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Investment and Economic Opportunities: Urbanisation, Infrastructure and Governance in North and South India¹

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Executive Summary

There are substantial disparities across India's southern and northern states (Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh) in terms of fundamental economic phenomena such as per capita net state domestic product, rural and urban poverty rates, and investment flows, with the southern states taking a lead over their northern counterparts. In this paper, we attempt to understand what factors have caused these differences. We examine human capabilities, skills and awareness, resources and the efficiency of their utilisation; extent of urbanisation; good governance, including law and order; and infrastructure across the two groups of states. With respect to the factors representing human capabilities – literacy, infant mortality, stock of graduates, enrolment in technical courses, population in working age group, number of higher educational institutions, and infrastructure such as installed capacity, households with electricity and telephone penetration, we find that the southern states have an advantage when compared to the northern states. The same is true with respect to factors indicating law and order, such as the proportion of cases pending trial in court.

We estimate the per capita net state domestic product (NSDP) as being dependent on the lagged form of these explanatory factors, given their endogeneity. We find that the lagged percentage of urbanisation is statistically significant in determining per capita NSDP in the northern and southern states, collectively and individually. The lagged per capita public expenditure is the other significant factor which determines per capita NSDP in the case of the full sample, and the southern states.

When we compare the results from the separate regressions for the northern and southern states, the law and order conditions, as indicated by the percentage of pending cases under trial in court, have a negative and significant impact on per capita income in the states. As far as human capability indicators are concerned, in the case of the northern states, the literacy

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rate has a positive and significant impact on per capita income, implying convergence, whereas the same is not true for the southern states. In addition, the percentage of the population with graduate degrees and above in the northern states suffers a negative impact, whereas that from the southern states experiences an expected, positive effect.

Overall, we conclude that the upward shift in per capita income, downward trend in poverty reduction and investment flows that occurred in the south relative to that in the northern states can be explained partly by the advantage the former had in terms of human capabilities, infrastructure, urbanisation and some (not all) law and order conditions and partly by the economic liberalisation of 1991.

JEL Classification: O10, O18, P47, R11

Key words: Indian states, Regional disparities, southern Indian states, northern Indian states, Governance

Introduction

It is now well-known that in India, there is substantial variation in incomes across states. For instance, in the southern state, Tamil Nadu, the per capita net state domestic product (NSDP) was Rs14,000 (in 1993-94 prices) in 2004-05, whereas in the northern state, Uttar Pradesh, the NSDP was less than half of Tamil Nadu's, being only Rs6,138 for the same year (based on data from the Economic and Political Weekly Research Foundation [EPW-RF]). Similarly, according to data from the Department of Industrial Policy and Promotion, Ministry of Industry, Government of India, Maharashtra, Dadra and Nagar Haveli, Daman and Diu together accounted for nearly 32 percent of all foreign direct investment (FDI) inflows into the country, and Delhi, parts of Uttar Pradesh (Noida) and Haryana accounted for 18 percent, whereas the rest of Uttar Pradesh and Uttaranchal accounted for less than 0.02 percent of all FDI inflows into the country. In fact, Dreze and Sen (1997) point out that some of the southern Indian states have been growing at the rates of East Asian countries such as Taiwan and Singapore, whereas some states in the north have been crawling at the rates of those in sub-Saharan Africa, suggesting that an eventual fault line might develop between the two regions.

While the state is the unit of policy-making, throughout this paper, we compare the four southern states of Karnataka, Kerala, Tamil Nadu and Andhra Pradesh with the four northern states of Bihar (along with the recently-created Jharkhand), Madhya Pradesh (along with Chhattisgarh), Rajasthan and Uttar Pradesh (along with Uttarakhand). This is possible as regions can be viewed as common markets which consist of several states and which facilitate the movement of ideas, goods and services.

A comparison of this nature between the northern and southern states mentioned above is defensible because Punjab, Haryana, and the western states of Gujarat and Maharashtra have been high on the economic performance scale since the independence of India. For instance, as early as 1960-61, the per capita incomes of Punjab, Haryana, Gujarat and Maharashtra were respectively Rs4,923, Rs4,614, Rs4,904 and Rs5,527 compared with only Rs3,338 for Uttar Pradesh (all in 1993-94 constant prices).³ However, the southern states have rapidly surged sometime in the recent past – 1980s or 1990s (this is something we will learn from the forthcoming analysis). Thus, the northern states (with the exception of Rajasthan which has been only recently surging (see Ahluwalia [2000]) have remained behind. As Paul and Sridhar (2009) and Ramachandra Guha point out, historically, the north was viewed as a region which was growing and where job opportunities were being created, whereas the southern states were perceived as laggards. However, in recent years this has changed with the southern states surging economically. Hence, a study of the four southern states with their northern counterparts offers interesting lessons in contrast.

In our comparisons of the northern region, we include the three newly-created states (Uttarakhand, Jharkhand and Chhattisgarh) along with their parent states because the new ones were carved due to stark intra-state disparities and their backwardness. Also, when we are comparing the pre-2000 period with the post-2000 period (2000 is the year in which the

³ One could argue that Rajasthan has moved out of this league of poor-performing states recently (as pointed out by Ahluwalia [2000]). Rajasthan has been in this league of slow-growing states historically, and its growth is only a recent phenomenon. So we retain Rajasthan in our set of northern states, our objective being to study longer run trends. One could also make a case for including Orissa, which has also lagged economically, in the list of northern states. Orissa, being in the east, does not enter the north-south debate, which is the focus of our work here, as laid out in our research objectives and literature survey.

three new states were created), it is necessary to account for them in the interests of comparability.

Before we examine the record of investment into these states, it is instructive to explore the differences in basic economic phenomena such as NSDP and poverty rates. As discussed, these fundamental economic phenomena show remarkable differences between the southern and northern states when observed over a period of time. Studying these phenomena over a long period of time has the advantage of demonstrating whether such disparities are a recent phenomenon or they have existed for a long time. Nunn (2009) provides a survey of a growing body of empirical evidence which points towards the important long-term effects that historic events have on current economic development.

This paper is organised as follows. The next section presents the research objectives supported with data on fundamental economic phenomena such as per capita income, poverty rates and investment flows across the southern and northern states. This is followed by the literature survey which summarises past literature on the subject. The detailed literature review is followed by a section on the model and methodology for estimation, where the rationale for inclusion of various explanatory variables, is presented. This is followed by a description of trends in various explanatory factors – human capabilities, skills and awareness, resources and the efficiency of their utilisation, the extent of urbanisation, good governance including law and order, and infrastructure, which are presented for the southern and northern states. The results from estimation are then presented. The final section pulls all the findings together and summarises the implications of the work.

Research Objectives

In this paper, we attempt to understand what factors have caused these differences in economic phenomena such as per capita income, poverty rates and economic opportunities such as investments and FDI flows which are observed across the southern and northern states. As indicators of explanatory factors, we examine human capabilities, skills and awareness, resources and the efficiency of their utilisation, extent of urbanisation, good governance including law and order, and infrastructure across the southern and northern states.

Figure 1 summarises the trend in the average-weighted per capita NSDP of the four southern states (Karnataka, Kerala, Andhra Pradesh and Tamil Nadu) and the four northern states (Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh).⁴ This figure shows that even on average, the per capita NSDP of the southern states (weighted with population) is on a much higher trajectory compared with the northern states. Furthermore, the divergence between the two sets of states has been increasing since the early 1990s,⁵ making it a source of concern.

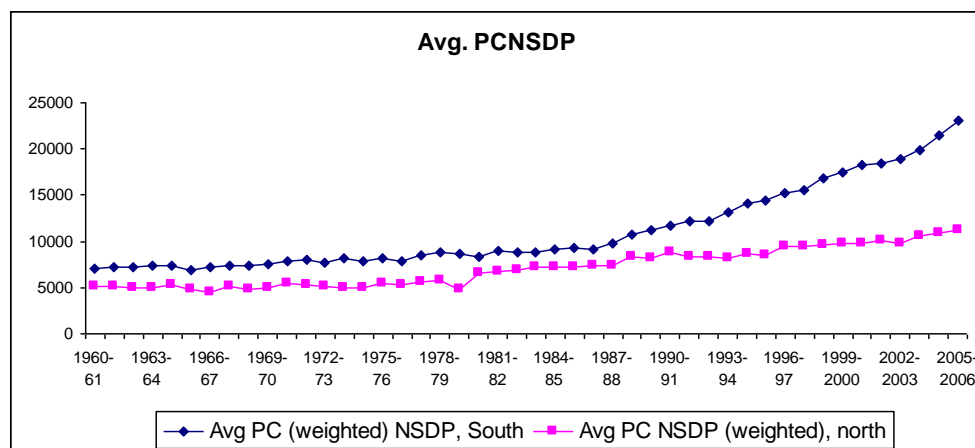
We corroborate the disparities in per capita income with data on rural and urban poverty in the southern and northern states. While aggregate per capita income portrays the general

⁴ For purposes of reasonable comparison, the data for Bihar, Madhya Pradesh and Uttar Pradesh include data for Jharkhand, Chhattisgarh and Uttarakhand respectively from 1993-94 onwards. Although these three new states themselves came into existence only in 2000, the EPW-RF had reconstructed the population and NSDP data series for the new states from 1993-94 onwards, based on the new districts forming these states.

⁵ These disparities are based on per capita NSDP data when they are expressed in 1999-2000 prices. When the per capita NSDP are expressed in 1993-94 constant prices as well, one finds a similar trend with the divergence beginning in the early 1990s.

economic conditions of the state, the prevalence of poverty indicates the extent of distress. The rural and urban poverty data portray a picture similar to that of the NSDP, showing a greater prevalence of economic distress in the northern states. Figure 2 summarises the disparities in rural poverty (weighted with population of the respective states) between the southern and northern states. The rural poverty rate summarised in Figure 2 refers to the proportion of rural population in the states living below the poverty line.

Figure 1: Trends in per capita NSDP, southern and northern states, 1960-2006, 1999-00 prices



Source: EPW-RF and authors' computations.

Figure 2 shows that the extent of rural poverty is comparatively much greater in the northern states than in the south, where it is declining at a more rapid rate (since 1988) and the disparities are widening.⁶ The extent of rural poverty is directly determined by agricultural yield, agricultural wages and the availability of non-farm employment (see Besley and Burgess (2000); Fan, Hazell and Thorat [2000]).

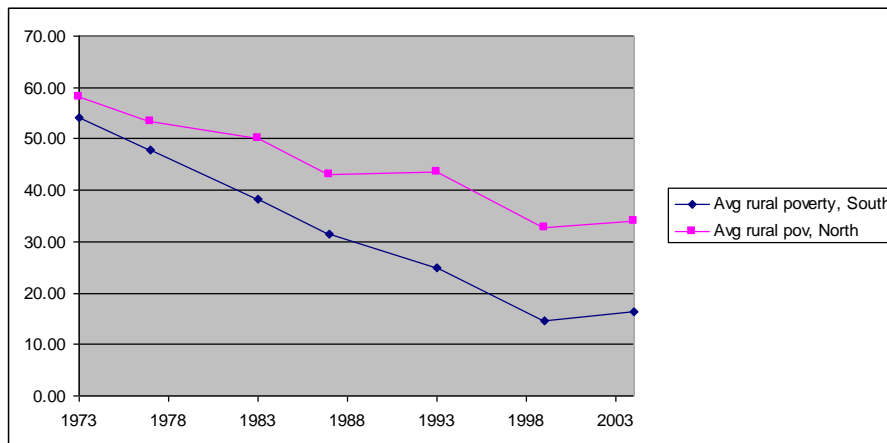
However, historically, the southern states have not always had this edge. For instance, Datt and Ravallion (1998) reported an almost 70 percent rural poverty rate each for Tamil Nadu and Kerala in 1960 and 65 percent for Andhra Pradesh,⁷ compared with only about a 48 percent rural poverty rate each for Uttar Pradesh and Rajasthan in 1960. Madhya Pradesh and Bihar had a rural poverty rate of around 55 and 65 percent respectively in 1960, according to Datt and Ravallion. This suggests that poverty was much more acute in the southern states earlier on, but they reduced it rapidly at some point. Our objective is to understand when, how and why this took place.

The disparities in urban poverty rates across the southern and northern states (when weighted with population) are much less than rural poverty rates (Figure 3). While urban poverty rates in the northern states were higher in 1973 than they were in the south, that of both the northern and southern states were the same in 1993, after which they started declining more rapidly in the south (Figure 3). While rural poverty is closely related to productivity in the agricultural economy, urban poverty is related to the availability of urban employment, prevalence of rural-urban migration and level of urban wages.

⁶ It may be noted that the poverty series in both Figures 2 and 3 end in 2004-05.

