holders), and technicians (presumably diploma holders), or SET in short, per 1000 of the population rose from 2.6 in 1980 to 3.8 in 1990 and almost doubled to 7.3 in 1999. However, the number of SET engaged in R&D per 1000 of the population rose by only 60 percent from 0.10 in 1980 to 0.16 in 1996. In fact, SET engaged in R&D as a percentage of the total stock of SET showed a *rise* from 3.8 percent in 1980 to 5.9 percent in 1990 but *declined* to 1.4 percent by 1999. This is broadly indicative of supply outpacing demand for such personnel.[23] In the same context, the Mid-Term Appraisal of the Tenth Five Year Plan

[21] Argued out in detail in Tendulkar and Bhavani (2005).

[22] The figures in this and the next paragraph are derived from Tables 3.3.13 and 3.3.14 (p.179) of the *Manpower Profile, India Year Book 2002*, Indian Institute of Applied Manpower Research, New Delhi.

[23] A reported estimate puts India's total number of engineering graduates at around 3,50,000, forming a third of engineering graduates in the world. The report states that out of the total at least around 60,000 are of high

observes: "India's large pool of engineers has made the country an attractive FDI destination.

However, there has been a continuous decline in educational standards, and only about 50,000 engineers out of the annual turnover 400,000 are reported to be of internationally acceptable standards. It is necessary to take firm steps to stem the decline."[24]

II.3.3 Labour Force and Human Capital

The Indian educational system has been known for its lopsided development in the sense of significant public investment in subsidised higher technical and scientific education since the 1960s with the founding of elite Indian Institutes of Technology but gross neglect of primary and secondary education since the country became independent in 1947. This is reflected in the educational and occupational composition of the total workforce.

According to the latest available information for the years 1999-2000, of the estimated nearly 400 million strong workforce, 44 percent (175 million) were illiterate while another 23 percent (90 million) were literate but had less than four years of primary schooling. These two categories constituted two-thirds of the work force. Those with graduate or higher degrees were 6 percent of the total work force but nearly 24 million in absolute terms, and remained productively under-utilised till the 1990s. Occupationally, 59 percent of the workers were in agriculture and related primary occupations, and another 20 percent were engaged in production-related work. Nearly 10 percent (39 million) were white-collar skilled workers in professional, technical, administrative, executive, managerial and clerical jobs requiring higher education and prior training. The remaining 11 percent were semi-skilled sales and service workers.

The extent of under-utilisation of the technically trained manpower during the slow-growth phase (1960-80) can be seen from the fact that the population census of 1981 estimated their total number to be nearly one million of which two-thirds were scientists and one-third were engineering degree holders. Their work activity status reveals that 25.5 percent were engaged in (university-level) teaching and research with little interaction with business and industry, and another 26.5 percent were involved in sales, marketing and administration! Hardly 9 percent were in design and development, and about 16 percent in production, operation and maintenance.[25] The stock of engineering degree holders increased from 325,000 in 1981 to 520,000 in 1991 and exceeded one million by 2002. Available information[26] from about 19 distinct disciplines within engineering suggests considerable diversification in the engineering manpower. While all the branches of engineering indicated expansion, the proportionate share of the earlier mainstream branches (civil, mechanical, electrical and chemical) declined by 15

quality. This compares with 45,000 engineering graduates per year in the United States quoted by Mr. Duanne Tiede of the Society of Automotive Engineers, U.S.A. "Annual Focus" by S.Vishwanathan, *Industrial Economist* (Industry magazine from Tamil Nadu), combined issue of 15-29 January and 30th January – 14 February, 2005, pp.15- 18.

[24] Para 12.45, p. 393 in Government of India, Planning Commission (2005): *Mid-Term Appraisal of the 10th Five Year Plan* (2002-2007), New Delhi (June).

[25] Tables 3.3.6 and 3.3.7, p. 175 in *Manpower Profile, India Year Book 2002*, Indian Institute of Applied Manpower Research, New Delhi.

[26] Table 5.3.5 in *Manpower Profile, India Year Book 2002*, Indian Institute of Applied Manpower Research, New Delhi.

percentage points during 1991-2002, from 73.8 percent to 59.1 percent. While the total stock of engineering degree holders grew at 6.86 percent per annum, double-digit average compound growth was reported for automobile engineering (10.82 percent), electronics and telecommunications (13.22 percent), production engineering (14.86 percent), and instrumentation (18.88 percent). The share of branches not included in the 19 rose from 6.77 percent in 1991 to 15.14 percent in 2002. It may be mentioned that many of those working in mainstream branches have also, with additional training, moved to information technology, which is estimated to have absorbed 841,500 professionals[27] in 2003-04.

Significant wage differentials between the U.S.A and the European Union on the one hand and India on the other have been generating expanding demand for IT professionals as well as computer aided design and manufacturing personnel in India. Opening up the economy has also intensified the competition that has been creating demand for high-skilled, relatively low-wage, technically trained manpower in various branches of engineering and applied sciences in Indian and foreign firms, thereby leading to the absorption of earlier under-utilised engineers and scientists.

Pro-active policies toward the IT industry[28] (including tax concessions and Software Technology Parks providing world-class infrastructure) in the 1990s have been reinforced by a significant expansion in telecommunication facilities in response to telecom reforms. Consequently, while India's share in world merchandise exports remained a tiny 0.7 percent in 2003, its share of commercial services was double that, at 1.4 percent, thanks mainly to the wage-differential and the availability of technically trained manpower.[29] However, as indicated earlier, two-thirds of the Indian work force is illiterate or less educated with low skills and mainly engaged in agriculture and related primary activities with lower than average productivity. While the skill and education levels of the Indian work force need to be upgraded over time, this is a process that involves long gestation lags. The immediate problem is one of providing productive employment for the current work force at rising levels of productivity. This requires sectoral diversification of workers into non-agricultural activities, especially in labour intensive manufacturing, and that too for the external markets because the domestic market is limited by a low level of per capita income.

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[27] Srinivasan (2005) quoting NASSCOM as source.

[28] The development of the IT industry and its connection to policy and fortuitous factors in India is discussed in Srinivasan (2005). He traces it back to the Prime Minister, Rajiv Gandhi, whose government announced the Computer Policy in November 1984. It recognised software as an "industry" entitled to the investment and other incentives available to domestic industries and a lowering of import tariffs (from 100 to 60%) on software and personal computers. The Computer Software Development and Training Policy, announced in 1986, liberalised access to the latest technologies and software tools. Among the fortuitous factors, he mentions its less capital-intensive nature and the small to medium size of IT enterprises that did not invite an interventionist scanner, the disproportionate investment in higher technical education, and the simultaneous deregulation of telecommunication infrastructure.

[29] A dramatic increase of 3.3 percentage points of GDP in a single year is reported in India's service exports from 4.1 percent in 2003-04 to 7.4 percent in 2004-05, and more than a doubling of the U.S. dollar value of service exports from $24.9 billion to 51.3 billion. Impressive merchandise export growth of 47.4 percent from $89.7 billion to $132.2 billion over the same period pales into insignificance. The bulk of the service exports reportedly appeared in the "miscellaneous services" category. Drawing on indirect evidence, the report attributes this to exports of value added services in communication, construction, financial services, news agency, royalty, copy right, licence fees and management. *The Times of India*, New Delhi, July 27, 2005, page 16. Another news item in the same newspaper also gives examples of MNC pharmaceutical firms and airlines outsourcing services to India in order to leverage risk and cut costs. *The Times of India*, New Delhi, July 28, 2005, page 16.

II.3.4 Physical Infrastructure

It is well recognised that physical infrastructure is indirectly productive in the sense that it facilitates directly-productive economic activity in the economy through the positive externalities associated with it. It is obvious, however, that, in the absence of direct positive incentives in terms of higher profitability, the positive externalities would remain unrealised. Conversely, inadequacies in the physical infrastructure would have a constraining impact on the realisation of the full potential of growth-promoting incentives structure.

During the slow-growth phase (1960-80), the demands on physical infrastructure remained limited and its services were mostly subsidised. During the 1980s, when the growth rate picked up, thanks to the wide-ranging domestic investment liberalisation, the economy still remained mostly closed and the markets non-competitive so that the higher cost of infrastructure services could be passed on to the buyers and consumers as the fiscal deficits widened. With the progressive opening up of the economy in the 1990s, inadequacies in the physical infrastructure started stifling the potential benefits of wide-ranging investment and trade liberalisation.

II.3.4.1. Shortages, Uncertain Supply and High Cost of Power

Persistent power shortages and unpredictable supply quality are the most serious infrastructure constraints on production. Years of inadequate addition to capacity, inefficient generation, and unsatisfactory or poor maintenance of transmission networks have led to high transmission and distribution losses, frequent interruptions in supply, and common voltage and frequency fluctuations.[30] The pricing, staffing, and operational decisions of state electricity boards (SEBs) were made more from political than economic considerations. A long-time neglect of economic criteria led to persistent losses and a poor allocation of resources. And the parlous fiscal position of state governments precluded their ability to finance additional investment to expand the power sector.

The pricing policy of SEBs continues to distort usage because the prices charged to industry for a low-quality power supply are kept high to subsidise power used by farmers and non-farm households. The high cost of power erodes any cost advantages Indian firms may have relative to their foreign competitors. Power subsidies also encourage wasteful use by farmers and households.

