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ESSAYS ON REGIONAL ECONOMIC GROWTH IN INDIA

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Om Shreedharay Namah

To,

Maa, Baba and Nanu:

The mainstays of my being.

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Abstract

In the first chapter I study regional growth and sub-national income convergence in India in the context of economic reforms that were undertaken since 1991. I also examine convergence in development inputs such as population growth, literacy and investment at the sub-national level. My results show that there is a strong evidence of divergence in per capita income of the 15 states studied in the sample. The standard deviation of net state domestic product has increased over time indicating no evidence of convergence in the pre- or post-reforms period. Population, state capital expenditure and commercial bank credit have also diverged over time across these 15 Indian states. However, literacy shows evidence of convergence across states.

In the second chapter I study sectoral output patterns and growth across states in India during pre- and post economic reforms period (1970-1990 and 1991-2005). I also study the relationship between per capita income and the shares of primary, secondary, and tertiary sectors in the total output. The data shows that the growth of secondary sector has stagnated in India. Thus there was an increase of just 1.45 percent in the secondary sector mean share in total output during post-reform period. The primary sector's share in the total output has declined with increasing per capita income conforming the theoretical prediction. As far as the tertiary sector is concerned, it has experienced rapid growth over the sample period. However, employment growth in the tertiary sector has been very slow. I have also investigated for the effect of increasing per capita income and other development inputs like investment, population and literacy rate on the changes in sectoral shares. I find literacy rates and state capital expenditure to be positively and significantly linked to the increase in tertiary sector output.

In the third chapter I study the relationship between socio-political violence and economic growth across 16 states in India. I find that in India at large riots do not have a significant effect on NSDP growth. In spite of the various socio-political disturbances in terms of caste, language and ethnic issues, India has continued to develop economically. The episodes of socio-political problems and related violence do not seem to have put a drag on India's fast pace of economic growth. However, I find that in case of seven states that are affected with Maoist/Naxalite violence, riots have a significant growth-inhibiting effect.

1 Income convergence and regional growth in India: Before and after the economic liberalization

1.1 Introduction

In recent years India has shown a dramatic improvement on the economic scene. It has become one of the world's fastest growing economies with average growth rates of nine percent over the past four years (World Bank 2009). This is in stark contrast to the post independence decade growth rate of about 3.5 percent per year and 5-6 percent average rate of growth which prevailed in the 1980s (Economic survey 2008). Looking at the fast pace of growth in the 2000s, media and scholars have dubbed India as 'Asia's other powerhouse,' 'newest Asian tiger' and so on. India is also the world's second most populated country with a population that is both growing and young. This is a vital dimension of India as a player in the world markets as an investor, consumer and producer.[1] Being a democratic country, India's recent turnaround in growth is also important from the point of view of development and democracy nexus.

The role of comprehensive economic reforms undertaken in 1991 in this unprecedented growth boost and transformation of India's image has sparked a lot of discussion in the development literature, especially about whether this fast economic growth can be attributed to the liberalization in 1991 (Panagaria 2004; Ahluwalia 2000; Kumar 2000; Joshi and Little 1996). Apart from this debate, it is important to note that a high rate of economic growth at the national level need not necessarily mean that all the states enjoyed equal benefits of this growth spurt. Besides the effect on the national

[1] As an example of India's role in world markets, Robert Zoellick (President of the World Bank) recently said that 'India's strong crisis management and sustained global demand from the 1.2-trillion-dollar economy was playing an important role in helping the world recover from the global economic crisis' (The Hindu 2009).

economic growth, economic reforms also have significant implications for the regional distribution of growth in India.

In this paper I study the regional growth patterns and income convergence in the context of economic reforms. Understanding the regional differences after economic liberalization has important implications for continuation of these reforms and the development of second generation reforms.[2] To examine if states in India experienced income convergence both before and after the reforms, I analyze economic growth across 15 Indian states for the pre-liberalization period (1970-1990) and post liberalization period (1991-2005). I test for sigma convergence in output (income).[3] For any explanation of divergence or convergence of output, it is also important to test for convergence in some determinants of the steady state.[4] Hence I investigate sigma convergence of input variables such as human capital, investment and population.

My results show that there is a strong evidence of divergence in the per capita income of the 15 states in the sample. The standard deviation of net state domestic product has increased over time. This indicates that there is no evidence of sub-national convergence in the pre- or post-reforms period in Indian states. Population, state capital expenditure and commercial bank credit also have diverged over time across these 15 states. However, literacy shows evidence of convergence across states.

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[2] As mentioned by Kar and Saktivel (2007:69), the study of trends in regional disparity in the context of reforms has 'serious ramifications for the continuation of the reform processes'.

[3] Sigma convergence refers to a decrease in dispersion of income in a group of economies. One important implication of the neoclassical growth model is output (income) convergence between regions. If states have similar population growth, savings, and technology, the output or income across countries will tend to converge to a common steady state.

[4] See Grier and Grier (2007).

My paper is novel in the following ways. First, as mentioned above, in addition to studying convergence in output across states, I also study convergence in inputs like population growth, literacy and investment to see whether there has been a convergence in these development inputs across states over time. Second, I break the period under study into pre-liberalization and post-liberalization years. This will help in understanding the differences and/or similarities in growth processes in states across the two periods.

The paper is organized as follows: in the next section I discuss the economic policies that prevailed in the pre-reform years, the circumstances that led to the 1991 economic reforms, and the reform policies in detail. In section 1.3, I explain why it is important to study growth at the state level. Section 1.4 presents the state level growth experience in the context of per capita net state domestic product in the pre- and post-liberalization periods. Later in section 1.5, I review articles on income convergence in India at the sub-national level. In section 1.6, I discuss the convergence hypothesis. In section 1.7, I discuss data, methodology, and test for convergence. Section 1.8 summarizes the results. I present descriptive evidence of impact of economic reforms in some states in section 1.9. Section 1.10 concludes.