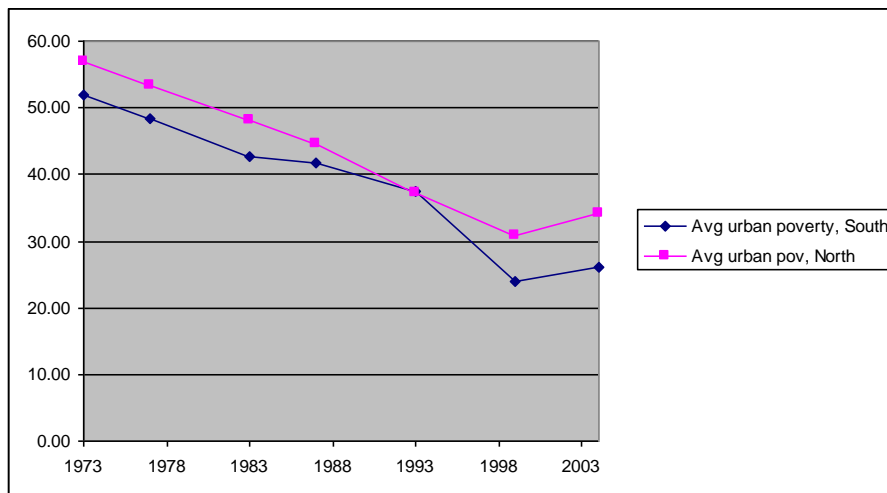
⁷ Karnataka was the only southern state according to Datt and Ravallion (1998) to have had a lower rural poverty rate of 52 percent even as of 1960.

Figure 2: Trends in rural poverty rate, southern and northern states



Source: Planning Commission, Government of India.

Figure 3: Trends in urban poverty rate, southern and northern states



Source: Planning Commission, Government of India.

Summarising the disparities in fundamental economic characteristics, the northern states are characterised by lower per capita income with greater rural and urban poverty than the south. The rural poverty rates across the two groups of states started to diverge in 1988 whereas disparities in urban poverty rates started increasing much later, in 1993. Finally, per capita NSDP started diverging in the early 1990s.

Based on their relative performance in aggregate economic phenomena, it is plausible that there are significant disparities between the southern and northern states in terms of economic environment, opportunities and potential for investment.

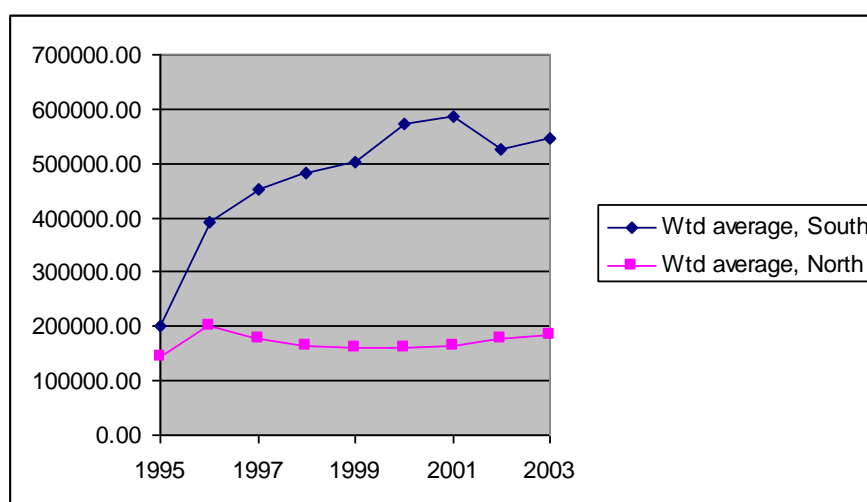
Disparities in Investment and Economic Opportunities

We measure disparities in economic opportunity across India's northern and southern states in terms of actual private investment flows (FDI inflows and domestic investments) which

are recent phenomena.⁸ Actual investment flows are indicators of disparities in economic opportunities because they imply the creation of jobs, income and more broadly, economic growth. They also reflect underlying conditions such as infrastructure and public services, which influence the choice of location for firms [see Sridhar and Wan (2007)].

The differences between the southern and northern states are very pronounced in terms of the amount of actual investments. Figure 4 summarises this trend separately for the two groups of states (weighted with population). The south is way ahead of the northern states in attracting investment. The northern states are in a permanent low-level equilibrium as far as investment inflows are concerned, with inflows amounting to a meagre average of Rs170,216 crores, when compared with the average of Rs473,522 crores for the southern states during 1995-2003.⁹ There is a need to explain these disparities in economic opportunities and lack of investor interest in the northern states. This is consistent with what Kurian (2000) reports for the states. If these trends continue in investment, the northern states could stand to lose substantially in terms of investment, jobs and income. Clearly, there are some fundamental differences between these sets of states which need to be explained.

Figure 4: Disparities in actual investment flows, northern and southern states



Source: Centre for Monitoring Indian Economy's CAPEX Database and authors' computations.

Inter- and intra-regional disparities within the country can lead to civil and social unrest. They also can lead to migration, resulting in undesirable consequences. Hence it is most important to understand the trends in these disparities and study what is causing them. A better understanding of the factors underlying regional disparities will provide more insight on economic and investment opportunities available in the Indian states. Hence researchers, state governments, and investors stand to benefit from these findings.

⁸ We had data from the Department of Industrial Policy and Promotion, Ministry of Commerce, Government of India, regarding the number and amount of FDI approvals and domestic investments approved. However, given that there usually is a significant difference between the FDI approvals, domestic investment approvals and actual investments, and the number of approvals does not translate in terms of actual investments, we use data on actual investments made by firms in various states, from CMIE's CAPEX database.

⁹ The figure presents data for 1995-2003. While we had (unweighted) data on actual investment flows until 2009 for all the states we studied, the data on population were not available beyond 2003, with the result that we could not report weighted averages beyond that year.

In this paper, after reviewing the current literature regarding the subject, we examine the factors that might be causing these disparities in the framework of an econometric model. The next section summarises past literature on this subject.

Literature Survey

There is a vast amount of literature dealing with economic growth and the convergence/divergence in Indian states. There is also a substantial quantity of literature on intergovernmental transfers in India which shows how the fiscal disparities of the poorer states have not been adequately offset by the transfer system and how various types of subterranean transfers can be disequalising (Rao and Singh [2005]). Our paper should not be viewed as an addition to the general literature on inter-state disparities. There is another strand of literature which examines the sources and timing of the shift in Indian output growth since the 1980s. This literature addresses a variety of questions such as when did the shift in growth occur? Was the shift uniform across the states? What were the factors causing the shift? Based on a review of this literature, we find that none of these studies took the distinct, north-south approach that we adopt in this paper.

We divide this literature survey into parts – one of them dealing with the timing and extent of disparities among Indian states, and another critically summarising the literature which explained the factors behind interstate differentials.

Disparities across Indian States

First, we discuss the literature on the disparities across the Indian states and the timing of the shift, if any. Nair's (1983) pioneering analysis covered 14 major states. The study showed that inter-state disparities in per capita NSDP, as measured by the coefficient of variation (CV), had declined over the period 1950-51 to 1964-65, but increased between 1964-65 and 1976-77. Unfortunately this paper is quite dated and did not take into account post-1983 developments.

Roychoudhury (1993) also examined inter-state disparities and reported that the coefficient of variation (CV) of per capita NSDP in current prices had increased between 1967-68 and 1977-78, but declined between 1977-78 and 1985-86. However, the CV in terms of constant prices showed a persistent increase during the entire period 1967-68 to 1985-86. While this kind of analysis is useful for purposes of this work here, Roychoudhury's (1993) study did not cover a substantial part of the post-liberalisation period for us to make assessments.

Dholakia (1994) in his analysis of inter-state disparities in growth rates of 20 Indian states over the 30-year period 1960-61 to 1989-90 empirically identified the optimal year of shift in growth trend separately for each state, through the estimation of a kinked exponential trend curve model. This analysis is interesting, but this paper did not probe into the causes of the interstate disparities in growth rates.

Das and Barua (1996) examined several dimensions of regional economic disparities among 23 states/union territories during the period 1970-92. It was found that inter-state inequality increased in almost all sectors. This paper suffers from the same caveat as the earlier papers – it did not attempt to explain the inequality in the sectors among the states.

Mathur (2001) analysed several facets of national and regional economic growth since the 1950s, but with a specific focus on the 1980s and 1990s. The study reported a steep acceleration in the coefficient of variation of per capita incomes in the post-reform period of 1991-96. A tendency towards convergence was noticed within the group of middle income states, while divergence was evident within the groups of high and low income states. Unfortunately the paper goes no further in explaining the convergence or divergence among the states, but some of its findings are of relevance to what we found in this paper later.

Kurian (2000) drew attention to inter-state disparities by presenting recent data for Indian states on demographic characteristics, social characteristics, magnitude and structure of SDP, poverty ratio, developmental and non-developmental revenue expenditures, Eighth Plan outlay and its sectoral distribution, disbursal of financial assistance for investment, indicators of physical infrastructure development and of financial infrastructure. The paper found that a sharp dichotomy between the forward and backward groups of states had emerged.¹⁰ This paper takes a holistic view of development in the states, but does not explain the causes of the observed dichotomy. Kurian also clubbed together all states with high per capita income and others with low per capita income, without making a distinction as to when these changes occurred.

Wallack (2003) found evidence for a break in the GDP growth rate in the early 1980s. This is close to the result reported by Rodrik and Subramanian (2005). Hausmann *et al* (2005) analysed transitions to higher growth in a large cross-national sample, and dated the Indian growth break to 1982. However, their paper primarily dealt with India in a cross-national sample and attempted to explain the Indian growth take-off in the early 1980s. They did not delve to the sub-national and regional level, as we do here.

Virmani (2006) found that the growth rate of manufacturing in Indian states accelerated after 1980-81, and this contributed to the acceleration in the growth of GDP from 1981-82. Virmani found no additional breakpoints in the nineties, once the breakpoint in 1980-81 was accounted for. Thus, the interest of all these studies seemed to be to examine when a break appeared in the growth rate of Indian states without worrying about why and how it occurred.

In contrast to Virmani, Balakrishnan and Parameswaran (2007) found that the break in the growth rate of GDP occurred in 1978-79 – with the 1978-79 takeoff in growth occurring prior to the positive break in manufacturing (1982-83). This suggested that the evidence for manufacturing having served as a primary engine of growth through appropriate market reforms is weak.

In all fairness, in addition to the literature which summarised the disparities among the states and the timing of the shift, there has also been a stream of literature which made an attempt to explain inter-state growth differentials. The next sub-section summarises this literature.

Explanation of Interstate Growth Differentials

So far, a number of studies have attempted to explain interstate differentials among the Indian states. One of the earliest studies was one on the northern and southern states in the United States by Olson (1984). This study explained the differences in economic performance in

¹⁰ Kurian's (2000) forward group consists of Andhra Pradesh, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Punjab and Tamil Nadu. The backward group comprises of Assam, Bihar, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal.

terms of endowments, policies and institutions. The independent variables included the level of urbanisation in 1889, lawyers per 100,000 of the population, and labour union membership and the dependent variable was economic growth rate. The hypothesis was that distributional coalitions should be more powerful in places that have had a stable freedom of organisation and collision. In the study of the United States, the hypothesis was supported by the regression results.

Ahluwalia (2000) explained inter-state differences in economic performance in terms of market development and the Indian states' ability to take advantage of economic liberalisation. He found and argued that Rajasthan and Madhya Pradesh have performed reasonably well in recent years.

Sachs *et al* (2002) attempted a detailed qualitative assessment of the factors behind interstate growth differentials, and listed several possible hypotheses for the lack of unconditional convergence among the Indian states:

- 1) the geographical differences in India are larger than in the United States, Europe and Japan;
- 2) population movements in India do not respond very slowly to income differentials;
- 3) policies of the national or state governments do not facilitate convergence; and
- 4) economic convergence is slower at lower levels of economic development as in India.

Further, they found that coastal access and climate were also factors in convergence. The paper by Sachs *et al*, thus, did not take into account the role of governance factors in convergence.

In a largely agricultural country like India, agricultural growth may also be expected to have some impact on growth. Panel data regressions by Shand and Bhide (2000) from the data for 15 states over three time periods, 1972-82, 1982-90, and 1992-95, suggested that agricultural growth has positive impacts on industrial growth and service sector growth. Agricultural growth in turn was affected positively by land productivity in agriculture and negatively by the share of agriculture. While the regression results were useful in understanding growth, the paper did not go beyond economic factors.

It is plausible that a state's initial distribution of income and private investment impact its current per capita income. Rao *et al* (1999) analysed the determinants of growth of per capita state domestic product (SDP) with data for the 14 major Indian states. The coefficient on the initial income variable was significantly positive in the regressions for longer periods 1965-94, 1970-94 and 1975-94. The variable indicating private investment was found to be the most important determinant of growth. Next in importance was the literacy variable. We found that this paper ignored the role of non-economic factors such as governance.

Nagaraj *et al* (2000) put various factors together and used panel data for 17 states for the years 1960-94. The growth regression included, apart from lagged per capita SDP, the share of agriculture, the relative price of agricultural and manufactured goods, several infrastructure indicators and fixed effects for states as explanatory variables. Evidence for conditional convergence was found. The results of the study suggested that focusing investment efforts on physical infrastructure (electricity, irrigation and railways), and social infrastructure (human development) would raise the overall effectiveness of public investment and raise growth. However, factors such as law and order, and health-related

indicators such as infant mortality explained the differences in growth, which were not taken into account by this paper.