There have been several attempts to reform the energy sector in the past, short of the politically difficult but basic problem of reforming the SEBs. The first was the steady expansion of the generating capacity owned and operated by the corporatised, central-government-owned National Thermal Power Corporation (NTPC) and National Hydroelectric Power Corporation (NHPC). These two public sector undertakings, which controlled 25 percent of the country's generating capacity in the late 1990s, have been relatively better managed and freer from political pressures than the SEBs that control 70 percent of the capacity, or the private industrial enterprises that control the captive plants producing the remaining 5 percent. The 73.6 percent plant load factor in the newer thermal plants operated by the central public sector undertakings in 1999 was higher than that of privately operated plants, and as much as 10 percent higher than that of plants

[30] Power supply interruptions became so frequent and of such long duration over time that households, offices, and shops began investing in small power generators.

operated by SEBs.[31] However, because SEBs were the sole distributors of electricity, NTPC and NHPC, as generators, had to sell what they generated to SEBs, which predictably ran into arrears in their payments to generators! Besides increasing supply from non-SEB generators, this also reduced the pressure on SEBs to reform.

The second solution attempted was to permit captive power generation, especially in highly power-intensive, continuous-process metalliferous industries. Captive power plants, however, were inefficiently small in scale and used more expensive fuels (e.g., fuel oil) than the cheaper coal used by SEB plants. The use of higher-cost power reduced the competitiveness (at the going exchange rate) of Indian producers relative to those of their competitors abroad, including China, which did not face this problem. The third reform effort was to encourage the use of such unconventional energy sources as solar and wind power.

Since the mid-1990s, the central government and multilateral and bilateral lending agencies have entered into several memorandums of agreement with state governments to restructure the SEBs. The central Electricity Regulatory Commission has been developing guidelines for tariff fixation and a grid code. Eighteen states have established state electricity regulatory commissions and have amended the Electricity Act of 1948, effectively transferring tariff fixation powers to state electricity regulatory commissions. Six states have unbundled power generation, transmission and distribution, and moved toward corporatisation.

The basic sources of bankruptcy of SEBs have been the politically determined (and economically unviable) pricing of electricity, cross-subsidisation of one class of users by others, and transmission and distribution losses (including the outright theft of electricity). These sources are being addressed belatedly by the evolving regulatory framework and through the privatisation of distribution. As the World Bank (2000a: ch. 5) correctly noted, regulation is an imperfect alternative to competition wherever competition can be introduced. The first step in the privatisation of the distribution of electricity became effective on July 1, 2002, in Delhi, where theft accounts for the bulk of the incredible 50 percent transmission and distribution losses. The central government is also bringing out a power tariff policy document to lay down guidelines for setting tariffs by power sector regulators.[32]

II.3.4.2 Telecommunications: A Partial Success

The telecom sector has been better run than power generation. The pricing of telecom services, being entirely under the purview of the central government, was less subject to political pulls and pressures. Low-volume local users were charged tariffs below costs, but the Department of Telecommunications exploited its monopoly position by overcharging for long-distance traffic to ensure internal resource generation. Thus there has been a substantial surplus for reinvestment and expansion.

Hesitant steps toward privatisation were taken in the 1980s. The first manufacture of subscriber terminal equipment by private producers was allowed in 1984. Metropolitan and international telecom services were corporatised in 1986. A Telecom Commission was created in 1989. Further liberalisation on a somewhat larger scale has been attempted

[31] Ministry of Finance, Government of India, *Economic Survey 2001-02*, Table 9.3.
[32] MSN Business Web site http://www.msn.co.in/business/economy (June 2002).

since July 1991. Telecom equipment manufacturing was opened to the private sector, including multinational corporations, in 1991. Value added services, such as fax and cellular mobile telephones, were opened for private competition in 1992, and permission was given for private networks in industrial areas a year later. The first National Telecommunication Policy, announced in May 1994, ended the public-sector monopoly and permitted private-sector entry into basic services (with foreign equity allowed up to 49 percent). Finally, the Telecom Regulatory Authority of India (TRAI) was formed in January 1997 and reorganised in 1999 after the announcement of the second Telecommunication Policy.

However, state intervention continues to constrain modernisation of the telecom infrastructure. The best decision in the reform process was to create TRAI, an independent regulatory authority. The question of where the jurisdiction of TRAI as a regulator begins and that of the Ministry of Telecommunications as a policy maker ends, has not been fully resolved. The government continues to control the number and location of new companies. Its regulation of entry and its power to grant an operating licence appear to be a means of generating and transferring windfall monopoly rents to the Ministry of Telecommunications.

Consequently, TRAI's early days were marked by conflict with the Department of Telecommunication when its jurisdiction included the department's service-providing units. But the two agencies have been reorganised to avoid further infighting. TRAI's tariff regulatory function has been separated from its adjudicative powers. The latter have been vested in a separate quasi-judicial authority. The department was also reorganised, with policy formulation assigned to a Telecom Commission, and responsibility for service provision given to the Department of Telecom Services and the Department of Telecom Operations, which were later corporatised in October 2000, into Bharat Sanchar Nigam Limited. The Department of Telecom has now taken over some functions of policy formulation, licensing, wireless, spectrum management and research and development.

Entry restrictions into cellular and basic service operations have also been relaxed slightly to permit additional basic service operators along with the existing duopoly structure and a fourth cellular operator. Fixed-service providers can also provide wireless services within their local loop. Unrestricted entry has been allowed in domestic long-distance service, and the termination date for the monopoly for international long-distance services has been moved to March 2002 from March 2004.[33] Rebalancing of tariffs and competition has dramatically reduced the rates for long-distance and international calls. However, the TRAI's reputation as an independent regulator is still being established and the boundaries of its regulatory power are still being defined.

Although the steps taken by the government are indeed rapid in comparison to the past, they are not adequate for India to catch up with its neighbours. Ten years ago, China and India had equivalent information technology infrastructures. China's information technology penetration since then has far outpaced that of India. China's "teledensity" in 2000 was 112 telephone main lines per 1,000 people, compared with 4.5 per 1,000 in

[33] The state-owned monopoly, Videsh Sanchar Nigam Limited, has since been privatised, and several private- and public-sector firms have entered the area of international station dialling services. Competition is also getting more intense, and agreements have been signed by private operations (Ministry of Finance, Government of India, *Economic Survey, 2001-02*, p.179.

India. Mobile phone density also showed similar disparities: 6.6 per 1,000 in China compared with 4 per 1,000 in India.[34]

II. 3.4.3 Railways

Railways and roads have been the two major means of transporting exportable goods to seaports or airports across India's continental expanse. Neither is currently able to ensure the timely delivery of exportables, creating a critical competitive disadvantage in international markets. The inadequate and poorly maintained transportation infrastructure is particularly worrisome for countries of continental size such as India, which could export perishable agricultural and horticultural products.

In track length, Indian Railways compare favourably with rapidly growing Asian countries, with 12.4 kilometers of track for 1,000 square kilometers of land area and 42 kilometers of track per million people (McKinsey & Company 2001, vol. 1, appendix 5E).

Railways accounted for 89 percent of the freight traffic and 68 percent of the passenger traffic after Independence. Over the years, however, the railways' share has decreased –to 40 percent (freight) and 20 percent (passengers) by 1995 – and road use has increased accordingly. The reasons have been obvious. Railways are state monopolies that depend on budgetary allocations for financing investment. Populism, rather than an economic rationale, continues to drive their staffing and pricing decisions. They employ more labour than needed, are unable to recover operational costs through user charges, and cross-subsidise passenger traffic with freight traffic – the former accounted for 59 percent of total rail traffic but contributed only 30 percent of the revenue in 1999. Consequently, they are unable to invest in track renewal and rolling stock, and deliver a poor-quality, irregular service.

Poor service quality has been particularly harmful for goods traffic because passenger traffic has been accorded priority over goods movement by successive populist ministers of railways. The growth in wagon utilisation (a measure of freight being transported) slowed down in the 1990s, from 4.8 percent annually during 1990 and 1995 to 3.1 percent annually during the subsequent four years until 1999. The ratio of average earnings per ton-kilometer from freight to average earnings per passenger-kilometer, a measure of the extent of cross-subsidisation, hovered around two during the 20 years from 1950 to 1970. It deteriorated to 2.6 in 1980 and reached 3.3 in 1999. Given the rising costs of moving goods by rail combined with uncertain and irregular scheduling, it is no wonder that even long-haul goods traffic, which would be most efficiently handled by rail, is being moved more and more by road.

II.3.4.4 Roads and Highways

As with rail track, the length of Indian roads compares very well with the rapidly growing countries of Asia, with 280 kilometres of paved roads per 1,000 square kilometres of land area and 950 kilometers per million population (McKinsey & Company 2001). Poor maintenance and overuse, resulting from increasing demand and inadequate traffic-carrying capacity in terms of road width and lanes, have been the key problems. The World Bank (2000a) cites a study for India that estimates the cost to the country from

[34] World Bank, *World Development Indicators 2002*, tables 5.9 and 5.10. Indian "teledensity" as of December 31, 2001, was reported to be 39.5 per 1,000 people (GOI-MOF 2002a, p.5).

inadequate road expenditure and maintenance as of the order of Rs30 billion per year in 1988 (about $2.2 billion at the 1988 exchange rate) in excessive wear and tear of vehicles, accidents, fuel costs, and so on. The situation is likely to have worsened with the increasing volume of traffic stemming from faster GDP growth in the 1990s.

A massive highway-building programme is clearly warranted in the face of increasing demand and long neglect in the past. The demands on road transport have been rising progressively due to a relative cost advantage as well as the convenience of control over the timing and delivery schedule. Nevertheless, investment in and the maintenance and improvement of India's road network, the third largest in the world, has long been neglected.