It is clear that urbanisation and industrialisation had a role to play in increasing per capita income. Ghate and Wright (2008) found that the ratio of Indian to American per capita output over the past 45 years has displayed a distinctive “V-shaped” pattern.¹¹ They showed that a strikingly similar “V-shaped” pattern is visible not just in aggregate output figures, but also as the primary determinant of long-term movements in the cross-sectional distribution within the all-India total, at both sectoral and state output levels. They also carried out preliminary investigations of the correlates of the “V-factor”, using a new panel data set for Indian states from 1960 to 2005 that extended and encompassed all previous data sets relevant to macroeconomic analysis of the Indian states. Ghate and Wright (2008) found that:

- V-states were on average more urbanised and more literate;¹²
- They were somewhat more industrialised, and somewhat less dependent on agriculture; and
- They spent somewhat less on development spending (revenue expenditure) than non-V states.

We find that Ghate and Wright, like the others, focused on economic factors such as infrastructure, but did not take into account the role of law and order or political factors in explaining growth. It is reasonable to expect that the law and order situation in a state would impinge upon their private investment, economic growth and environment. States which are in a law and order turmoil would not be viewed as good places to do business.

While per capita income is only one measure of economic performance, there are studies that examine the reduction in poverty. Agricultural productivity determines the extent of rural poverty. Datt and Ravallion (1998) studied the causes of rural poverty in a developing rural economy and asked the question as to why some Indian states have done better than others at reducing rural poverty. They modelled the evolution of various poverty measures using pooled state-level data for the period 1957-91. The differences in trend rates of rural poverty reduction were attributed to differing growth rates of farm yield per acre and differing initial conditions – states starting with better infrastructure and human resources saw significantly higher long-term rates of poverty reduction. Deviations from the trend were attributed to inflation (which hurt the poor in the short term) and shocks to farm and non-farm output. This paper, while being quite insightful, unfortunately did not cover institutional factors such as the existence of a minimum support price to farmers and their impact on reducing rural poverty.

In addition to agricultural growth, productivity, initial income, private investment, infrastructure, urbanisation and industrialisation, we would expect sweeping changes in policy also to affect economic performance. Rodrik and Subramanian (2005) stated – in similar vein to Virmani (2006) – that the improvement in India’s economic performance was

¹¹ Their approach in using the United States as a benchmark may be debatable, but given the United States is the head of the technological frontier, and the standard neo-classical model would predict that growth rates converge to the country on the technology frontier, their choice is somewhat understandable.

¹² Their ‘V-states’ are Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Orissa, Rajasthan, and West Bengal. Their non-V states are Assam, Bihar, Uttar Pradesh, Punjab, and Haryana. The latter two are included in the non-V states because they fit the convergence model (higher average income in the 1980s, lower growth in the 1990s).

driven by policy changes. In particular, Rodrik and Subramanian argued that the trigger for India's upward break in growth – which they pinned down to around 1980 – occurred because of an “attitudinal shift” on the part of the national government in 1980 in favour of businesses. While taking a cross-national focus, this is one of the few papers that took the importance of non-economic factors in growth into account.

Similarly, Basu (2004) provided empirical evidence, from a study of sixteen major Indian states for the period 1980-2001, that under the economic reform process, the better institutional mechanism could actually help economies to grow faster with a higher level of economic well-being. This paper estimated the economic well-being index (by aggregating 15 socio-economic variables, that is, education, infrastructure, technological progress, income, among others) and an index of good governance (by aggregating 13 variables indicating the rule of law, government functioning, public services, press freedom, and the like) by multivariate statistical measures. Panel regression showed that governance measures and economic policy variables are crucial to explain the differential level of development performance across states in India during the last two decades. It is worthy of note that this is one of the few papers to take into account the impact of governance and institutional factors on differential economic performance of the states.

There is also an important survey article on inter-regional disparities by K. L. Krishna which focused on the issues of growth variability and volatility in Indian states. The coefficient of variation of year-to-year growth rates for a state was used as a measure of volatility. The four most volatile states in India were Orissa, Rajasthan, Gujarat and Uttar Pradesh while the three least volatile states were Punjab, Maharashtra and Kerala. However, the volatility has been declining on the national level since the 1980s. The author noted that the dispersion of the growth rates of states increased considerably in the post-reform period (from 15 percent in the 1980s to 27 percent in the 1990s). Further analysis showed that agriculture has a positive impact on industrial and service sector growth. Also, social infrastructure was an important determinant of the investment decisions. The author, however, stressed that there is a need to explore other approaches to explain economic growth from all perspectives.

Ashraf *et al* (2008) assessed quantitatively the effect of exogenous health improvements on output per capita in general (not with specific reference to India). They found that the effects of health improvements on income per capita were substantially lower than those that are often quoted by policy-makers, and may not emerge at all for three decades or more after the initial improvement in health. These results suggested that proponents of efforts to improve health in developing countries should rely on humanitarian rather than economic arguments.

Ghosh (2006) evaluated the relative performance of 15 major Indian states on human development, and examined the two-way nexus between this and economic growth. The estimates of cross-sectional growth regressions provided strong evidence of regional convergence in human development despite considerable divergence in real per capita income, indicating that the poor states that have failed to catch up with the rich ones in terms of per capita income have managed to catch up in terms of human development. The results suggested that the sequencing of policy should be such that the human development-induced growth process has to be strengthened for lifting the states from the vicious to virtuous cycle category. Although the findings from this paper made sense, it focused only on the relationship between human development and economic growth, without worrying about the other factors that impinged upon economic performance.

Banerjee and Iyer (2005) analysed the colonial land revenue institutions set up by the British in India, and showed that differences in historical property rights institutions lead to sustained differences in economic outcomes using district-wise growth rates. They found that areas in which proprietary rights in land were historically given to landlords have significantly lower agricultural investments and productivity in the post-independence period than areas in which these rights were given to the cultivators. This is similar to the effects Besley and Burgess (2000) found for the impact of land reform on rural poverty.

While the differential rate of growth among Indian states and the issue of convergence has been extensively probed in the literature, as is clear from the literature review above, few studies have looked at what explains the difference between the northern and the southern Indian states, taking into account the role of both economic as well as non-economic factors. While some past research has focused on economic factors, we make an attempt in this exploratory research, taking into consideration both economic and non-economic factors such as law and order that impinge upon growth in the northern and southern Indian states.

The next section focuses on the econometric model and methodology formulated for examining these questions.

Model and Methodology

Model

Once we reviewed the trends in the per capita NSDP, rural and urban poverty rates, and investment, we formulated a model to estimate the dependence of per capita NSDP on various explanatory factors that we hypothesised.

The theory is that growth in emerging economies is driven by differences in human capabilities, skills and awareness, resources and their utilisation, extent of urbanisation, good governance including law and order, and infrastructure. We believe these factors explain the disparities in investments, economic opportunities and other economic phenomena such as poverty and per capita income. Below we describe the indicators we have chosen for each of these factors and explain the rationale for their inclusion in the model. Following a discussion of the indicators, the structural and reduced form models are described and discussed.

Indicators of Human Capabilities

Some measures of human capabilities may be represented by education, and health care indicators. More precisely, these education and health indicators might be literacy rate, proportion of graduates, proportion of population enrolled in technical courses, and infant mortality rate (IMR) respectively. In addition, we examine the percentage of population in working age-groups, and on the supply-side, the number of institutions of higher education in the states.

Literacy rate can be expected to positively affect economic growth and per capita income in the states primarily because it is a measure of the knowledge and awareness of the population. Our assumption is that a higher literacy rate prepares the ground for higher skills, the ability to deal with higher technology, and the discretion to make rational choices. A more literate population is able to use its skills productively to generate more output and income.

The proportions of graduates and those enrolled in technical courses also positively impact the per capita income due to their effects on building a labour force with certain skills. The proportion of graduates reflects the percentage of the population that has attained a certain threshold level of education which equips them with certain skills used in specific kinds of economic activity. Hence, an increase in the proportion of graduates can be expected to increase the workforce participation rate and enable the population to contribute to increased output and income. The proportion of technical manpower can bring about growth and has the potential to increase incomes since investors are usually attracted to a pre-existing pool of manpower with certain skills.

Given the fact that we did not have enough observations to determine the proportion of graduates or students enrolled in technical courses, we did not include them in the model. In addition, these variables might be collinear with the literacy rate. While we did not have data for a reasonably long period of time to include these two variables in the estimation, we nonetheless review trends in these indicators across the southern and northern states. We may expect the percentage of population in working-age groups to affect per capita income positively through their impact on output because only the population in the working-age groups is likely to contribute to output increases.¹³

Turning to health indicators, the IMR across the states is an indicator of their progress on health. While this factor does not directly affect investments in the states, nevertheless it can be viewed as an indicator which reflects the economic capability of the workforce. Good health enhances the productivity of the population. The IMR indicates pre-natal care, maternal care and the existence of child care facilities, indicating maternal mortality, fertility rate and the death rate of the population. It indicates the stage of demographic transition the states are in. Our assumption and expectation is that a lower IMR of the population implies that the state's population is healthy. Time and again, empirical studies have brought out the finding that hospitalisation is one of the most important reasons for indebtedness and abject poverty, especially in rural areas (see George 2009). Hence we assume that states which have lower IMR of population are healthier. A healthy population, thus, is capable of producing more output and income.

Indicators of Governance: Law and Order

Governance refers to the functioning of governments and public institutions that impact economic activities and the lives of citizens (Paul and Sridhar [2009]). When the processes of public decision making and implementation of policies are carried out with credibility, transparency and accountability, governance is considered good. Given its complex nature and scope, however, it is far more difficult to define and measure governance than the other factors discussed above.

In this paper, governance has been equated with law and order. This was done because of the absence of data on other variables which reflect governance. As Paul and Sridhar (2009) point out, it is extremely difficult and challenging to come up with measures of governance that reflect the functioning of public institutions.

¹³ The working age group is defined as the population in the age groups 15-59 years. Only for 1971, data on population in the upper age limit was not available and, hence, we used population greater than 15 years as those being in the working age group. However, this was the same problem for all the states and, hence, we do not expect their relative positions to change.

A sound law and order system is essential for economic and social progress. Based on open-ended discussions with senior police officials, we came up with two measures of governance or law and order – police firing incidents per million population and percentage of pending cases under trial in courts. We have selected police firings per million population as an indicator of the law and order condition in a state, because it signals the intensity of agitation between groups, and the ability or inability of the administration to bring them under control or a combination of both. Because police firings are widely and regularly reported, they can add to uncertainty in the minds of investors, and can adversely impact the smooth functioning of a society, and its economic activity.

Law and order may also be represented by events which capture the efficiency and effectiveness of the judiciary such as the proportion of pending cases in court.¹⁴ One common measure that is chosen to reflect governance is corruption – the use of monetary or non-monetary bribes to get work done in government or public institutions. There is no reliable sub-national data on these measures. However, the fact that other measures of governance have been used does not imply that corruption and other measures of governance have been ignored, as Paul and Sridhar (2009) pointed out. Good governance does manifest itself in law and order. For example, when law and order is broken down (as reflected in the rising number of incidents of police firing), the public may be forced to resort to corruption. Similarly, when the public image of a place is that it is disorderly or when court cases take a long time to resolve (pending judicial cases), entrepreneurs will refrain from investing in that state since they look for a stable environment and speedy redressal of grievances in the event of disputes. Sound law and order is also essential for the retention of a skilled workforce. Hence, the measures we choose are reflective of public functioning and governance of a state.

Specifically, we expect that the greater the police firing incidents per million population are, the lower the per capita income would be. Similarly, the greater the percentage of cases pending trial, the lower the per capita income would be, for reasons discussed earlier.

We also examined special and local laws (SLL) crimes. These refer to crimes committed under the Arms Act, Opium Act, Gambling Act, Excise Act, Prohibition Act, Explosives and Explosive Substances Act, Motor Vehicles Act, Prevention of Corruption Act, Customs Act, Indian Railways Act and other offences. We have already demonstrated that corruption gets reflected in the law and order situation. It is similar in cases of crimes committed under the Explosives and Explosive Substances Act which is likely to be reflected in police firing incidents. Most of the other SLL crimes noted above are private crimes and do not reflect the general law and order condition of the state. Moreover, the reporting of many of these crimes is determined by the filing of a First Information Report (FIR). If no FIR is filed, then these crimes are not reflected in the data. However, since data on police firing and pending court cases are reported widely, we choose them to reflect governance and public functioning.

Thus, the measures of law and order we choose reflect to a substantial degree the governance of a state. We consider our work pioneering in that we found no other earlier studies (with a few exceptions) that have examined non-economic factors such as law and order and their impact on the economic environment.

¹⁴ In order to arrive at these indicators, we had open-ended discussions of the role that law and order plays and how it impinges on the economic growth and environment in the states, with the Director General of Police, in Karnataka. He suggested that the number of incidents of police firing and the percentage of civil to armed police are good indicators to capture the public agitation mood in the state, which impinges on their economic and investment environment.