The central government appears to have recognised the urgency of this task. The National Highway Authority of India, with initial capital contributed by the central government, has been in charge of improving interstate infrastructure since February 1995. Its mandate has been expanded to include implementing the National Highways Development project that will augment the carrying capacity of the national highways. The high-traffic-density Golden Quadrilateral, connecting the four major cities of Chennai (Madras), Delhi, Kolkata (Calcutta), and Mumbai (Bombay), for example, has been widened from four to six lanes under this programme. The government has also established a dedicated Central Road Fund for the development of all roads (from national highways to state highways to rural roads), which has been financed with a duty of R1per liter on petrol since June 1998 and on high-speed diesel since March 1999.

II.3.4.5 Ports

India's 11 major ports are controlled in effect by the central government and handle 90 percent of the country's port throughput. The cargo shipping facilities at these and the 139 minor ports operating under the control of the state governments were neglected under the restrictive import and export policy of the past.

Even with improvements in the indicators of port productivity since the mid-1980s, Indian ports are hopelessly inefficient in comparison with other Asian ports like Colombo and Singapore. The average output per ship-berth-day slowly crept up by 2.7 percent annually, from 3,942 tons in 1991 to 4,497 tons in 1996, and rose by 5.9 percent annually to 5,338 tons in 1999. Average pre-berthing waiting time, after hovering around 1.7 days in the first half of the 1990s, came down to 0.9 days in 1998, where it remained a year later. Average turnaround time for ships was as high as 11.9 days in 1984. This came down to 7.5 days in 1996 and further to 4.7 days in 1999 and 4.2 days in 2001-02.[35]

However, this improvement compared very poorly with average turnaround time in other countries' ports (as short as 6 to 8 hours for container ships in Singapore). Indian cargo has come to be predominantly transhipped through the hub ports of the region, such as Colombo and Singapore. The cost of transhipment adversely affects the competitiveness of Indian merchandise exports and provides an additional layer of protection (over and above tariff and non-tariff barriers) for import substitutes.

[35] See GOI-PC 2000.

The unionisation of labour combined with age-old labour-intensive methods and antiquated equipment, has resulted in high labour costs for most major ports.[36] Labour requirements are likely to go down with the introduction of containerisation and automatic cargo handling, but government policy does not allow retrenchments and the termination of services before retirement – unless a person retires voluntarily and accepts a generous compensation.

A policy for private investment in ports was announced in 1997, but the overprotective labour laws and unionised labour practices that would apply to even these privatised entities made the investment less attractive. The finance minister's 2001 budget proposed several amendments in labour legislation to address the problem of low labour productivity and inflexible labour practices. Obviously, this was a small but desirable step in the right direction, but it has yet to be acted upon.

II.3.5 Institutional Constraints

Finally, we turn to constraints imposed by institutional rigidities that came in the way of realising the full potential of decisive change in the incentive structure. Needless to add, this is not necessarily inconsistent with our claim regarding the basic change in the institutional matrix and the resulting change in the incentive structure. Certain institutions that are deeply influenced by path dependence proved too stubborn to change.

The availability of efficient and inexpensive financial and physical infrastructural services facilitates improvements in the international competitiveness of domestic industry and contributes to productivity improvements. However, if enterprises do not have the flexibility to reallocate capital and labour swiftly in response to changing domestic and international market conditions, better financial and physical infrastructure in and of itself can only have a limited effect on competitiveness. Unfortunately, labour and bankruptcy laws continue to constrain the flexibility of enterprises.

II.3.5.1 Labour Market Inflexibilities

Rapid growth requires continuous adjustment to changes in domestic demand, technology and opportunities for international expansion. A regulatory framework that allows for the mobility of labour and capital away from inefficient uses and into efficient uses is absolutely critical. The legacy of activist government's past interventions in labour and capital markets has yet to be undone.

Two pieces of legislation provide the defining characteristics of the pre-1991 policy regime that was designed to protect labour's rights. First, the pre-colonial Trade Union Act of 1925 fragmented the trade union movement by permitting any seven workers to come together and form a trade union eligible for recognition in collective bargaining.[37] There were no restrictions that these "unions" had to represent the majority of workers in a given industry.

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[36] *The Mid-Term Appraisal of the Ninth Five-Year Plan* (vol. 2, para.7.1.183, 813) mentioned that 88 percent of wharf cranes, 66 percent of mobile cranes, and 31 percent of forklift trucks were still being used beyond their economic life. McKinsey & Company (2001) estimates that the currently massively overstretched capacity of Indian ports can be increased almost fivefold by focusing on the right equipment to remove bottlenecks to existing capacity and through better organisation of functions and tasks.

[37] The Trade Union (Amendment) Act of 2001 came into existence in September 2001. This act proposes to bring about reforms in the trade union movement, apart from curbing the multiplicity of trade unions (*Times of India*, New Delhi, September 19, 2001).

The second major law, The Industrial Disputes Act of 1948, closely follows the Defense of India rules formulated by the colonial government during the emergency situation created by World War II. This legislation, which is still on the books, aimed to provide employment security, including a "no retrenchment" guarantee and restricting employers' flexibility regarding production techniques as well as placements, transferability, and the allocation of labour. Production units of more than 100 workers must secure government permission for closure. Elaborate compulsory arbitration and adjudication procedures laid down in the Act discourage voluntary settlements through bilateral collective bargaining.

Along with this law, comprehensive labour legislation has been enacted to ensure minimum labour standards with regard to wages, other benefits, safety standards, and conditions of employment. Judicial interpretations have further expanded the scope of labour legislation and labour security regulations.

The net result of legislative provisions and judicial interpretations has been to increase hiring costs, require companies to carry surplus labour power, and prevent them from adjusting the work force in response to demand fluctuations. Labour in the organised segment of the economy has thus been legislatively transformed into a fixed factor of production at a par with fixed capital.

These state interventions in the labour market have also affected producers' behaviour. The labour code has discouraged new investors from entering into the highly productive organised segment of the manufacturing sector. Resources are wasted as private-sector employers look for legal loopholes that enable them to evade the legal provisions by subcontracting to producers in the unregulated informal sector, by giving workers limited contracts, or by artificially fragmenting their productive capacity. Employers have also bypassed the employment security provisions by using prolonged lockouts, inducing closure by not paying electricity bills, and forcing separations by linking pay to production and then stopping output.

Private employers, who accounted for 30 percent of organised employment, found legal, extra-legal and informal ways of getting around the legislation. The brunt of the overprotective legislation was borne by the public sector employers, with 70 percent of the organised employment – mostly in organised services like banking, insurance, finance, railway transport, wholesale trade in food and fertilisers, and telecommunications. These services being critical to the economy, workers exploited this to their advantage by forming a coalition of fragmented Trade Unions (TUs). This forces a continuing tie-up of already invested resources with non-viable enterprises and preventing the reallocation of these resources to more viable activities, and the generation of more productive and sustainable formal sector employment. An interesting phenomenon has emerged since the systemic liberalisation in 1991. In the face of *formal legislative rigidity* in the organised labour market, the incentive structure generated by liberalisation is reported to be inducing *informalisation* of labour market flexibility.[38] Workers at the plant level looking for employment in a situation of overall job insecurity and job shortages have accepted the imperative need for "hire and fire", which their leaders in the central TUs and political parties steadfastly refuse to accept, as necessary

[38] See Sharma and Sasikumar (1996) for a study of small and medium firms in Ghaziabad during 1991-95 and Deshpande et al. 92004) for a study of labour flexibility practices in 10 states and 9 industries in India during 1991-1998. These studies are cited and discussed in Shyam Sundar (2005), Section II.

for the growth of productive employment, and the consequent need to amend the overprotective legislation. While those familiar with this informalisation (mostly existing employers) are not deterred, those who are not familiar (potential investors) feel daunted by the legislation. Among the latter group are potential private foreign investors in labour-intensive activities that successive central governments have been actively seeking. Coalition politics since the mid-1990s has made this formal institutional reform impossible.

II.3.5.2 Industrial Restructuring and Bankruptcy Laws

Post-1991 liberalisation has resulted in the removal of barriers to entry into many economic activities. However, in the absence of a speedy legal framework for restructuring or exits, the resource reallocation will be slow, resulting in lower growth in industrial output and hence in new and more productive employment. The transfer of resources is complicated in India because, unlike in most countries, the procedures for reorganisation, bankruptcy and liquidation are governed by separate laws.

The Companies Act of 1956 governs bankruptcy and liquidation, and the judicial proceedings take place in the relevant High Court. Industrial revival and reorganisation, however, are covered by the Sick Industrial Companies Act of 1985 (SICA), and the authority in this respect is vested with the quasi-judicial Board for Industrial and Financial Restructuring (BIFR). SICA was originally applicable only to private-sector units but since 1991 public-sector units have also been referred to BIFR under SICA.

The existing two-step procedure is explained in the report of the Prime Minister's Economic Advisory Council (GOI-PM-EAC 2001). A sick company (according to criteria defined in SICA) has to report to BIFR under SICA. BIFR then explores reorganisation and restructuring for revival. If revival is deemed infeasible, closing down the company is recommended, and the issue is referred to the relevant High Court under the Companies Act. The High Court appoints the official liquidator to look into the affairs of the company and to enable the subsequent bankruptcy and liquidation proceedings. This process can often take 20 years or more.

The Economic Advisory Council describes the system as "dilatory and fundamentally flawed" (GOI-PM-EAC 2001, p.18). *The Mid-Term Appraisal of the Ninth Five-Year Plan* (GOI-PC 2000) also notes several drawbacks, including the fact that BIFR takes a "rather long time to come up with an appropriate revival plan." The report goes on to observe that "it has not been possible to close down a single unit in the private or public sector, based on BIFR's recommendations" (para 23, p. 116). Both the Planning Commission and the Advisory Council recommend the repeal of SICA and the winding up of BIFR because it creates an incentive to induce sickness in order to keep the creditors at bay and attract low-interest funds allegedly for revival. The council has also recommended amending the Companies Act to allow for reorganisation and revival where feasible and rapid bankruptcy and liquidation where necessary.