Measures of Infrastructure

Why is infrastructure important for economic growth and investment? Infrastructure is an important enabler for economic growth. Electricity is much required for manufacturing; telecommunications are necessary for reducing firms' transaction costs; good roads are required for transportation of inputs and connectivity to markets. Mani, Pargal and Huq (1996) found that power availability rather than its price, reliable infrastructure and factors of production played significant roles in firm location decisions across major Indian states. In line with this literature, our chosen measures of infrastructure or public services are the installed generation capacity of electricity, and the penetration of telecommunications.

First we take the instance of electricity – installed generation capacity in the states. While *electricity consumption* is concomitant with growth and may be expected to increase monotonically with growth, *installed capacity* is a precondition for growth. Installed capacity is critical for manufacturing processes and is necessary to increase output and raising per capita incomes.

Another measure of physical infrastructure we examine is the percentage of households with electricity. This indicates the extent to which electricity is extensively available in the state. However, given that the percentage of households with electricity could be correlated with the installed generation capacity in a state, we include only installed generation capacity in the estimation, although we present trends and disparities in the percentage of households with electricity connections across the northern and southern states.

Telecommunications are crucial for firms to reduce their transaction costs (see Norton (1992); Roller and Waverman [2001]) and for increasing organisational efficiencies, output and per capita incomes. The literature conclusively showed that tele-density has positive impacts on growth. A number of researchers have hypothesised that telecommunication infrastructure lowers both the fixed costs of acquiring information and the variable costs of participating in markets (Norton, 1992). They point out that as such infrastructure improves, transaction costs decline, and output increases for firms in various sectors of the economy. Sridhar and Sridhar (2007) found that mobile and landline phones have a positive impact on national output, when controlled for the effects of capital and labour. Hence, we expect both installed generation capacity and tele-density to have positive effects on the economic environment in the states, especially so for manufacturing, and positively impact the per capita NSDP.

Indicators of Resources

We choose per capita public (both capital and revenue) expenditure as an indicator of resources available to the states which could endogenously determine its per capita NSDP. This is because it is assumed that all public expenditure translates into the output of goods and services, increasing the per capita NSDP. This could be endogenous since rising public expenditure could be partly financed out of rising NSDP. However, we get around the endogeneity by using the lagged form of this variable. While current year expenditure can be endogenous, per capita income in current year cannot impact previous year's expenditure.

Measures of Urbanisation

We use the percentage of urban population in a state as the measure of urbanisation which we expect will impact per capita income. Urbanisation is a causal factor underlying high per capita incomes because scale economies and agglomeration economies make it possible to accumulate output rapidly. How is urbanisation defined in India's context? The Census of India defines settlements having the following characteristics as urban areas:

- a) a population of five thousand or more;
- b) a minimum density of 1,000 people per square mile; and
- c) at least seventy five percent of work force outside agriculture.

It should be mentioned that India's definition of urbanisation is quite conservative when compared with that of China where all areas with a minimum of 10 percent non-agricultural employment are classified as urban. As Cohen (2004) argued, if India were to reclassify its urban areas using a more liberal definition, a majority of India would be urban today. In fact, higher levels of urbanisation also attract firms to locate, invest and create jobs due to urbanisation economies and localisation economies.

Based on the discussion above regarding indicators of various factors, a model was formulated to explain the per capita NSDP of state i at time t . It is stated below:

$NSDP_{it} = f$ (Investment, Literacy rate, IMR, Police firing incidents, Percentage of pending cases in courts, Installed capacity, Per capita expenditure, Percentage of urbanisation, Percentage of population in the working age group, Percentage of technical enrolment, Tele-density) (1)

It is easy to believe that per capita income is determined by private investment which creates jobs and income. Per capita income is one of the most fundamental economic phenomena which reflects the economic living conditions of a population. Next, this is also one variable on which a reasonably long time series of data was available (unlike the poverty rate, data on which was available only for a few years). Hence the per capita NSDP was chosen as a measure of aggregate economic performance of the states, as is commonly done.

The model in equation (1) was estimated in reduced form, taking into account econometric problems that arise when a model of this type is estimated. For instance, investment is a function of all the factors highlighted in the equation. Hence equation (1) was estimated in reduced form. Potentially, a number of variables such as literacy rate, urbanisation, and IMR are all likely to be endogenous. To get around this problem, we used the lagged form of all variables in equation (1) and estimated the model. The equation which was estimated is shown below.

$NSDP_{it} = a_0 + a_{1i,t-1} \text{Literacy rate} + a_{2i,t-1} \text{IMR} + a_{3i,t-1} \text{Police firing incidents (per million population)} + a_{4i,t-1} \text{Percentage of pending cases in courts} + a_{5i,t-1} \text{Installed capacity (per million population)} + a_{6i,t-1} \text{Per capita public expenditure} + a_{7i,t-1} \text{Percentage urbanisation} + a_{8i,t-1} \text{Percentage of population in the working age group}$ (2)

Thus, per capita NSDP of state i at time t is estimated as a function of the explanatory variables shown in equation (2) for state i at time $t-1$. We were unable to include the

percentage of population enrolled in technical courses and tele-density in the estimation because of the very limited number of observations for these variables.

Methodology

Most of the data we examined as it relates to economic phenomena, investment opportunities, human capabilities and skills (educational and health indicators), infrastructure, urbanisation, and resource utilisation exist from the 1980s onwards (although some of them exist only decennially for the census years). Reasonably long enough time-series data (going back to the 1960s) do not exist for all the indicators (with the exception of per capita NSDP and installed generation capacity [of electricity]).

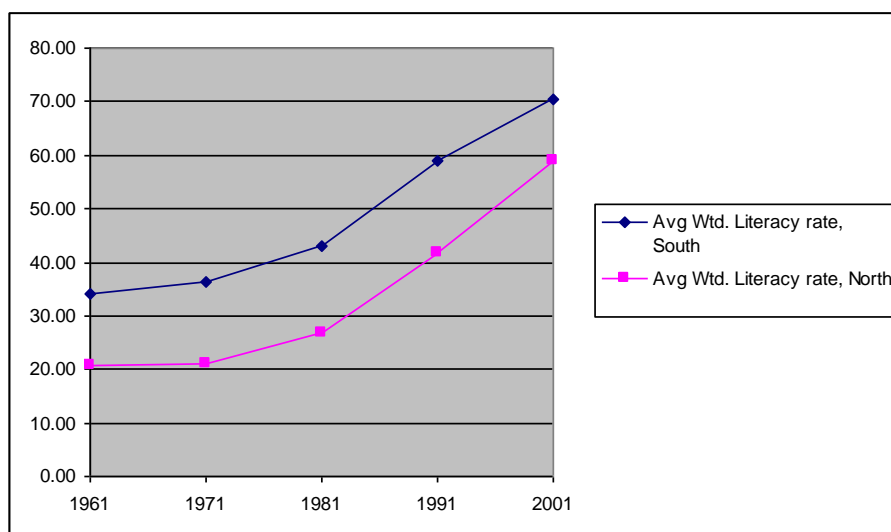
Hence, we first examine historical trends in each of the above indicators to determine if some form of relationship exists between economic phenomena, urbanisation, governance, infrastructure and human capabilities. As discussed earlier, observing these phenomena over a period of time has the advantage of demonstrating whether such disparities across the southern and northern states are a recent phenomenon or they always have existed for a long time. Once we examined the trends and disparities in each of the indicators, in the next step, we estimated the econometric model shown in equation (2) to analyse the impact of various human capability factors, law and order (governance), urbanisation and infrastructure on per capita income across the northern and southern states.

In the section which follows, we focus on trends in the various explanatory factors before we delve into the estimation and the results.

Trends in Explanatory Factors: Human Capabilities

In the previous section, we examined the rationale for the inclusion of variables in the model for estimation of the dependence of per capita NSDP on various explanatory factors. In this section, we review the trends and disparities in these explanatory factors. Figure 5 compares the average weighted (weighted with population) literacy rate across the southern and northern states over time.

Figure 5: Trends in literacy rate, south and northern states



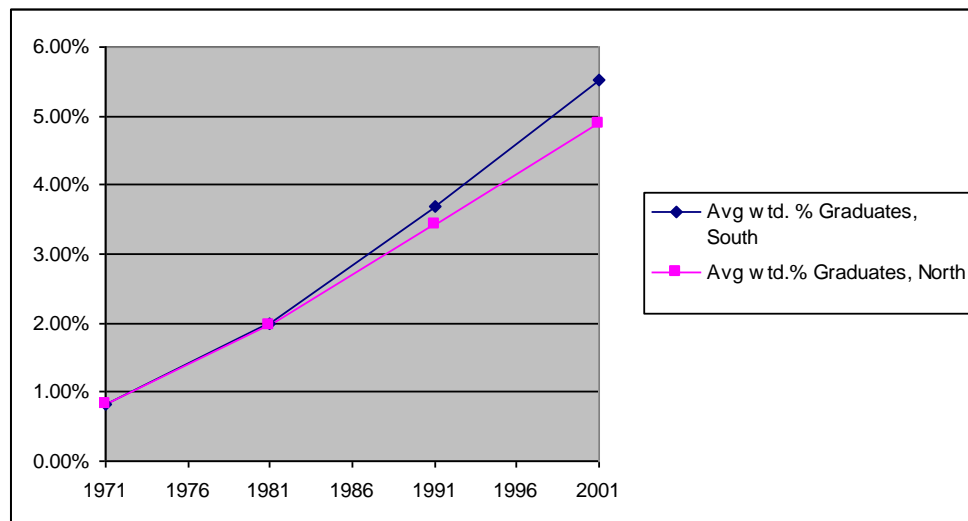
Source: Census of India and authors' computations.

Figure 5 shows that the southern states' literacy rate has always been at a higher level when compared with that of their northern counterparts. In addition, the rate of growth of literacy also has been occurring at the same rate in the two regions, with the result that the northern states' literacy rate has remained well below that of the south as of 2001. Despite its remarkable stability when compared with per capita NSDP (which is quite volatile, see Figure 1), we surmise that the literacy rate may have been one of the pre-conditions necessary for economic growth to have taken off in the southern states.

In terms of examining trends in educational outcomes, we do not stop at the literacy rate. We compare the trends in the average proportion of graduates (or above) during 1971-2001 between the southern and northern states as yet another educational measure.

Figure 6 compares the trend in the average weighted proportion of graduates during 1971-2001 for the southern and northern states separately. The interesting finding here is that the northern states had on average the same proportion of graduates as the southern states in 1971-81. However, they gradually lost out to the southern states during 1991-2001 (Figure 6). Thus, we have more evidence here that shows that the surge of the south is a more recent phenomenon, not historical.

Figure 6: Proportion of graduates, southern and northern states, 1971-2001



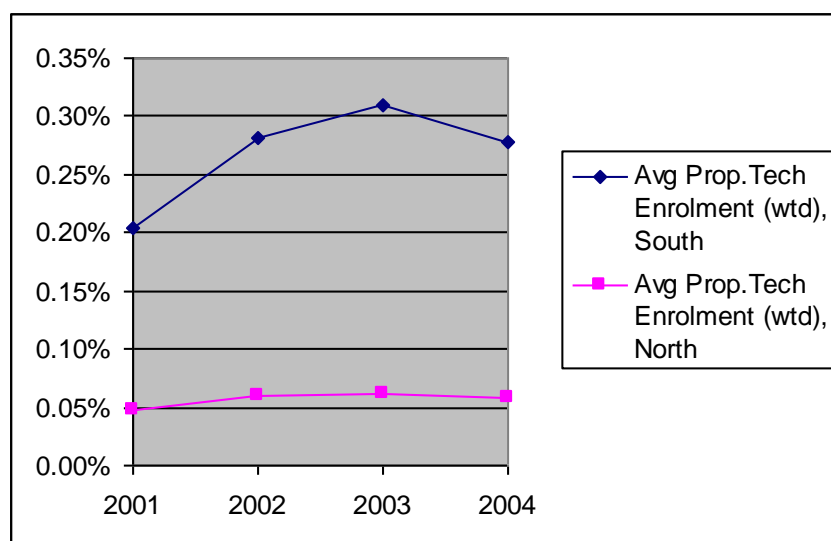
Source: Census of India and authors' computations.

Over and above the general graduates, we made an attempt to examine the proportion of technical manpower in the two groups of states. Enrolment in and graduation with degrees in technical courses such as Engineering, Science, Architecture, Medicine, Dentistry, Nursing, Pharmacy, Ayurvedic & Unani, Education and Technology have a role in building a skilled labour force. So we compared enrolment by year in all the above technical degree courses as a proportion of the population in the relevant age group (above 15 years) to examine if the southern states have more of an edge compared with their northern counterparts (see Figure 7).¹⁵ Certainly, the southern states have a higher proportion of skilled and technical labour when compared with the northern states for all the years of study.

¹⁵ The methodology we used to arrive at the enrolment in these technical courses as a proportion of population above 15 years of age, during 2001-05 is as follows: We took the age-wise distribution of population in 2001 from the 2001 Census for all the states. Then we assumed that the same age-wise distribution of population

All these measures of human capabilities and skills can be expected to impact not only per capita income through their effect on skilled jobs, but also affect investment due to the existence of a pool of skills, which impact firm location decisions. In fact, it is plausible that technology giants such as Infosys and WIPRO have located in Bangalore only because of the pre-existence of a large pool of skilled and technical workforce there. Paul and Sridhar (2009) reported that the southern Indian state of Tamil Nadu had a total of over 540 engineering colleges in 2008 compared to only 11 colleges in the 1970s. They reported that Uttar Pradesh, on the other hand, had less than half this number of engineering colleges though it had a head start in this area in the 19th century.

Figure 7: Enrolment in technical courses, southern and northern states



Source: Ministry of Human Resource Development, Government of India, and authors' computations.

On the labour market aspects, we examined the percentage of population in the working-age groups. Figure 8 presents the disparity across the northern and southern states in terms of their working-age group population.

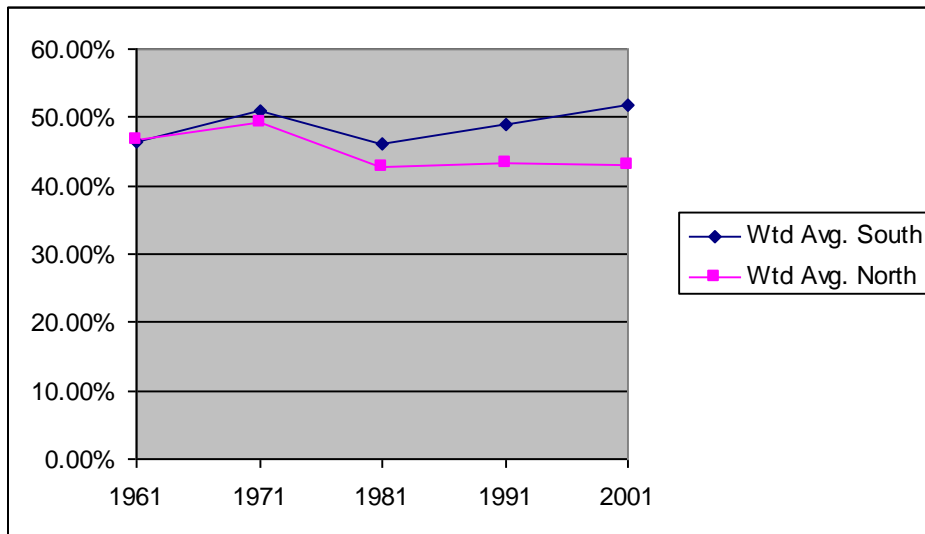
Figure 8 shows that although the northern and southern states in 1961 were the same as far as the percentage of population in working age group is concerned, there was a divergence after 1971, when there was a steady increase in the working-age population in the southern states, compared with that in the north. This lends credence to the belief that this may have been a contributing factor to the rising incomes we observe in the south.¹⁶

holds good for 2002-05. Since we had the state-wise populations during 2002-05, we applied the age distribution (of population above 15 years of age) of 2001 to obtain population above 15 for the non-Census years. Then we took the enrolment in the technical courses as a proportion of population above 15 years of age. Next we averaged this proportion for the southern states and the northern states (including Jharkhand, Uttaranchal and Chhattisgarh) separately.

Although we tried, we were unable to get data for earlier years on this important indicator.

¹⁶ We also got data on the man-days lost by the states, but there was no reliable data on the number of man-days of employees or workers, against which we could compare the man-days lost. Hence this variable could not be used.

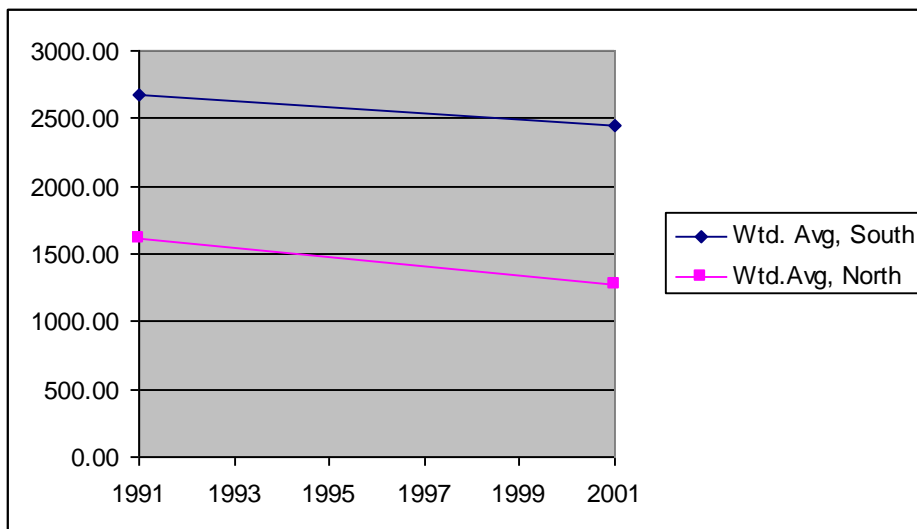
Figure 8: Population in working age groups, south and northern states



Source: Census of India, various years and authors' computations.

Finally, on the supply side of human resources, we examined the number of higher educational institutions in the northern and southern states. To get this information, we aggregated data on the number of colleges from the Census town directories.¹⁷ The assumption is that only towns and cities contain institutions of higher education, which is reasonable. There is also no source which would contain this data for rural areas as well. Figure 9 presents this data for the northern and southern states.

Figure 9: Higher educational institutions, south and northern states



Source: Census of India town directories and authors' computations.

Figure 9 shows that as with the other measures of human resources we observe, even with respect to higher educational institutions, the southern states have stolen a march over their

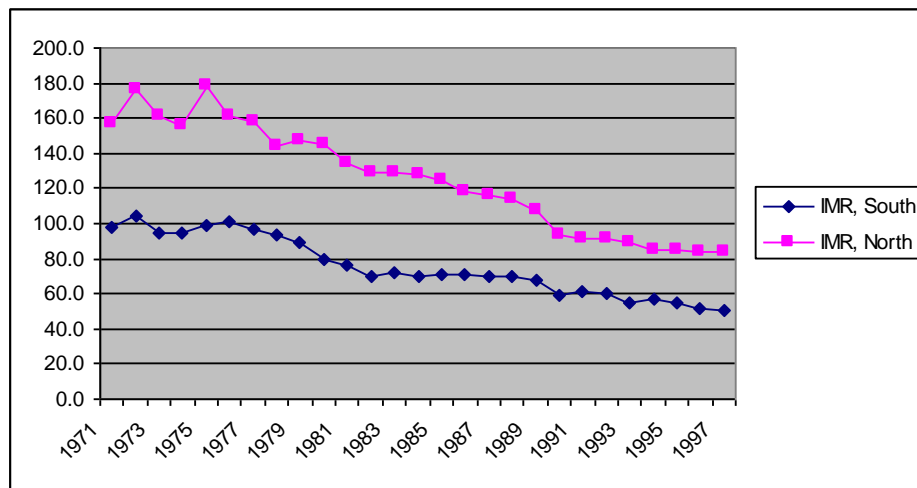
¹⁷ Here, information on arts, science, commerce, engineering, medical and law colleges, vocational training institutes and polytechnics is included.

northern counterparts. This must have created the necessary institutional capacity to turn out a large pool of skilled labour responsible for the increasing levels of output and income.

Thus, we find that in terms of educational outcomes measured in the literacy rate, proportion of graduates, enrolment in technical courses, proportion of population in the working age group and supply-side factors such as the number of higher educational institutions, the southern states have an edge over the northern states during the entire period of our study.¹⁸

Figure 10 summarises the selected health indicator of human capabilities – the IMR, weighted by population of the respective states. Figure 10 which summarises the historical trends in the IMR across the southern and northern states shows that the southern states (with a lower IMR) have always been better than their northern counterparts, consistent with our expectation. This implies better pre-natal medical care and related facilities in the south which implies a population with a much better health and productivity than in the north, although IMR in the northern states has been declining post-1991.

Figure 10: Infant mortality rate, southern and northern states



Source: Compendium of India's Fertility and Mortality Indicators, 1971-97, Registrar General of India and authors' computations.

These trends in education and health which are indicators of human capabilities and skills, thus, strongly suggest that the southern states have had a historical advantage, at least in some of them, over their northern counterparts.

Trends and Disparities in Governance: Northern and Southern States

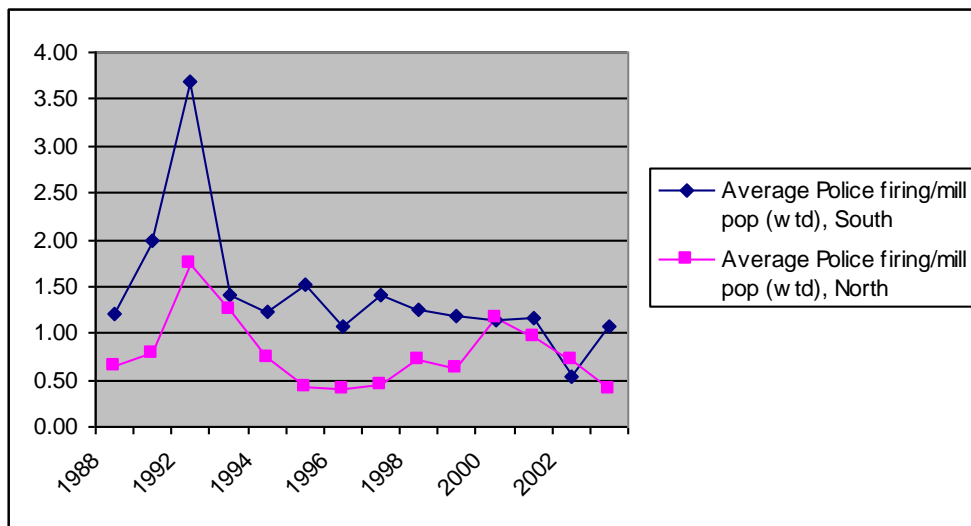
We have already discussed the indicators of governance – police firing incidents (per million population) and proportion of pending court cases under trial. An examination of trends in police firing incidents, and proportion of pending cases in the court (filed under the Indian Penal Code [IPC]) are very revealing when we look at these separately for the southern and northern states.

¹⁸ A caveat to note is that the mere existence of a large number of educational institutions in the southern region does not mean that enrolments are only from the people from the southern states or that the graduates coming out from these institutions necessarily constitute the labour force for the industries in the south.

Figure 11 summarises the trend in the average number of police firing incidents (per million population) separately for southern and northern states, weighted by their population.¹⁹

During the 1990s, the south Indian states had relatively more police firing incidences per million population when compared to the northern states, which is a startling observation. We probed into this and found that the police firing incidents in the south are dominated by Andhra Pradesh, which was characterised by frequent Naxalite disturbances (1987-2002), due to which there was a sharp increase in the number of police firing incidents. It should be noted that Andhra Pradesh which is high on this score (law and order problems), is lowest on the per capita income front among the southern states (implied in Chart 1, see Paul and Sridhar [2009]). By and large, if Andhra Pradesh is to be excluded, police firing incidents in the southern states are always at a lower level than in the north. Paul and Sridhar (2009) also found evidence of this.

Figure 11: Trends in the average number of police firing incidents per million population, southern and northern states



Source: National Crime Record Bureau and authors' computations.

Next we take the proportion of cases pending in courts in the two sets of states and examine their trends during 1991-2004. This is calculated as cases filed under the IPC pending trial in the courts as a proportion of the total number of cases for trial including pending cases from previous year. Court cases should be viewed as a measure of public faith in the judiciary and pending cases demonstrate its (in)efficiency.

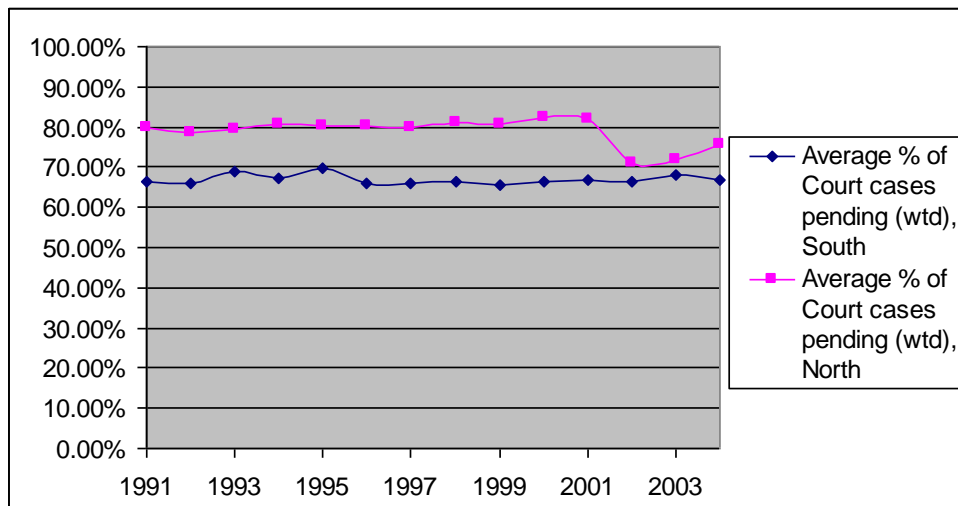
Figure 12, which compares the weighted (weighted by population of the respective states) proportion of cases pending trial in courts, shows that the judiciary in the north Indian states is quite inefficient when compared with that in the south Indian states, where on average the proportion of cases pending trial stood at only 67 percent as of 2004, compared with 76 percent in the northern states (including the three new states – Jharkhand, Chhattisgarh and Uttaranchal). It may be argued that cases are pending probably because the number of cases

¹⁹ For the northern states, since we are comparing the undivided states (Madhya Pradesh, Bihar and Uttar Pradesh) prior to 2000 with years beyond 2000 after the three new states were carved, we have added the data for Chhattisgarh, Jharkhand and Uttaranchal post-2000 to ensure that we are comparing the same sets of states.

registered is higher than that of judges. The small number of judges seems to indicate that the state is unable to recruit more of them to increase its efficiency. This is yet another indicator which impacts the economic environment in these states, which is very representative, since investors also expect an effective redressal of grievances in the event of disputes.