The finance minister proposed repealing SICA in his 2001 budget speech. A bill repealing SICA was introduced in parliament on September 30, 2001, and has been referred to the Standing Committee on Home Affairs for its examination and report (GOI-MoF 2002a, item 58, p.9).

II.3.5.3 Public Sector Reforms

Another institutional reform, which has been proving very difficult in the era of coalitional politics, relates to the public sector. As noted earlier, public-sector-dominated planned industrialisation has been an integral part of the ideology of socialism and self-reliance since the pre-Independence days. It was implemented during the post-Independence 1950-80 period when the public sector was wrongly equated with and elevated to, one of the major socialist goals. Its indiscriminate expansion well beyond the analytically justified categories of public goods and activities involving externalities followed as a logical (but an economically irrational) consequence. This was financed through domestically mobilised household savings without adversely affecting the fiscal balance.

While the widening fiscal deficits of the 1980s forced a slow-down in the expansion of public enterprises, the efficiency drag from the non-commercial functioning of commercial public sector enterprises (PSEs) started to become obvious. Consequently, some hesitant steps were taken to ensure their autonomous operation through the instrumentality of a memorandum of understanding. Under this arrangement, a given PSE was asked to fulfil certain mutually agreed performance targets in lieu of seeking government permissions in those matters. However, with sole government ownership, the political-bureaucratic culture of interference did not permit their autonomous operation.

The IMF-World Bank conditionality of 1991 started the process of shedding minority ownership of PSEs – called disinvestments. However, this was accepted with a great deal of reluctance, and the process was very slow till the late-1990s. The reasons are obvious: the still persistent wide appeal of the ideology of socialism among the intelligentsia as well as the general public, which is being exploited by the beneficiary interest groups of politicians, bureaucrats, and the white-collar PSE employees. The constellation of government ownership, parliamentary accountability and the dirigiste mindset of politicians and bureaucrats generally results in a procedure-oriented and risk-averse behaviour on the part of PSE managers. Even in a few well-managed PSEs, the rate of return on employed capital is low because PSE managers have little freedom to set the prices of their outputs, and investment plans need to be approved by the administrative ministry even if they were to be undertaken with internally generated funds.

Consequently, most of the PSEs have been incurring losses or earning inadequate profits in relation to employed capital. The process of disinvestment received a stimulus for a brief while toward the end of the 1990s when the coalition headed by the Bharatiya Janata Party did not carry the hangover of the socialist ideology.

III. Policies for Productivity and Growth

III.1 A Brief Recap

In this final section, we explore the connection between productivity movements and government policies.

Descriptively, as noted in Section I, Indian total factor productivity growth has been virtually stagnant over the forty year period 1960-2000 except for a brief spell of ten years, 1981-91, when it registered a low but positive exponential growth of 1.8 percent per annum (Table 1). Its two components of efficiency improvement and technical change had also exhibited stagnation till the mid-1960s but experienced mutually offsetting movements thereafter except for the 1981-91 period when positive but low growth in efficiency improvements was combined with stagnation in technical change. We have argued that stagnation in technical change was attributable to strict import controls on technology and on capital goods, leading to a backlog in international frontier technology.

On the other hand, efficiency growth resulted from a *de facto* wide ranging domestic investment liberalisation that was reinforced by healthy growth in the size of the domestic market, in particular agricultural growth, and rising fiscal deficits that made the resulting step-up in growth rate unsustainable. From 1991, positive and healthy growth in technical change was offset by negative growth in efficiency improvements of the same magnitude. We attributed growth in technical change to trade liberalisation, in particular in capital goods and technology, combined with the entry of private foreign direct investment.

Efficiency growth suffered, partly because of the time required to realise the full potential of new technology and partly due to the constraints imposed by inadequacies in physical infrastructure (Section II.3.4), institutional rigidities (Section II.3.5) and a slowdown in growth. Over the forty-year period of 1960-2000, the Indian economy was transformed from a low-income, slow-growing one during 1960-1980 into one of the ten fastest growing developing countries in the world since 1980. At the fundamental level, our explanation has sought to focus on a gradual but decisive change in the incentive structure from being inimical (1960-80) to providing considerably expanded space for the freer operation of the domestic and international markets and private enterprise. This unleashed the creative entrepreneurial impulses and triggered faster growth, which, we have argued, was the basic pre-condition for productivity improvements. The change in the incentive structure resulted from a gradual but radical shift in the mode of management of the economy and hence in development strategy. As noted earlier, the shift involved three potentially growth-promoting elements: (a) reduction/ removal of entry barriers to investment in the domestic market at the upper end of the investment scale; (b) a policy regime that was friendly toward the freer operation of domestic and external markets and private enterprise; and (c) a gradual, partly reluctant and partly forced contraction of public sector units in the commercial domain producing *private* goods and services. All the three elements combined to unshackle and stimulate the dynamic impulses of private entrepreneurship, which had always been present.[39]

[39] The Indian economy, despite being centrally planned during 1950-80, always had the presence of a class of dynamic entrepreneurs because private ownership of the means of production had constitutional sanction and,

The pace of progress in individual elements had indeed been uneven, as our discussion in Section II brought out, the lack of concordance among policies directed at different elements often coming in the way of realising the full potential of certain faster-moving growth-promoting elements. As in any society, the pace has been governed by the political economy of reforms in a long-established democracy in (*i*) a low-income country where short-termist populist pressures on polity remain ever present, (*ii*) a society that is marked by mind-boggling ethnic, religious and Hindu caste-based diversities, and (*iii*) a polity where coalition politics and regionalisation have been the order of the day since the mid-1990s. We have explored these aspects in greater detail elsewhere [Tendulkar and Bhavani (2005)]. Suffice it to say that in this formidable constellation consensus building for taking the long-term view that is necessary for rapid growth is a difficult, though not impossible, process. However, despite these apparently formidable hurdles, a slow process of what we may term 'learning-by-reforming' has been going on, given the politically perceived indispensability of rapid economic growth to sort out the distributional conflicts in a peaceful and orderly fashion. This has been happening in a situation where the number of regional and economic interest groups to be accommodated has been rising in an era of regionalisation of the central parliament and the onset of coalition politics.

We may mention the possible factors that facilitated the process of collective learning-by-reforming. The significant step-up in the GDP growth rate that was associated with the hesitant liberalization of the 1980s strengthened the hands of the reforming minority in the Congress government in 1991. The crisis-gripped atmosphere that helped tide over the pains of sharp fiscal contraction in 1991-92 was reinforced by a remarkable rebound from the sharp stabilisation-induced dip in the growth rate to 1.3 percent in 1991-92.

A good agricultural harvest, an improved world economy and the inherent resilience of the economy helped the corporate investment boom following the liberalization of controls on private (domestic and foreign) investment to trigger the GDP growth rate to 5.1 percent in 1992-93, 5.9 percent in 1993-94 and an unprecedented 7 percent-plus continuously over the next three years, averaging 7.5 percent. This was the fastest recovery in international experience (Acharya 2001). This helped convince the sceptics among the intellectuals and politicians that liberalization and globalisation worked not just elsewhere but *in India* too.

Many sceptics of the hesitant liberalization process of the 1980s were converted to the view that sustained liberalization worked better, belying the early apprehensions about the large-scale unemployment and social unrest that was expected to emerge from structural adjustment. Between 1993-94 and 1999-2000, the GDP growth rate averaged a healthy 6.5 percent annually. Over the same period, the results of the large-scale sample surveys of consumer expenditure indicated a decline in absolute poverty in the 1990s[40] [Sundaram and Tendulkar (2003), Deaton (2003), and Deaton and Dreze (2002)].

consequently, functioning markets existed rather than being supplanted as in the Soviet Union. However, as we argued, incentive structure stifled their creative energies and instead provided scope for rent-seeking and directly unproductive but profit-making activities.

[40] We may note in passing that the results of Sundaram and Tendulkar (2003) and Deaton (2003) were presented in a largely attended seminar organized jointly by the Indian Planning Commission and the World Bank in January 2002.

These experiences might have contributed to developing an intellectual consensus that liberalization and opening up resulted in a rapid growth, which in turn led to a reduction in poverty and muted the pro-rich criticism (that haunted the hesitant liberalization of the 1980s) by the left intellectuals although many were yet to be convinced. The intellectual consensus came in handy for the minority reformers in coalition governments in making the political case for reforms and appears to have gradually percolated into the political consciousness.

However, the decision-making process has been inevitably slow and often tortuous, marked by movements of the two-steps forward, one-step backward, several steps sideways variety. As a result, in our judgment, India is unlikely to be in the league of very fast growing 'tiger' economies of the East and South-East Asia. However, judging by the results, the forward surges have so far overwhelmed the braking elements, and the growth process has been more or less uninterrupted.

In our view, both of the components of total factor productivity growth (TFPG), namely, growth in efficiency improvements and growth in technical change, are driven by opportunities for higher profitability which, in turn, are generated by the expanding size of the domestic as well as the external markets. Consequently, in the policy domain, domestic and foreign investment and trade liberalisation provide a necessary condition for productivity improvements. The two components of TFPG, however, differ with respect to the underlying mechanisms in the policy space. We take efficiency improvements to be guided by distortion-reducing and competition-enhancing macro-management and structural adjustment policies while technical change requires, in addition, an easier access to and a reduction in the price of capital goods relative to the output price. In our scheme of explanation, policies directed at the intensification of competition and at trade and investment liberalisation played a causal role in explaining the growth transformation of the Indian economy while political economy factors along with constraints have mostly been responsible for the poor productivity performance.