We investigated the possibility of using other law and order measures, such as the proportion of civil to total police force (consisting of civil and armed police). However, since that is correlated with the number of police firing incidents, we decided to use the police firing incidents per 100,000 population. For instance, only when the number of police firing incidents is on the increase that we may expect armed police strength in a state to increase. Hence, we expect that police firing incidents coupled with the pending cases under trial in the courts of the state provide reasonably good measures of law and order.

Figure 12: Trends in proportion of cases pending trial in courts of northern and southern Indian states



Source: National Crime Record Bureau and authors' computations.

In summary, with the average weighted number of police firing incidents (leaving out Andhra Pradesh which is the outlier) being lower in the south and with their high judicial efficiency (low proportion of cases pending trial), there is reason for us to believe that the south would offer a more peaceful and stable environment resulting in better economic opportunity and investment opportunities compared with their northern counterparts.

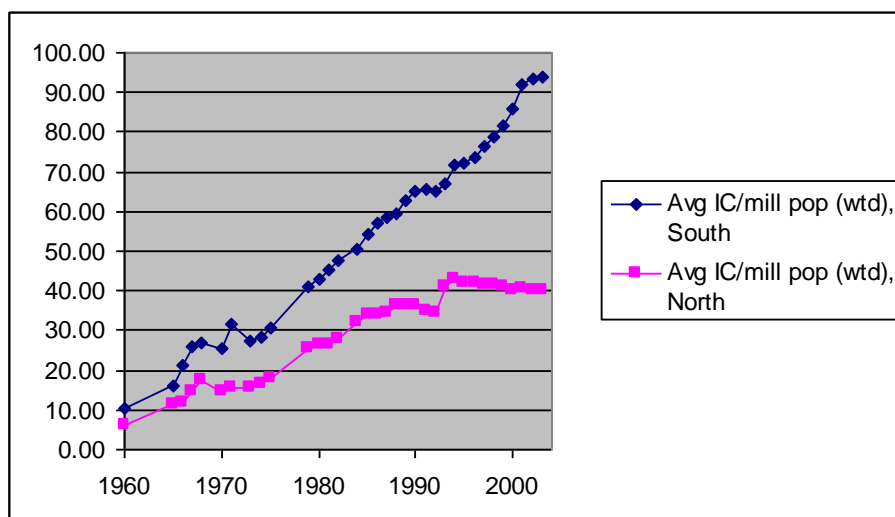
Trends in Indicators of Infrastructure

Our findings with respect to the infrastructure indicators – installed generation capacity, and tele-density, are interesting. We find that the southern states are ahead of the northern states in these respects.

Figure 13 summarises weighted (weighted by the respective states' population) installed capacity (thousands of kilowatts) per million population in the southern and northern states separately. These data series cover a reasonably long period of time. Not only was the installed capacity per million population always lower in the northern than in the southern

states, but there was also a widening of these disparities between them from the mid-1980s.²⁰ The southern states experienced a continuous increase in their installed capacity after the 1990 liberalisation whereas the northern states faced several constraints in installed capacity expansion due to which their average weighted installed capacity stagnated since the beginning of the mid-1980s. Thus, it is possible that a number of pre-conditions necessary for the existence of industry and services were forming in the southern states, which prepared them to take off when the reforms of 1991 took place.

Figure 13: Trends in installed capacity of electricity per million population: southern and northern states



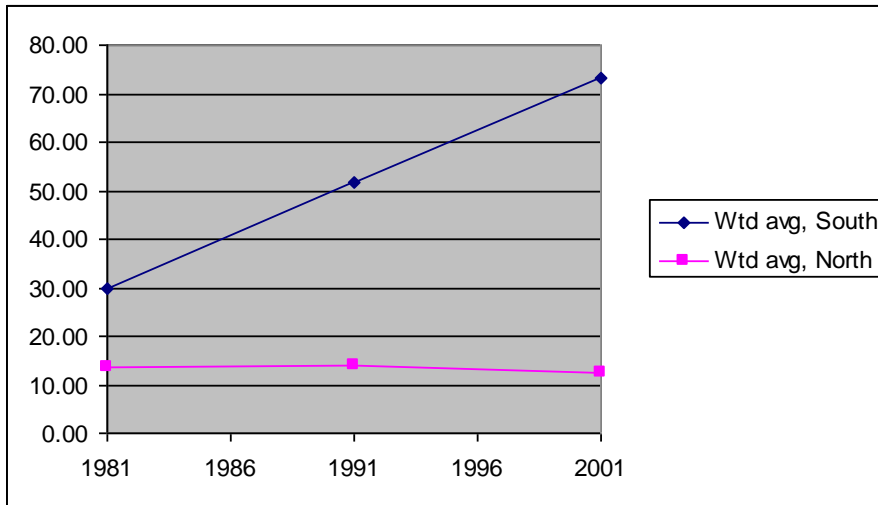
Source: Central Electricity Authority, Ministry of Power, Government of India and authors' computations.

Another measure of physical infrastructure we examine is the percentage of households with electricity. This indicates the extent to which electricity is extensively available in the state.

Figure 14 summarises the weighted proportion of households in the two groups of states and presents the trends over time. This figure shows that the southern states clearly have a lead in the percentage of households with electricity for all the years of our study. This implies that the southern states' physical infrastructure was much better when compared to the northern states, which prepared them to grow rapidly when the liberalisation of 1991 took place. The northern states with their low level equilibrium with regards to the electricity infrastructure were not prepared and, hence, lagged behind even when the reforms of 1991 took place.

²⁰ Here, as with other indicators, post-2000, we added the installed capacity for Chhattisgarh, Jharkhand and Uttaranchal to that for Madhya Pradesh, Bihar and Uttar Pradesh respectively, in all fairness to the northern states, since Chhattisgarh especially got a lot of power plants post its bifurcation from Madhya Pradesh. We have ensured, based on our discussions with the Central Electricity Authority, that it is possible for installed capacity to decline when old plants are retired or when plants are degraded.

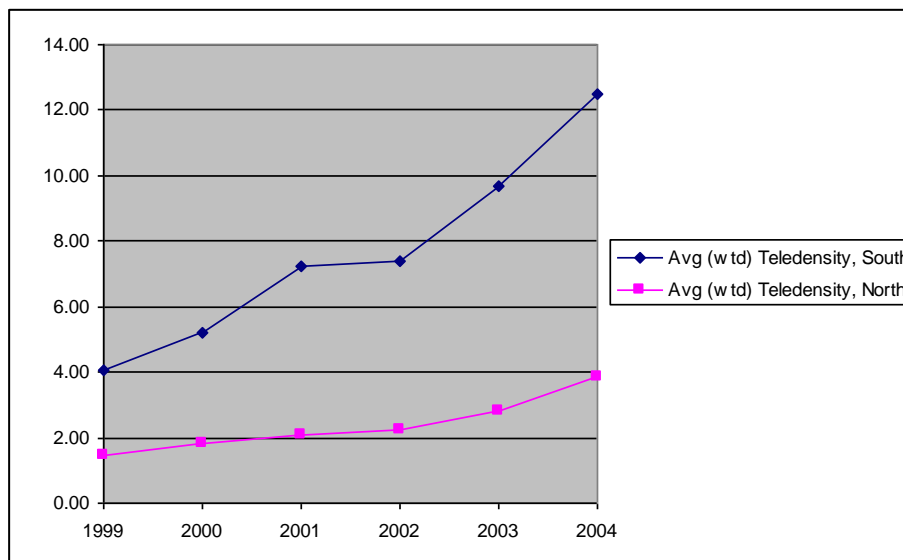
Figure 14: Percentage of households with electricity, northern and southern states



Source: Census of India, various years, and authors' computations.

Another measure of infrastructure we looked at relates to tele-density – the number of fixed land lines and mobile phones per 100 population for the southern and northern states. Figure 15 presents weighted tele-density (weighted with the states' population) for the two sets of states. As with electricity, tele-density for the southern states on average is not only much higher than that for the northern states for the limited period (1999-2004) over which we observe this, but it also increased at a much higher rate in the south than in the northern states over this period.

Figure 15: Trends in tele-density: southern and northern states



Source: Department of Telecommunications, Government of India.

Recall that we have defined tele-density to consist both of land lines and mobile telephones. Given that land lines are mostly offered by government operators (such as Bharat Sanchar Nigam Limited, Mahanagar Telephone Nigam Limited and so on), there is not much of a

difference in penetration between the southern and northern states.²¹ The differences in total telephone penetration across the northern and southern states could be attributed to the extent of mobile telephone penetration, which is much higher in the southern states. This is primarily due to the competition prevalent in the mobile telephony sector (see Sridhar [2007]) which is much greater in the southern than in the northern states.

We made an attempt to examine the road length in the northern and southern states. We did obtain data on this from the Centre for Monitoring Indian Economy (CMIE), but found that the road length declined during some years in most of the states. This suggests that there were changes in road classification which were not captured by this database and hence are not reported here.

In summary, all infrastructure indicators including installed capacity (electricity) and the percentage of households with electricity and tele-density show clear advantage for the southern states and steep disparities which have been widening between the northern and the southern states over a reasonably long period of time. This strongly suggests that the southern states had all the pre-conditions necessary for growth and were ready to take off when the 1991 reforms took place. However, the northern states with their poor infrastructure and pre-conditions were not simply ready to take advantage of the opportunities when economic liberalisation started to take place in the country.

Trends in Resource Utilisation

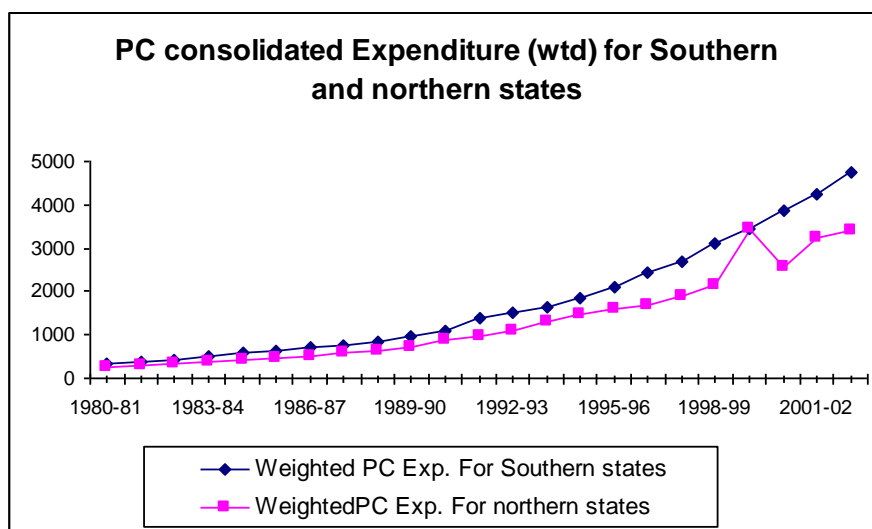
The efficiency with which resources are utilised has an impact on economic growth. If resources are used in a manner which maximises the useful goods and services derived from those resources, then we may expect greater economic growth. The ‘doing more with less’ slogan indicates the focus on *more* outputs with *fewer* impacts (fewer resources). While we focus on outputs with fewer resources, we are unable to examine other resource utilisation impacts such as on the condition of the poor (those relating to equity), due to data limitations. Some measures of resources and their utilisation would be public expenditures. We examined the trend in total expenditures²² (consisting of both developmental and revenue expenditure) on various social sectors (such as education and public health), which are seen as inputs.

Figure 16 summarises the average total (developmental and non-developmental) per capita expenditure of the southern states (weighted with population), and that of their northern counterparts. The record of the southern and northern states in terms of spending (summarised in Figure 16) indicates that the southern states made a leap forward in their developmental expenditures post-1991 compared with their northern counterparts. However, the fact that the southern states did not always have this advantage may be seen in the fact that in the 1980s, the northern states’ per capita expenditure was more or less the same as of the southern states. Ghate and Wright (2008) found that revenue expenditure by the V-states were lower than those by their non-V states.

²¹ As far as the three new states which were created in 2000 are concerned (namely Chhattisgarh, Jharkhand and Uttaranchal), they are still treated as being part of the circles of their parent states with the result that pre-2000 and post-2000, we are comparing the same states.

²² This includes developmental expenditure incurred on the capital and the revenue accounts.

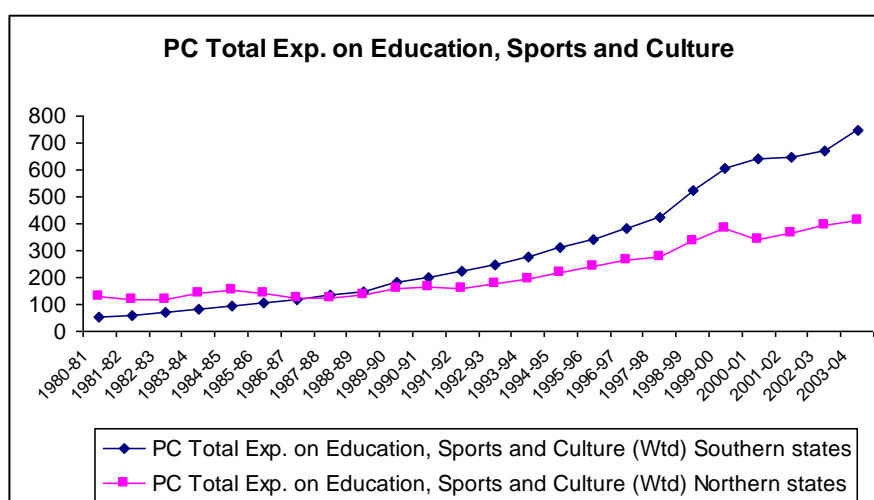
Figure 16: Total per capita expenditure, southern and northern states



Source: EPW-RF and authors' computations.

Next, we review the sectoral expenditure for the southern and northern states. When we look at sectors such as education and health, it is important to take total expenditures rather than merely capital expenditures. Much of the education and health outcomes depend upon the number of school teachers and health workers. In this context, current/revenue expenditure constitutes more than 80 percent of total expenditure. Thus, we compared total expenditures on sectors such as education and health with respective outcomes such as literacy rate, proportion of graduates, enrolment in technical courses, and the IMR.

Figure 17: Trends in total per capita expenditure on education, sports and culture, southern and northern states



Source: EPW-RF and authors' computations.

Figure 17 summarises over time the average per capita (total) expenditure on education, sports and culture by the southern and northern states.²³ While we do not have this data

²³ In the case of education and health, the total expenditure was developmental expenditure on the capital and revenue account. There was no non-developmental expenditure reported.

disaggregated separately for education, sports and culture, we surmise that the expenditure on education must account for a major part of this expenditure. Having noted this, Figure 17 shows that the southern states spent lower on education than the northern states during the 1980s. It was only after 1990 that the southern states' spending on education, sports and culture started diverging from that of the northern states.²⁴

It is not clear if the increased spending is a sign of inefficiency or indicates better outcomes. Hence, we compared this expenditure on education to relevant outcomes in the southern and northern states to assess this. The foremost of educational outcomes is the literacy rate which we have compared for the southern and northern states in Figure 5. That figure clearly showed that the south has been well ahead of the north historically in terms of its level and progress of literacy rate. This means that the per capita expenditures on education are either not completely reflected in the literacy rate or the southern states are more efficient (recall from Figure 17 that their spending on this sector during the 1980s had been lower than that of the northern states) when compared with their northern counterparts as far as the outcomes are concerned.

We have also compared the trends in the average proportion of graduates (or above) during 1971-2001 between the southern and northern states as yet another educational outcome (see Figure 6). We found that the surge of the south is a more recent phenomenon, not historical (recall that initially the southern and northern states had the same proportion of graduates until 1981). Even when we compared enrolment in technical courses, we found that the southern states have a higher proportion of technical labour when compared with the northern states in all the years of study (Figure 7).

Thus, educational outcomes measured in terms of literacy rate, proportion of graduates (post-1981), and the enrolment in technical courses, show that the southern states have maintained an edge over the northern states. This is so despite the fact that their spending on education has not always been higher than that of the northern states (Figure 17, see the decade of the 1980s). Thus, it must be the case that the southern states' expenditures on education are efficiently spent compared with that of the northern states.

Next, we examined per capita expenditures by the states on public health and medical facilities.²⁵ Figure 18 summarises the trends in per capita spending on public health and medical facilities in the south and northern states. Figure 18 shows considerable variability in the per capita expenditures on public health and medical facilities across the two set of states, with the southern states' spending diverging from that of the northern states beginning from the late 1980s.

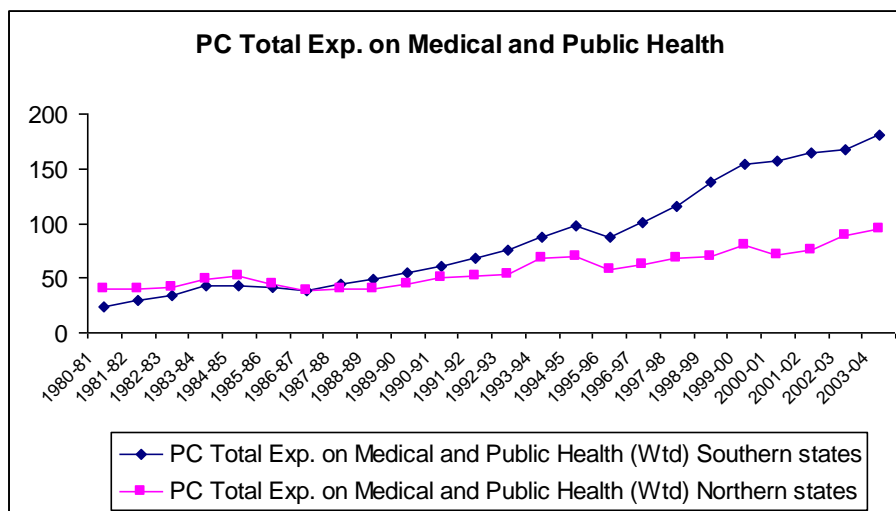
We have already reviewed the outcomes of health spending – manifested in the IMR of the population, which is lower for the southern states (see Figure 10). Given that the southern states' spending on public health was clearly lower than that of the northern states during the decade of the 1980s, but its health outcomes such as IMR were clearly better always, it must

²⁴ It must be mentioned that, as with the other indicators, for the northern set of states, we have included the data for the three newly created states – Jharkhand, Chhattisgarh and Uttaranchal post-2000, so that the pre-2000 and post-2000 data are comparable.

²⁵ As with the other indicators, for the northern set of states, we have included the data for the three newly created states – Jharkhand, Chhattisgarh and Uttaranchal post-2000, so that the pre-2000 and post-2000 data are comparable.

be the case that the quality of spending in the south is much better than in the northern states even with regards to public health.

Figure 18: Per capita expenditure on public health, southern and northern states



Source: EPW-RF and authors' computations.

In summary, when we compare spending on education and health with their outcomes across the two groups of states, we find that the south is relatively more efficient as it is able to ensure better outcomes than the northern states with its lower record of spending on these sectors during the 1980s. In attempting to compare the expenditure on roads and bridges by the southern and northern states, we did not have reliable data on outcomes there – road length, to enable us to make an assessment of this component of public spending.²⁶ We also had data on spending on energy, which could have been easily compared with the outcome on installed capacity generated, but the data on energy was incomplete.²⁷

While in this section we have compared the public expenditure on social sectors with their outcomes to assess the efficiency of spending, we use total public expenditure per capita (lagged) as an explanatory variable in the regression.

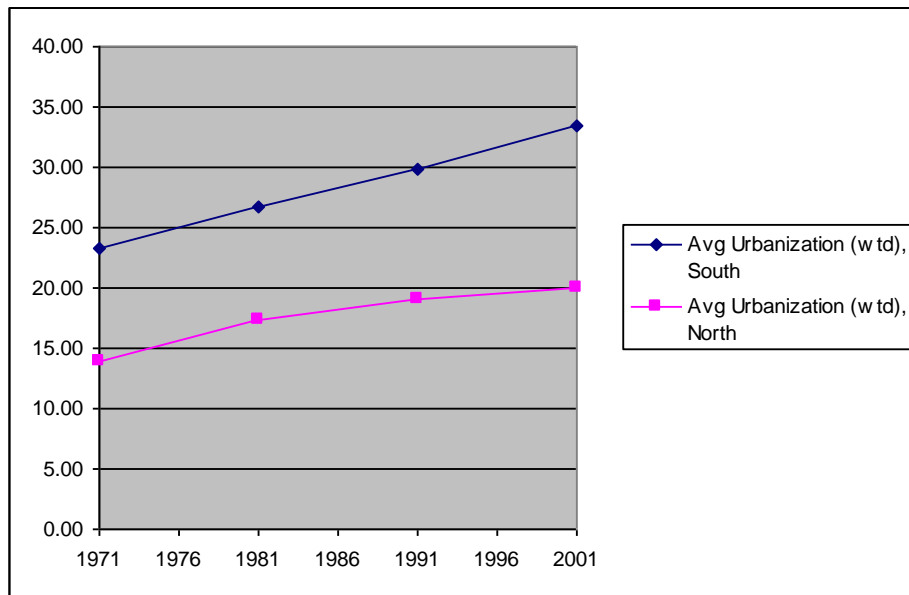
Disparities in Urbanisation

Given the importance of urbanisation in increasing aggregate productivity and incomes, what do we observe with respect to the urbanisation pattern of the southern states versus the northern states?

²⁶ We found in the case of some states that road length actually declined in some years, which is not plausible except in the event of a reclassification of roads. Further we found that the data on road length from the Centre for Monitoring Indian Economy (CMIE) was disaggregated by various types of roads such as surfaced national highways, surfaced state highways, district roads, *panchayat* roads, urban roads, project roads and so forth. But the length of different types of roads did not add up to the total road length reported. We made an attempt to get in touch with CMIE regarding this, but did not obtain a satisfactory response.

²⁷ We found negative values in the developmental expenditure on energy in the case of both the southern and northern states. Based on our discussions with the EPW-RF, the actual developmental expenditure on energy is worked as follows: if the actual expenditure is Rs100 crores during any given year, and the receipts were Rs116 crores, then the Rs16 crores appears as deficit. The problem with using these data is that they do not indicate what was spent, but only the deficit.

Figure 19: Trends in urbanisation, southern and northern states, 1971-2001



Source: Census of India and authors' computations.

Results from Estimations

We estimated equation (2) by OLS regressing the per capita NSDP on the lagged form of a number of explanatory factors representing human capabilities, skills, awareness, infrastructure, urbanisation, law and order, and other relevant factors. First, we used the full sample consisting of the northern and southern states to understand what determines economic growth. Then we estimated the regressions separately for the northern and southern states, to examine if there are factors which uniquely determine their economic conditions.

The full sample results are summarised in Table 1. It shows that the lagged per capita expenditure and urbanisation are the most significant variables impacting per capita NSDP in the northern and southern states. The per capita total expenditure²⁸ impacts the per capita NSDP positively, implying that higher public expenditure manifests in higher levels of output which translates into higher income. The magnitude of the coefficient implies that for every Rs1 increase in public expenditure per capita, there is nearly an Rs1 increase in per capita NSDP. The percentage of urban population impacts the per capita NSDP positively implying that scale economies and urbanisation economies lead to higher productivity and incomes, which was expected. Specifically the magnitude of the estimate on urbanisation implies that for every one percentage point increase in the level of its urbanisation, there is nearly an Rs200 increase in the per capita NSDP of a state.

²⁸ This includes revenue expenditure (which includes developmental and non-developmental expenditure, grants-in-aid by the state, compensation and assignments to local bodies and *panchayat raj* institutions, reserve with finance department), and total disbursements (which includes capital outlay, discharge of debt, repayment of loans to the centre, loans and advances to other states, appropriation for contingency fund).

Table 1: Estimation of per capita NSDP, northern and southern states

Variable	Unstandardised Coefficients	Std. Error	t	Sig.	Variable Mean
(Constant)	-3520.00	5651.20	-0.62	0.54	
Literacy rate (lagged)	-11.83	14.58	-0.81	0.42	43.88
IMR, lagged	-8.60	12.47	-0.69	0.49	83.90
Police firing incidents per million population, lagged	-33.85	76.89	-0.44	0.66	0.96
Percentage of pending cases, lagged	1.84	18.14	0.10	0.92	74.79
Installed capacity (in 000 KW) per million population, lagged	-2.76	13.99	-0.20	0.84	42.45
Per capita expenditure, lagged	0.97***	0.17	5.77	0.00	1,570.72
Percentage of urbanisation, lagged	199.33***	29.58	6.74	0.00	23.56
Population in working age group, lagged	101.76	100.30	1.01	0.31	46.73
Percentage with graduate degrees and above, lagged	130.55	258.88	0.50	0.62	2.45
Number of observations	88				
Adjusted R²	0.91				
Dependent variable mean	5,597.35				

***Statistically significant at the 1 percent level.

Table 2 summarises the estimation of per capita NSDP dependent on the lagged form of various explanatory factors for the northern states' income through its likely impact on investment. Here as in the full sample, urbanisation, human capability indicators, law and order variables are statistically significant in determining the per capita NSDP. Specifically, the literacy rate has a positive impact on the per capita NSDP in the northern states, as we would expect. This means that preparing the ground for higher skills in the form of higher literacy rate contributes to higher income.