III.2 *Policies Directly Bearing on Productivity*

We begin with policies bearing on productivity in a direct manner. They include technology policies with respect to embodied technology in the form of imports of capital goods, imports of disembodied technology, indigenous research and development of technology, and the development of domestic capital goods industries along with the pattern of adoption of reward structure.

During the slow-growth phase, minimal dependence on external trade and self-reliance, interpreted narrowly as self-sufficiency, were the driving force of technology policy. These were reinforced by the maintenance of a deliberately overvalued exchange rate, under the (untested) premise of export pessimism, and a variety of complex import restrictions to contain the resulting excess demand for foreign exchange. The self-fulfilling prophecy resulted in perpetual foreign exchange shortages and import-substitution irrespective of costs, which also applied to indigenous technology development and domestic production of capital goods embodying earlier imported and later indigenous technology.

However, both were driven by scarcities in virtually insulated and non-competitive markets rather than cost competitiveness. India, indeed, developed technological capability and a diversified industrial structure not found in countries at similar levels of per capita income as India at that time. However, it was a high-cost, low-quality variety. Rosenburg (1963) had indicated the consequences in a classic paper: the higher cost of indiscriminately import-substituted capital goods raised the cost of producing goods and services all along the line and acted as a constraint on the rate of economic growth in an autarkic economy. The associated incentive structure was also symptomatic of this. The Indian government gave awards for successful import-substitution on the criterion of foreign exchange saved rather than domestic resource-cost minimised or international competitiveness. The contrast with South Korea is sharp, as the Korean government distributed awards for export performance in the international market.

The situation started gradually changing from the mid-1970s onwards when the foreign exchange reserve position improved with the fortuitous factor of remittances from the Gulf migrants. The first move was to replace quantitative restrictions on imports of capital goods with *ad valorem* tariffs in the 1980s to translate privately earned scarcity rents into public revenue. Consequently, imported capital goods became easily accessible though not cheaper. A long-time backlog of technology has been built up with severe restrictions on imports for two decades. In this situation, the productivity of imported capital goods, even of older vintages, might possibly have been higher than that of the corresponding domestically produced counterparts. Tariffication might have raised the cost of capital goods of all vintages but more so of later than earlier vintages. This provides a possible reason for virtual stagnation in technical change in the 1980s. As already noted, efficiency improvements in this period were the consequence of growth in the domestic market.

The systemic trade liberalisation of 1991 started with a devaluation of the overvalued currency, abolition of export subsidies, and removal of quantitative restrictions on most capital and intermediate goods, followed by a gradual lowering of the average level as well as dispersion of tariffs on capital goods in the 1990s. This made for easier and *cheaper* access to foreign technology embodied in imported capital goods. The simultaneous liberalisation of private foreign direct investment also made access to foreign technology easier.

Positive growth of technical change in the 1990s, at 5.71 percent per annum, can be attributed to this factor combined with the boom in industrial investment in the immediate post-reform period. Given the technology-lag since the earlier decades, this process led to the introduction of a large number of new technologies through imports and imported capital goods, thanks to the industrial boom during 1993-94 and 1996-97. Since there was a gestation lag for absorption and adaptation of new technologies, efficiency improvements took time to materialise. This lag became possibly longer due to a slow-down in economic growth after 1997-98. Negative growth in efficiency improvements may, thus, have been the consequence.

We have focussed so far entirely on imported technology and capital goods because this has been the major source of technical progress since the beginning of the liberalisation process. For the sake of completeness, however, it is important to comment on the indigenous industrial research and development efforts, which have been mostly of an adaptive rather than an innovative variety.

During the slow-growth process, the policy of import-substitution was complemented by what, in the Indian terminology, was called a phased manufacturing programme (PMP). Under PMP, whenever the import of technology was permitted, dependence on recurrent imports of components, parts and intermediate inputs was expected to be phased out by laying down the phased proportionate reduction of recurring import outlay and forcing the indigenous production in order to keep the production process going. This was rigidly enforced through the licensing of imports and foreign exchange. Whenever excess demand for the output existed in the domestic market, there was shortage-induced improvisation to realise the scarcity rents. These were R&D efforts carried out by individual innovators without formal blueprints and patents.

III.3 Broad Growth Facilitating Policies Having a Bearing on Productivity

Given that economic growth is a necessary pre-condition of productivity improvements, we deal in this section with broad government policies that facilitated the growth transformation of the Indian economy, especially since the 1980s. We consider four sets of policies: two related to microeconomic structural adjustment and two related to macro management. In our scheme of explanation in Section II, we attributed a key role to investment and trade liberalisation in changing the incentive structure. These are discussed in Sections III.3.1 and III.3.2. With regard to macroeconomic management, we consider the macroeconomic stabilisation and tax rationalisation policies (Section III.3.3) and financial liberalisation (Section III.3.4).

III.3.1 Domestic and Foreign Private Investment Liberalisation

During the slow-growth phase (1960-80), the activist government policy had resulted in what Desai (1999) called the government-policy-induced caste-system in the industrial sector. The highest caste, or the most favoured, were public sector enterprises (PSEs) in line with the socialist ideology. Next came the modern small-scale industries (SSI) that received promotional and protective concessions to reconcile the Gandhian perspective of decentralised industrialisation (small is beautiful) with the Nehruvian socialist vision of the large public sector. The third in the hierarchy were those industries which needed only government sanction under the Industries (Development and Regulation) Act (IDRA) 1951 for undertaking investment above a prescribed floor (below which no sanction was necessary). The fourth were the domestic large business houses subject to entry restrictions on their operations under the Monopolies and Restrictive Trade Practices (MRTP) Act, 1968. The most discriminated against were the existing subsidiaries of the foreign companies subject to Foreign Exchange Regulation Act (FERA) 1974. The mandatory government permission under IDRA, MRTP Act and FERA constituted the major negative instrument that could prevent domestic investment (above a certain floor level that kept changing over time) or foreign investment from taking place.

Ad hoc relaxation of domestic investment[41] started in 1985 with de-licensing (or doing away with mandatory permission) of 25 industries. The number increased to 31 by 1990. The floor investment level, below which no sanction was needed, was raised to Rs.500

[41] We draw on Panagaria (2004) in the following discussion for the 1980s.

million in backward areas and Rs.150 million elsewhere for large investments. The ceiling level for concessions under SSI was also raised from Rs.2 million to 3.5 million.

In January 1986, 28 industries were permitted under broad banding that allowed firms to switch production between similar or related lines of production without seeking mandatory consent. The list of industries was expanded subsequently. This was a major relaxation from IDRA, which required a very narrow licensed product line specification.

A minimum efficient scale of production was announced for a number of industries in the second half of the 1980s. This permitted expansion of capacity in these industries without their having to seek a mandatory sanction. This was a corrective to the earlier policy that resulted in fragmentation of capacity and units with sub-optimal scale.

In 1986 the firms that reached 80 percent of capacity utilisation in any of the five years preceding 1985 were assured authorisation to expand capacity up to 133 percent of the maximum capacity utilisation reached in those years.

Large business houses under the purview of the MRTP Act could not avail of the foregoing liberalising measures. The floor asset level that defined MRTP firms was raised five-fold from Rs.200 million to Rs.1000 million in 1985 so as to enable access of this category to the above measures. Consequently, as many as 90 out of 180 business houses registered under the MRTP Act went out of its purview and were freed from the freeze on the capacity in their existing product lines. In addition, the requirement of MRTP clearances was removed in the case of 27 industries, which permitted their entry into these industries subject to certain conditions.

Price and distribution controls on two key universal intermediates in short supply, namely, cement and aluminium, were abolished. The higher price induced greater output and new entrants, which eliminated black markets, intensified competition and improved quality as well as bringing a decline in price.

The success of the above *ad hoc*, hesitant and cautious measures lay in the step-up in industrial growth rate from an average of 6.3 percent in the first half of the 1980s to 7.8 percent in the second half. They helped convince sceptics among the bureaucracy and politicians that market-friendly liberalisation, rather than quantitative controls, was more effective in relieving shortages.

It was against this background that the Industrial Policy Statement of July 31, 1991, emerged in the shadow of the external payments crisis. It openly advocated systemic domestic investment liberalisation. It abolished all mandatory permissions under IDRA except for a small negative list of 18 industries justified by security, environmental and balance of payments reasons. The industries in the last category have subsequently been removed with improvements in the balance of payments, and the negative list is currently in single digits. The Statement heralded systemic change, from announcing *ad hoc* positive lists not requiring sanction, and thereby leaving an implicit all pervasive negative list requiring government permission, to announcing a small and explicit negative list, and leaving the rest as not requiring mandatory sanction. For large-scale domestic investors, this marked a sweeping change. An illustrative exercise of the World Bank (1992) subjected 9227 approvals under IDRA granted between 1988 and 1991 to the new policy and found that only 421 or hardly 5 percent would have required mandatory

sanction. The exercise could not take account of rejected applications, which could have been approved under the implicit positive list in the new policy. In addition to reducing the scope of IDRA radically, the Statement also opened up industries earlier reserved exclusively for the public sector to entry by the private sector and did away with pre-entry scrutiny of investment decisions regarding expansion, merger and diversification in respect of large industrial houses coming under the purview of MRTP Act[42]. A large number of entry restrictions on domestic large investment thus stand totally removed since 1991 except for industries exclusively reserved as small scale industries, whose number came down by 39 out of 838 between 1997 and 2001. The process of de-reservation picked up in the first half of the 21st century.

In contrast to the sweeping domestic private investment liberalisation, that in private foreign investment has been extremely cautious. In the political realm, the then Finance Minister (and present Prime Minister) Manmohan Singh, in his February 1992 budget speech, had exhorted the members "not remain permanent captives of the (colonial) East India Company". In terms of economic compulsions, too, the Indian policy-makers had been seeking private capital flows to supplement domestic savings and as a non-debt source of financing current account deficits, in addition to other benefits like technology upgrading, in an effort to take the economy on a higher and sustained growth path in the post-Reform period. The need for non-debt flows arose from the external payments crisis of 1990-91. In the face of widening current account deficits and the drying up of concessional assistance in the second half of the 1980s despite double-digit growth in exports, the Indian policy-makers resorted to more costly commercial borrowings, attracting deposits by Non-Resident Indians (NRIs) at higher than the Libor rate and short-term borrowing. The debt-creating flows were as high as 83 percent of total capital inflows in the crisis year 1990-91.

Although other exogenous factors contributed (the Gulf crisis, rising oil prices and anticipation of devaluation of the overvalued exchange rate), excessive debt flows were politically perceived to be the main cause of the external payments crisis when short-term debts amounted to 146 percent of foreign exchange reserves and default on external loans, looming large on the horizon, shook the polity. The IMF bailout package also suggested non-debt sources to finance current account deficits, such as private portfolio foreign investment (PFI) seeking capital gains and private foreign direct (equity) investment (FDI) sharing commercial risks.

However, the long-time influence of economic nationalism had not weakened enough to liberalise private foreign investment on the same lines as domestic investment. The relaxations of FDI have been *ad hoc* and hesitant measures of the 1980s vintage in respect of domestic investment liberalisation discussed above.

The approach continued to be driven by the implicit comprehensive negative list, with *ad hoc* announcements of industries explicitly on the positive list along with caps on foreign equity investment. A government agency, Foreign Investment Promotion Board (FIPB), was established[43] for case-by-case disposal of FDI proposals outside the explicit positive list. Similar caps and restrictions have also been placed on private portfolio foreign

[42] In effect removing M of MRTP and retaining RTP.

[43] This agency was replaced by the National Investment Commission with private corporate membership in 2004.

investment. There have been relaxations of these restrictions in terms of extending automatic lists, more liberal FIPB approvals, and raising the foreign equity caps of FDI and FPI in given companies.

Cumulatively, India attracted $48.0 billion net private non-debt capital flows between 1992-93 and 2002-03, about equally divided between relatively stable and risk-sharing FDI and relatively volatile and capital-gains-seeking FPI. Of the cumulative FDI of $24.2 billion, as much as 62 percent was accounted for by the discretionary FIPB route, and the remaining 38 percent came through the automatic route.

From the foregoing discussion, it should be obvious that domestic investment liberalisation has progressed broadly in line with the functioning market economy and the pool of private entrepreneurship that India always possessed but which had remained stifled earlier. Private foreign investment liberalisation has, however, been limited though it is a big step in comparison with the pre-1991 situation in India.

III.3.2 Liberalisation of International Trade in Goods and Services

In Section II, we noted that till the breakdown of the Bretton Woods system of a fixed exchange rate and the oil price hike that shortly followed, the Indian trade regime was marked by a complex web of tariff and non-tariff barriers. Covert devaluation of the rupee by linking it to the pound sterling, which was falling in relation to the U.S. dollar, may be regarded as the first hesitant exercise of deregulation, to be followed by a somewhat wide ranging liberalisation in the 1980s. The following measures[44], while limited in absolute terms, were, again, big steps in relation to the earlier autarkic policy.

The OGL or open general license list (i.e. import specifications not requiring government permission but only foreign exchange sanction) of capital goods was expanded from 79 capital goods in 1976 to 1329 capital goods in April 1990 while the OGL list of intermediate goods was expanded from 670 in 1987 to 949 in April 1988. Almost all of these were non-competing imports accompanied by a corresponding decline in imports canalised by government agencies. This opened up space for imports of raw materials and machinery by private entrepreneurs.

The second measure was the introduction of export incentives, especially after 1985. The majority of these were replenishment (or rep) export-linked import licences issued to exporters, equivalent to two times the imported inputs. This provided access to imports in banned or restricted permission (import-competing) categories and gave a boost to export profitability. In addition, exporters were provided with access to duty-free capital goods imports, especially in selected "thrust" areas, without requiring indigenous clearance.[45] This was combined with export profits being made partially or fully exempt from income tax and a reduction in the interest rate on export credit from 12 to 9 percent. Some element of stability in policy was introduced by leaving the export-import policy unchanged for three years in comparison with earlier annual changes.

These deregulations amounted to a very limited and hesitant opening up, even by comparison with South Asian countries. In the year 1987, 80.7 percent of the harmonised

[44] We draw on Panagaria (2004) for policy changes in the 1980s.
[45] This referred to a clearance that the imported capital good was not domestically available.

six-digit tariff lines were subject to quantitative restrictions (QRs) on imports in India, compared to 25.4 percent in Pakistan, 56 percent in Bangladesh and 13.9 percent in Sri Lanka. For the same year, the (simple) average of the *ad valorem* rates over all the six-digit tariff lines was 98.8 percent in India, 68.9 percent in Pakistan, 81.8 percent in Bangladesh and 27.3 percent in Sri Lanka [World Bank (2004)].

Drawing on an Indian (and a different) source [Mathur and Sachdeva (2005)], we find that considerable reduction as well as rationalisation of import tariff rates took place in the 1990s. The peak tariff rate has come down drastically from 350 percent in 1991 to 20 percent currently, the simple average tariff rate on all commodities coming down from 128 percent in 1991-92 to 39.9 percent in 2000-01, the standard deviation from 41 percent to 12.7 percent, and the import-weighted average tariff rate from 81.4 percent to 30.7 percent. The reduction was neither continuous nor at a uniform pace for different commodity groups [Table 10]. Consumer goods are the most protected, and mining products the least.

Starting from 97.8 percent in 1990-91, the weighted average tariff on consumer goods came down to 33.8 percent before climbing to 66.2 percent in 2000-01 and 50.7 percent in 2001-02, in the wake of the WTO-forced phase-out of QRs. It continued around 50 percent till 2004-05 while average weighted tariff on all commodities came down to 18.0 percent in that year. Capital goods are also marked by a steep reduction in the simple as well as the weighted average and standard deviation, next only to mining goods. Intermediate goods tariffs lay in between. Since non-tariff barriers in the form of QRs on imports of most capital goods and intermediate goods were removed in 1991, only tariff barriers remained, and these have come down drastically.

However, in international comparison, the Indian tariff rates remained higher than most countries, whether we consider bound rates or applied tariff rates, or whether we examine each of them for agricultural, non-agricultural or all goods put together [Table 11]. What does this imply for productivity? Falling tariffs, over time, of capital and intermediate goods *ceteris paribus,* combined with investment liberalisation, should have contributed to increased competition, improved efficiency and cost competitiveness. However, one straightforward implication of international comparison is that the profitability of selling in the domestic market remains higher than that in the international market so that the size of expansion of the domestic market would be critical to productivity improvements. The slow down in the growth rate from 1997-98 till 2002-03 must have reduced the profitability of efficiency improvements in the process of realising the full potential of imported capital goods and technology between 1992-93 and 1996-97.

Table 10: Average Import Duty Rates in India

Commodity Groups	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05
Weighted Average														
Agriculture	47.0	22.8	19.8	16.8	16.7	25.2	25.3	22.8	24.4	30.0	26.2	30.3	32.1	29.2
Mining	56.9	32.6	33.4	30.3	31.1	25.7	23.8	19.9	21.4	15.3	15.2	10.7	14.7	5.2
Consumer Goods	97.8	83.2	68.7	55.9	36.1	40.6	33.8	40.1	37.4	66.2	50.7	48.4	49.1	50.4
Intermediates	69.5	62.6	47.6	38.4	34.8	34.7	33.4	31.8	33.1	37.1	36.1	32.1	29.0	19.6
Capital Goods	94.8	85.2	58.4	45.5	29.1	29.3	25.9	29.4	31.0	30.7	27.8	25.4	25.5	18.1
All Commodities	81.4	60.6	46.8	43.2	32.9	32.2	30.2	30.3	31.4	30.7	29.6	25.7	26.1	18.0
Simple Average														
Agriculture	108.0	49.0	40.0	32.0	25.2	28.7	26.3	29.5	29.4	40.0	39.3	37.4	37.1	32.9
Mining	108.0	99.0	72.0	47.0	30.0	25.4	24.8	29.6	26.6	26.8	24.6	24.1	23.4	12.5
Consumer Goods	141.0	108.0	85.0	67.0	45.5	45.6	40.1	45.4	42.7	45.1	41.7	36.9	33.5	25.9
Intermediates	132.0	118.0	91.0	71.0	43.8	39.8	35.3	39.9	41.0	39.8	36.5	32.9	29.9	21.3
Capital Goods	105.0	97.0	69.0	55.0	33.2	34.6	30.3	34.7	34.6	34.6	32.5	31.2	29.8	20.4
All Commodities	128.0	107.0	82.0	64.4	41.0	39.5	34.9	39.6	39.3	39.9	37.1	33.7	31.1	22.8
Standard Deviation														
Agriculture	47.0	50.0	40.0	28.0	22.1	20.8	17.0	18.7	16.9	16.8	17.8	21.6	21.7	21.1
Mining	19.0	23.0	26.0	25.0	15.7	11.7	11.6	12.2	12.3	12.6	11.5	10.9	10.3	5.7
Consumer Goods	36.0	47.0	41.0	37.0	26.8	27.1	20.6	20.6	19.1	16.9	17.2	16.0	19.1	16.7
Intermediates	42.0	28.0	26.0	23.0	12.2	12.8	10.0	11.0	9.7	9.3	8.8	8.0	7.1	7.0
Capital Goods	33.0	33.0	32.0	28.0	12.4	11.8	9.4	10.1	8.0	7.8	12.3	11.6	11.5	11.4