Second, the percentage of population with graduate degrees and above has a negative impact on the northern states' per capita NSDP. While this is a result we did not expect, it is nonetheless reasonable. This is because a mere increase in the percentage of those with graduate degrees and above does not lead to rising incomes. Rather a pool of skilled or technical labour force might be required to translate into rising incomes. Unfortunately as described earlier, we lacked sufficient observations to include this technical labour force variable in the estimation.

Third, the IMR has a negative impact on the per capita NSDP in the northern states, as we would expect. This means that a higher IMR leads to lower incomes because it implies lower human capabilities and a less healthy population.

Fourth, the percentage of pending cases in court has a negative impact on the per capita NSDP in the northern states, as expected. This means that the greater the extent of inefficiency of the judiciary as reflected in the percentage of pending cases under trial (including those from previous year), the lower the per capita.

Finally, the extent of urbanisation has a positive and statistically significant impact on per capita NSDP in the northern states. The magnitude of the estimate is higher (a more than

Rs300 increase in per capita NSDP in response to a one percentage point increase in urbanisation) than it is in the case of all states, implying convergence.

Table 2: Estimation of per capita NSDP, northern states

Variable	Unstandardised Coefficients	Std. Error	t	Sig.	Variable Mean
Constant	1204.60	9665.06	0.12	0.90	
Literacy rate (lagged)	167.77***	42.40	3.96	0.00	105.70
Percentage with graduate degrees and above, lagged	-1966.82***	389.30	-5.05	0.00	2.35
IMR, lagged	-52.71***	12.96	-4.07	0.00	105.70
Police firing incidents per million population, lagged	-182.03	119.62	-1.52	0.14	0.89
Percentage of pending cases, lagged	-53.04**	22.08	-2.40	0.02	81.58
Installed capacity (in 000 KW) per million population, lagged	-22.97	15.09	-1.52	0.14	30.65
Per capita expenditure, lagged	0.23	0.18	1.29	0.20	1,370.09
Percentage of urbanisation, lagged	308.69***	44.40	6.95	0.00	18.76
Population in working age group, lagged	178.37	248.79	0.72	0.48	44.84
Number of observations	44				
Adjusted R²	0.96				
Dependent variable mean	4,502.32				

Table 3 presents the estimation of per capita NSDP for the southern states. There are a few differences from that of the northern states. First, the percentage of population with graduate degrees and above has the expected, positive impact on per capita NSDP in the southern states. One possible reason and difference from its sign in the regression for northern states is that in the context of the southern states, the percentage of those with graduates is also probably concomitant with their employability, which is the reason why we expect it to translate into rising incomes.

Second, the percentage of pending cases under trial in court has a negative and significant impact on the per capita NSDP, as we would expect, and as we find in the case of the northern states. This is the impact of law and order/governance on income. Measures of infrastructure are significant in affecting income in the southern states. Specifically the installed capacity has a negative impact on the per capita NSDP. We expected this measure of infrastructure to have a positive impact. The negative impact we find means that businesses and/or public sector enterprises failed to utilise the opportunities offered by increased installed generation capacity in the southern states. This also lends support to the findings in Balakrishnan and Parameshwaran (2007) who found the case for manufacturing to have served as an engine of growth to be weak. While we had data on tele-density for a few years, the number of observations was not adequate for inclusion in the model, as discussed earlier.

The lagged per capita expenditure has a positive impact on per capita NSDP, as we expect, and as we found in the case of all the states. This implies that the higher public expenditure indeed translated into better public services, output and rising income. Finally, the lagged urbanisation has a positive and highly significant impact on the per capita NSDP which implies the continued robustness of scale economies and urbanisation economies in increasing output and the per capita NSDP of more urbanised states.

Table 3: Estimation of per capita NSDP, southern states

Variable	Unstandardised Coefficients	Std. Error	t	Sig.	Variable Mean
Constant	-4498.29	6154.30	-0.73	0.47	
Literacy rate (lagged)	8.29	18.87	0.44	0.66	53.68
Percentage with graduate degrees and above, lagged	1026.80***	268.22	3.83	0.00	2.54
IMR, lagged	23.75	17.22	1.38	0.18	63.47
Police firing incidents per million population, lagged	-30.96	53.56	-0.58	0.57	1.03
Percentage of pending cases, lagged	-52.22***	16.61	-3.14	0.00	68.01
Installed capacity (in 000 KW) per million population, lagged	-29.27*	16.24	-1.80	0.08	54.16
Per capita expenditure, lagged	0.85***	0.24	3.50	0.00	1,771.36
Percentage of urbanisation, lagged	124.06***	22.17	5.60	0.00	28.42
Population in working age group, lagged	142.55	105.80	1.35	0.19	48.61
Number of observations	44				
Adjusted R²	0.96				
Dependent variable mean	6,704.48				

The adjusted R² in the case of all regressions is well above 0.9 which indicates that the model is an extremely good fit for the phenomenon being observed.

Summary of Regression Results

Summarising results from the various regressions, we have several interesting findings. First, the lagged percentage of urbanisation is statistically significant in determining per capita NSDP in the full sample and both individually in the case of northern and southern states. In terms of magnitude, this effect is the most significant in the northern states, followed by the full sample, and the effect is the least in the southern states. This reinforces the importance of urbanisation and scale economies in increasing productivity and rising incomes of the states. Urbanisation may have been endogenous, but since we have taken lagged urbanisation, it must be the cause, not the result of higher per capita income we observe in the case of all the regressions.

Next, the lagged per capita expenditure is the other significant factor which determines per capita NSDP in the case of the full sample and the southern states. It cannot be argued that increased per capita expenditure is the result of increased per capita incomes because it is the lagged per capita expenditure that has been used. Hence increased public expenditures lead to increased per capita incomes through their effects on creating employment and output.

When we compare the results from separate regressions for the northern and southern states, apart from the positive effect of urbanisation which we have discussed, the law and order conditions as indicated by the percentage of pending cases under trial in court has a negative and significant impact on the per capita income in the states. This is most likely through the route of private investment which can be negatively affected by judicial inefficiency and the slow redressal of grievances and disputes. This indicates the negative impact of weak dispute resolution mechanisms on private investment.

As far as human capability indicators go, the literacy rate has a positive and significant impact on the per capita income in the northern states, implying convergence, whereas the same is not true for the southern states. Moreover, the percentage of population with graduate degrees and above has a negative impact in the northern states, whereas they have the expected, positive impact in the southern states. This indicates that those with graduate degrees and above in the southern states are more employable than their counterparts in the northern states. Employability manifests in the form of rising output and incomes whereas in the northern states, something more than mere graduation is required to make them employable. This also could be a reflection of the limited number of job opportunities for those with mere graduate degrees in the northern states. Finally, in the case of the northern states, the IMR has the expected, negative and statistically significant impact on per capita incomes, reflecting the importance of human capabilities and health in achieving desired outcomes.

Summary of All Findings and Implications

The purpose of the exposition in the previous sections of this paper has been to examine whether factors such as human capabilities, skills and awareness, infrastructure, governance, urbanisation and resource utilisation shed light on the divergent paths of per capita income growth, divergent trends in poverty reduction, and disparities in FDI inflows and domestic investment observed across the south and northern states.

What do we gather from the analysis of disparities in these factors between the southern and northern states? It is possible that differences in the underlying and relatively more stable conditions such as literacy rate, and IMR in the two set of states could at least in part account for the divergence in per capita income and poverty reduction although there could be some simultaneity there. Our premise is that the marked upward shift in per capita income and the subsequent reduction in poverty that the southern states experienced since the early 1990s can be attributed to the flow of substantial investments into these states. We find that the southern states attracted private investment worth Rs473,522 crores during 1995-2003 when compared with the average of a mere Rs170,216 crores, during the same period for the northern states. Based on our research and analysis, we surmise that disparities in governance, educational outcomes, urbanisation, infrastructure and resource utilisation could account for disparities in investment flows across the southern and northern states.

Being aware that we may not have taken into account some factors that could have contributed to the outcomes studied here (for instance, Paul and Sridhar (2009) discussed the impact of social movements and caste on education in the case of Tamil Nadu), the following specific findings from our analysis are worth noting:

1. With respect to most of the factors representing human capabilities – literacy, infant mortality, stock of graduates, enrolment in technical courses, and proportion of population in the working-age group, supply-side factors such as the number of institutions of higher education and infrastructure such as installed capacity, percentage of households with electricity and telephone penetration, the southern states had certainly an advantage over the northern states. We have to note that technical manpower (indicated by enrolment in technical courses), in which the southern states appear to have a lead, signals a critical resource that modern industries and the service sector need. Unfortunately, data on this was not available for a reasonably long time period for us to include it in the regression. Given this

limitation, we surmise that the supply of this factor must have played a key role in the transformation that the south experienced from the mid-1990s.

2. Even in terms of factors indicating law and order such as the proportion of cases pending trial in courts, the southern states have an edge over their northern counterparts. With the exception of Andhra Pradesh, the number of police firing incidents was lower in the southern than in the northern states. Based on this, we surmise that the potential (measured in terms of the initial conditions) for economic growth existed more in the south than in the northern states.
3. With respect to total per capita spending and per capita spending on education and public health, the south spent less compared to the northern states during the 1980s, and spent more than the northern states post-1991, presumably implying a greater level of public services.

We, thus, find that while the southern states had an edge with regards to the initial conditions of several factors that we have taken into account, it did not have an initial advantage in all of them [police firing (when Andhra Pradesh is included)], the stock of graduates and the proportion of population in the working-age group in which the south and the north started off at the same point in 1961).

A surprising finding is also that while the southern states' average weighted per capita NSDP was nearly twice that of the northern states in 2004, the growth rate of weighted per capita income was on average higher in the northern states (being 2.2 percent) than that in the south (which was 1.78 percent) during the period 1960-91. However, during 1992-2004, the average growth rate of weighted per capita NSDP in the southern states was 4.6 percent compared with only 1.62 percent in the northern states. This shows that the surge of the south is indeed a recent, post-1991 phenomenon.

For an explanation of the intriguing phenomenon of the sudden economic growth of southern states in the 1990s, we turn to major policy changes that were occurring in the Indian economy since the mid-1980s when the first steps towards de-control and liberalisation occurred in India (see Joshi and Little [1997]; Rodrik and Subramanian [2005]). This is also consistent with what the earlier literature (for example, Mathur [2001]; Basu [2004]) found. The de-licencing of industries and more liberal policies towards foreign investment were adopted during this period. In 1991, full-fledged economic liberalisation further enabled the opening up of the Indian economy which created favourable conditions for private sector investment, both domestic and foreign. These policy changes were exogenous and national, with all the states being free to take advantage of the opportunities it offered. Thus, the states which were more prepared (in terms of governance and infrastructure) to move forward succeeded whereas the states which were less prepared in these terms could not do so. Ahluwalia (2000) also highlighted how economic liberalisation reduced the degree of control exercised by the centre in many areas, leaving greater scope for state-level initiatives, particularly true as far as attracting investment, both domestic and foreign, is concerned. Ahluwalia concluded that state-level performance and policies, therefore, deserve much closer attention than they receive. It is particularly important to study the differences in performance among states in order to extract lessons about what works and what does not. A better understanding of the reasons for the superior performance of some states would help to spread success from one part of the country to the other.

Overall, the upward shift in per capita income, downward trend in poverty reduction and much greater investment flows that occurred in the south relative to that in the northern states can be explained partly by the advantage the former had in terms of human capabilities, infrastructure, urbanisation and some (not all) law and order indicators and partly by the economic liberalisation of 1991.

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Data Appendix

Data on investments are from the CMIE data set CAPEX. Data sources for education/health and urbanisation indicators are the Census of India. Historical data on IMR are obtained from the publication, *Sample Registration System: Statistical Report 2006*, published by Census of India. The SDP data is from the Central Statistical Organization (or the EPW-RF). The poverty data is from the Planning Commission. Law and order indicators such as the number of police firing incidents, proportion of pending cases in the court, are from the National Crime Record Bureau. Infrastructure measures such as the installed capacity of electricity are from the Central Electricity Authority, Ministry of Power, Government of India. The data on percentage of households with electricity by state is from the Census of India. The data on telephone penetration is from the Department of Telecommunications, Ministry of Information Technology and Communications, Government of India. The data on total and developmental expenditures by sector (education, sports and culture), and that on energy, roads and bridges is not reported for various reasons discussed in the paper, and data on public health and medical facilities is from the EPW-RF. Literacy rates, the proportion of graduates and percentage of people belonging to the working-age group for all states by year are from the Census of India. Data on the proportion of technical degree holders is from the Ministry of Human Resources Development's publication, *Selected Educational Statistics*. The annual time series data on the population in various states is from the EPW-RF. Data on urbanisation is from the Census of India. Data on higher educational institutions is aggregated at the state-level from the Census of India town directories for towns and cities in the respective states.

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