All Commodities	41.0	40.0	35.0	30.0	19.0	18.7	14.5	15.2	13.7	12.7	13.3	12.6	12.1	12.4
Coefficient of Variation														
Agriculture	43.5	102.0	100.0	87.5	87.7	72.5	64.6	63.4	57.5	42.0	45.3	57.8	58.5	64.1
Mining	17.6	23.2	36.1	53.2	52.3	46.1	46.8	41.2	46.2	47.0	46.7	45.2	44.0	45.6
Consumer Goods	25.5	43.5	48.2	55.2	58.9	59.4	51.4	45.4	44.7	37.5	41.2	43.4	57.0	64.5
Intermediates	31.8	23.7	28.6	32.4	27.9	32.2	28.3	27.6	23.7	23.4	24.1	24.3	23.7	32.9
Capital Goods	31.4	34.0	46.4	50.9	37.3	34.1	31.0	29.1	23.1	22.5	37.8	37.2	38.6	55.9
All Commodities	32.0	37.4	42.7	46.6	46.3	47.3	41.5	38.4	34.9	31.8	35.8	37.4	38.9	54.4

Source: Mathur, Archana, S. and Arvinder S Sachdeva (20005). "Customs Tariff Structure in India", *Economic and Political Weekly*, vol. XL, no. 6, February 5, Table 1B, p.537.

Table 11: Country Profile of Trade and Tariff

Country	Trade to GDP (%)	Share in World Total Exports (%)			Bound Tariff (%)			Applied Tariffs (%)	
		Merch. Goods	Com. Services	All Goods	Agri. Goods	Non-Agri. Goods	All Goods	Agri. Goods	Non-Agri. Goods
India	30.7	0.8	1.5	49.8	114.5	34.3	29.0	36.9	27.7
Argentina	25.1	0.4	0.2	31.9	32.6	31.8	14.2	10.3	14.8
Australia	42.9	1.0	1.1	9.9	3.2	11.0	4.2	1.1	4.6
Bangladesh	35.0	0.1	0.0	163.8	188.5	35.7	19.5	21.7	19.2
Brazil	26.2	0.9	0.6	31.4	35.5	30.8	13.8	11.7	14.1
Canada	83.6	3.9	2.3	5.1	3.5	5.3	4.1	3.1	4.2
Chile	64.1	0.3	0.2	25.1	26.0	25.0	6.0	6.0	5.9
China	50.9	5.0	2.5	10.0	15.8	9.1	12.4	19.2	11.3
European Union	28.7	19.0	25.8	4.1	5.8	3.9	4.2	5.9	4.0
Indonesia	77.0	0.9	0.4	37.1	47.0	35.6	6.9	8.2	6.7
Japan	21.1	6.4	4.1	2.9	6.9	2.3	3.2	7.3	2.7
Malaysia	218.1	1.4	0.9	14.5	12.2	14.9	7.3	2.1	8.1

Pakistan	39.1	0.2	0.1	52.4	97.1	35.3	17.1	20.4	16.6
South Africa	58.7	0.5	0.3	19.1	39.8	15.8	5.8	9.1	5.3
Thailand	124.5	1.1	1.0	25.7	35.5	24.2	16.1	29.0	14.2
United Kingdom	55.8	4.3	7.8	4.1	5.8	3.9	4.2	5.9	4.0
United States	24.1	10.7	17.3	3.6	6.9	3.2	3.9	5.1	3.7

Source: Mathur, Archana, S. and Arvinder S Sachdeva (20005). "Customs Tariff Structure in India", *Economic and Political Weekly*, vol. XL, no. 6, February 5, Table 4, p.538.

III.3.3 Macroeconomic Stabilisation and Tax Rationalisation

Macroeconomic stability, deemed necessary for sustained growth, is usually judged with respect to the sustainability of fiscal and external payments balances, which are mediated through the real rates of interest and foreign exchange, and the rate of inflation – an indicator of aggregate demand-supply balance. During the slow-growth phase, the government exercised control over both the interest rate in the formal institutional financial market and the foreign exchange rate through discretionary quantitative intervention in both the markets. Fiscal balance was maintained by channelling private savings into government hands through differential taxation rates, and nationalised banks mobilising the household deposits and governments pre-empting them, using the policy instruments of statutory and currency reserve ratios. Macroeconomic balance was maintained by distortion-creating discretionary policies.

The slow-growth that resulted has been argued to be sufficient to maintain the corresponding distributional equilibrium among the powerful but numerically small elite groups of politicians, bureaucrats, white-collar public sector employees and blue-collar workers in the organised (public and private) industrial units.[46]

The same policies continued in the 1980s but met with fiscal and external payments disequilibria. Numerically, two large segments of farmers and small scale industrialists and traders barged into the distributional process in the 1980s so that distributional conflicts could not be managed despite a step-up in the rate of economic growth. It was the double crisis[47] of unsustainable fiscal and external payments that opened the window of opportunity for a major change in development strategy and the associated market-oriented systemic policy reforms of liberalisation and globalisation since 1991.

The crisis-gripped atmosphere nationally, combined with the serious apprehension of insecurity among elected representatives to the central parliament, made it possible to undertake a very sharp fiscal contraction, equivalent to a reduction of 2.3 percentage points of GDP, between crisis years 1990-91 and 1991-92. As a result, there was a sharp dip in GDP growth rate from 5.6 percent in 1990-91 to 1.3 percent the following year.

Fortunately for the reformers, recovery had also been the quickest in international comparison, as mentioned earlier, the GDP growth recording 5.1 percent in 1992-93, 5.9 percent in 1993-94 and an unprecedented 7 percent-plus in the following three years. This was also preceded by devaluation of the rupee (14 percent in real terms) and abolition of all export subsidies. Unlike in the earlier two episodes involving World Bank/ IMF bailout packages in 1966 and 1980, the economist Finance Minister decided to undertake a more difficult microeconomic structural adjustment simultaneously with macroeconomic stabilisation (Sections III.3.1 and III.3.2). It was, indeed, a very difficult situation, where the pains of structural adjustment and sharp fiscal contraction were combined. From the point of view of macroeconomic management, the earlier segmented markets for foreign exchange, money and financial capital were becoming gradually integrated, with the task of macroeconomic management becoming more difficult and challenging. Judging by the results, the transition to integrated markets appears to have been a reasonable success, with declining external payments deficits, declining rates of

[46] Tendulkar and Bhavani (2005), section II.5
[47] This is dealt with in greater detail in Tendulkar and Bhavani (2005), Section III.4.

inflation but not such low gross fiscal deficits and rising revenue deficits in the second half of the 1990s [Table 2, Section II]. In this transition, rationalisation of tax rates played a major role in reducing distortions.

Among the major sources of distortion during the slow-growth phase (1960-80) was differential taxation. Taxation was used as a major instrument of resource mobilisation for public sector investment without any regard for its allocative consequences. Resource allocation was guided (ineffectively, in retrospect) by heavy-handed direct discretionary controls on domestic and foreign investment above a certain pre-specified floor level. By the mid-1970s, the shares of direct and indirect taxes were one-fourth and three-fourths of the tax revenue.[48] There were as many as eleven different personal income tax slabs with narrow bands and rates varying from an entry level of 10 percent and climbing to 85 percent at the top. With a 15 percent surcharge, the top marginal tax rate was 97.75 percent! Including the incidence of significant wealth tax rates, the combined marginal incidence of income and wealth tax often exceeded 100 percent for higher income brackets.

Corporate tax rates were also high at around 60 percent, with tax differentials for 'closely-held' and 'widely-held' companies, and with complicated tax preferences for sector-specific industrial ventures. Turning to indirect taxes, there were at least 24 separate rates into which domestically produced commodities were grouped for excise taxes. There was double taxation as inputs as well as outputs were routinely taxed without credit being given for input taxes already paid, thus making a mockery of allocative 'neutrality' across sectors, commodities or uses. Import duties exhibited similar wide variations, ranging from zero to 200 percent, with an added dimension of tight and detailed quantitative restrictions on imports through import and foreign exchange licensing. Year-to-year changes in rates, slabs and exemptions were common. Widespread evasion and avoidance of such taxes was the predictable consequence, with tax revenue as a percentage of GDP remaining in single digits. The taxation system thus violated the basic tenets of sound public finance (simplicity, economic efficiency and equity) with a vengeance.

Serious tax reforms started with *ad hoc* changes in the mid-1980s, and more systemic ones followed in the 1990s with the market-orientation of the post-1991 reforms. Significant weight came to be attached to the resource-allocation consequences of tax rates along with efforts at rationalisation. Thus, personal income tax slabs, which had been reduced from as many as 11 in 1973 to 8 by 1984, were further reduced to 4 in 1985 and to 3 in 1992 with reduced marginal tax rates of 20, 30 and 40 percent. The marginal rates were reduced further to 10, 20 and 30 percent in 1997. The wealth tax rate was reduced from 5 percent in 1973 to 2 percent in 1985 and further to one percent in 1992.

Corporate tax rates were also rationalised and the rate was reduced from 62 percent to 50 percent in 1985, 40 percent in 1994, matching the top marginal income tax rate, and further to 35 percent in 1997. Turning now to indirect taxes, the phased introduction of VAT (value added tax), giving credit for taxes on inputs, started in a limited fashion in 1986 with the implementation of modified VAT (MODVAT) in 37 chapters of the Central Excise Tariff. In 1994, MODVAT was extended to capital goods and petroleum

[48] We draw on Acharya (2005) in the following discussion.

products along with a shift from specific to *ad valorem* rates, substantial reduction in a number of rates and a halving of special exemption notifications. A major rationalisation of multiple rates was carried out in 1999 when 11 excise rates between 5 and 40 percent were compressed into just 3 rates of 8, 16 and 24 percent. As regards customs duties, 1980s saw very little activity. In fact, the *ad valorem* rates were raised in the second half, presumably for revenue reasons. With the prevailing tight quantitative restrictions on imports, increased import duties, in effect, translated scarcity premia into public revenues.

A major and systemic reform process was initiated in 1992 with the abolition of quantitative restrictions on the imports of most capital and intermediate goods and a sustained rationalisation and reduction of rates throughout the 1990s (see chart 10 in Section II). Peak rates of customs duties were also brought down from 300 percent in 1990 to 40 percent by 1996 and very slowly thereafter. Basic customs duty rates were reduced to just four (5, 15, 25 and 35 percent) by 2000. Quantitative restrictions on consumer goods were also phased out by 2001. Combined with current account convertibility and a pragmatic exchange rate policy, barriers to international trade came down drastically in the 1990s and bear little resemblance to their high levels at the end of the 1980s. This has not only reduced distortions induced by quantitative and differential trade and exchange rate policies but has also improved the competitiveness of the Indian industry in the 1990s. In particular, reduction in import duties on capital goods along with rationalisation of rates (chart 11 in Section II) progressively reduced the relative cost of acquiring capital goods embodying improved technology and provided a stimulus to technical change. Increased competition also contributed to the improved cost competitiveness and productivity of domestically produced capital goods.

While distortions introduced by multiple rates and high average levels of tariff have indeed come down since 1991, the current average levels of Indian tariff rates are still higher than India's rapidly growing neighbours in east and south-east Asia. Large numbers of exemptions, despite some reduction over the years, remain to be cleaned up. The consequence is that Indian firms still enjoy protection from international competition, which has continued the historical discrimination against India's merchandise exports.

III.3.4 Financial Liberalisation

The second facilitating factor has been financial liberalisation. Along with domestic and foreign private investment and trade liberalisation, deregulation of the financial sector has been taking place since July 1991. The banking sector had been highly regulated since the nationalisation of the major commercial banks in 1969. With a virtual monopoly, the public sector banks had been collecting deposits from households and lending the funds to the 'priority sectors' at administered interest rates, which were kept deliberately low in an effort to support the planned economic activities in the expanding public sector and the approved projects in the private sector.

Reforms started in the early 1990s with the recapitalisation of the public sector banks and efforts at reducing non-performing assets, gradual deregulation of administered interest rates, and trimming the 'priority sectors' lending. Simultaneously, permission was given to the private and foreign banks (up to 74 percent equity) to start operations in India and introduction of prudential norms. Deregulation of the capital markets had started in the late 1980s with the establishment of the market regulator (Securities and Exchange Board of India), which was vested with greater powers in the 1990s, along with the granting of

permission to foreign institutional investors to operate in the portfolio investment market. In addition, Indian private corporate and financial institutions have been permitted limited operations in the international financial market. The end result has been a significant increase in the variety of instruments available for financial intermediation. The resulting efficiency improvements have immensely facilitated the real investment boom since the sweeping liberalisation of the domestic and foreign private investment in the 1990s. The process has been helped by a reduction in the rate of interest and the rate of inflation.

III.4 Concluding Observations

Given the stylised facts emerging from the UNIDO data set, our task has been to explain the paradox of a remarkable growth transformation together with an associated stagnant total factor productivity growth (TFPG) in the Indian economy over the forty-year period 1960-2000. We have argued that India's activist reforming entrepreneurs (in the North-Baumol sense) attempted an idealistic experiment between 1960 and 1980 of bringing about a transaction-augmenting institutional change through modernising a traditional subsistence economy with the instrumentality of centralised, public-sector-dominated, autarkic industrial planning in a functioning market economy where private ownership of the means of production had a constitutional sanction. The basic tension between these institutional forms generated a perverse incentive structure that stifled productive entrepreneurship and dynamic impulses in the functioning markets. The predictable consequence was slow-growth and stagnant TFPG during 1950-80.

The transformation started gradually in the mid-1970s and became obvious in a quantitative fashion after 1980 when India became one of the top ten fastest-growing developing countries during the last two decades of the 20th century. The beginning was fortuitous. What proved growth-destabilising for many other oil-importing developing countries, namely, the onset of a floating exchange rate regime and two steep hikes in oil prices during the 1970s, turned out to offer India new opportunities for overcoming constraints. India's activist reforming entrepreneurs started hesitantly exploring these opportunities, rethinking the earlier autarkic policies, and made somewhat bolder but *ad hoc* attempts to change the institutional matrix through a *de facto* wide ranging domestic investment liberalisation and a limited external liberalisation, mainly offsetting discrimination against exports.

Systemic reforms of the post-1991 period formalised the earlier wide-ranging domestic investment liberalisation but also undertook external trade liberalisation, which was facilitated by reasonable macroeconomic stability and financial liberalisation. The resulting growth rate, though only somewhat higher than in the 1980s, is likely to be sustainable and less distorted. Poor productivity performance during 1980-2000, we have argued, might be attributed to an interconnected web of political economy factors, inadequacies in physical infrastructure, and institutional rigidities, all of which constrained the realisation of benefits from the change in the incentive structure. In other words, the process of putting in place conditions for a competitive economy has progressed reasonably well and been increasingly reflected in a higher growth rate, which is still driven much more by input accumulation than productivity. Even in the 1990s, the major contribution to growth and employment came from services rather than industry.

Given that India continues to be among the lower third of countries ranked by per capita GDP, industry's contribution to growth and employment should have been higher. Clearly, the manufacturing sector, a major component and a leading sector within industry, needs to perform better in terms of productivity. What needs to be done for this purpose? Since the present exercise has been aggregative, the possible options have to be explored by going beyond it.

One obvious possibility is to relax the constraints now that the conversion efficiency of domestic enterprises has improved relative to the pre-reform period, thanks to the progressive intensification of both domestic and external competition. While UNIDO cannot directly do much to relax the political economy constraints, it can impress upon the government and business associations the need to help relax one particular institutional constraint of a mainly apolitical nature, namely, reform of the legal structure relating to industrial restructuring and bankruptcy. Since most entry restrictions have been removed or reduced, exit restrictions constitute one major factor that permits resources to be tied to existing uses.

The other area where technical assistance would have a spin off is in the efficient management of physical infrastructure, particularly power, whose persistent shortages along with an uncertain and fluctuating supply of varying quality has been detrimental to productivity improvements.

Finally, we would like to focus on what, in our view, is the most important component of the manufacturing sector, namely, capital goods, whose productivity drives total factor productivity. For this purpose, we draw on a recent excellent benchmarking study[49] of the Indian machine-tool industry. Since quality differentials abound in machine tools, the study minimised the incidence of the problem by surveying 50 Indian users who operated an Indian CNC lathe, or vertical machining centre, side by side with a foreign equivalent machine, *in the same production process*. The survey probed, in considerable detail, the relative merits of each machine both in terms of technical characteristics and in terms of service backup. We take the liberty of quoting the main findings from the executive summary of the paper.

> "(a) On the technical performance, there was a small but *significant* quality gap in favour of the imported machine.
> (b) On service characteristics, there was a small but *significant* gap in favour of the Indian machine.
> (c) The most striking finding arose when we proceeded to pin down this difference in service characteristics. Here, there are two key elements, the speed of response of service personnel when called, and the quality of service provided on arrival. Indian firms out-scored foreign rivals in terms of the speed of response when called, but, crucially, they scored less well than foreign firms in terms of quality of service provided on arrival. The small net quality advantage noted in (b) above reflects the fact that the advantage of speedy response slightly outweighs the relative shortcoming in service quality" (emphasis added)

[49] Sutton, John: "The Indian Machine-Tool Industry, A Benchmarking Study" carried out for the World Bank, no date.

The implications of both the contributing factors to productivity differentials (technical performance and service characteristics) can be worked out from an old but insightful Rosenburg (1963) proposition: efficiency in the production of capital goods is limited by the size of the market. The cited World Bank study notes that the Indian customers of machine tools tend to be more price-sensitive and, by implication, less quality-sensitive.

This is not surprising in view of the price-sensitive character of the market at a low level of per capita GDP in which machine tool users have to sell their outputs. Given the size of the market, the volume of output *per plant* can be expanded by a rise in industry concentration, "whether by way of merger, consolidation or exit," as the study notes.

However, the size of the market itself can be expanded in two ways. Rapid economic growth expands the size of the domestic market and contributes to volume expansion directly. Indirectly, it also gradually reduces price-sensitivity and enhances quality-sensitivity. Alternatively, or simultaneously, the volume of output per plant can also be expanded by availing of external trading opportunities. This would entail specialisation in a particular quality along with cost competitiveness for a small group of firms. Given the agglomeration economies and networking practices in a location like Bangalore, the availability of relatively cheap manufacturing design skills and the existing base of a modern machine tool industry, this option deserves a serious consideration.

With regard to service quality although the gap was in favour of Indian machinery, the survey notes that, while the service personnel was prompt in attending to the problems, their problem diagnostic capabilities were found wanting in relation to the service providers of imported machines. The training of service personnel in this respect is clearly very important.

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