1.2 Liberalization in India

1.2.1 The pre-reform years: Post independence economic policies

For any discussion of the economic liberalization in India, one has to first understand the post independence economy and structure of the Indian economy. Therefore a good starting point is the explanation of economic policies and political thought processes in the post independence era. India achieved its independence from the British in 1947. Recovering from the scars of colonial rule, India's post independence

economic policy was to focus on self reliance. The Congress government followed an inward looking economic policy based on central economic planning. India's outlook towards economic policy was to some extent consistent with the Harrod- Domar model, which emphasized capital accumulation for achieving economic growth. Thus India followed a 'mixed economy' which featured state controlled capitalism. An analysis of the above mentioned post independence Indian economic history until the 1980s suggests that, for almost 35 years after independence, India had economic policies that were based on socialist ideology. This meant that before any private industrial effort could be undertaken, one needed the permission of the state. This led to the emergence of the 'License Raj' which meant that before setting up any entrepreneurial initiative, one had to go through a lengthy process of procuring a license and had to face numerous regulations. In addition to these licensing processes, the imports of raw materials and capital goods were restricted. There were multiple excise duties on goods, and the public sector had monopolies in services like banking, airlines, and electric power. The sectors that were open for private investment were limited.

In the late 1980s, India took the first steps in the direction of economic reform under the government of Rajiv Gandhi. Since there was still a dominance of the socialist mindset on the political front, these reforms were introduced slowly. In fact, the phrase 'liberalization by stealth' is often used to depict this generation of reforms. The government eliminated some regulations and restrictions on private sector industries. The so-called 'License Raj' was starting to be dismantled. One of the important decisions was modifications in the Monopolies Restrictive Trade Practices (MRTP) act. MRTP, which came into existence in 1969, was put in place to "prevent private monopolies and

concentration of economic power" (Dandekar 2004). However, the regulations and controls associated with this act led to increased bureaucracy and inhibited growth of private industry (Dandekar 2004). Some provisions of this act limited the expansion of existing private industries and new investments that could take place. As a part of the reforms, some industries were granted exemption from the MRTP altogether which provided a boost to the private industry. There were also changes in fiscal policies to reduce the taxes on inputs. These tax reforms helped reduce the price distortions that were rampant. All these policy initiatives raised domestic industries' morale and created an environment conducive to development. There was also a modernization of the telecommunications industry and transfer of technology in these areas from foreign countries.

However, these reforms were implemented at a slow pace and did not constitute a comprehensive economic liberalization. A stronghold of leftist ideologies still existed in Indian politics which did not support opening up the entire economy. Towards the end of the 1980s, India faced significant political instability, which affected the pace of reform. It was only in 1991 that a more comprehensive economic liberalization was undertaken due to circumstances discussed below.

1.2.2 Comprehensive and systematic economic liberalization in 1991

In 1991, economic liberalization was officially undertaken in response to the balance of payments crisis that India faced at the time. It was an important and definitive step toward having a more open economy, indicating a shift from the socialist thinking of the Congress government which prevailed until the mid-1980s. These economic reforms included changes in industrial, fiscal, external sector and financial sector policies.

Following its devaluation, the Indian Rupee became fully convertible on the current account. Foreign direct investment and technology transfers were encouraged, and Indian industries were allowed to access international capital markets.

The most important reason for reforms was the worsening of the balance of payments. In 1991, India only had enough foreign exchange to support two weeks of imports. The fiscal deficit was mounting, and there was high inflation. This was the worst liquidity crisis that India had faced. There were many factors responsible for this. In 1990, the Gulf War started after the invasion of Kuwait by Iraq. This affected the oil trade that India had with the Gulf countries. The price of oil rose, and paying for oil imports became more and more expensive for India. Also, the remittances from Indians residing in Gulf countries nearly stopped, and money that India earned through exports to the Gulf dwindled (Kumar 2000).

In addition to the above mentioned problems, there was a lot of political uncertainty. After the defeat of Rajiv Gandhi in the 1989 general elections, two short-lived governments came into power, each ruling for less than a year. This political instability lowered India's credit rating in both short-term and long-term credit markets. With this loss of confidence in the Indian economy, it became very difficult to borrow in the international market. In addition to this, Non-Resident Indians (NRIs), started withdrawing money that they had invested in India, creating capital flight.[5] This almost

[5] The State Bank of India, www.sbi.com defines 'a **Non Resident Indian** (NRI), as "an Indian citizen or foreign national of Indian origin residing outside of India for purposes of employment, carrying on business or vocation in circumstances as would indicate an intention to stay outside India for an indefinite period. An individual will also be considered NRI if his stay in India is less than 182 days during the preceding financial year."

default-like situation in the external account was countered through borrowing from the International Monetary Fund (IMF) under the provision of standby arrangements. The 1991 crisis drove India towards a policy change.

As mentioned earlier, trade liberalization had started in India in the late 1980s. But a more comprehensive set of reforms was only implemented in 1991. Therefore, there is a lot of debate in the literature about whether to consider the reforms undertaken in 1985-86 as an indicator of economic policy shift or whether the 1991-92 measures be deemed as policy shift. An examination of these counterarguments is beyond the scope of this paper. I have treated the 1991 economic reforms as an indication of policy shift since these were more far reaching and all-embracing in nature than the earlier generation of reforms.

1.2.3 Post-reform scenario: what policies characterized 1991 reforms?

In spite of some efforts in the late 1980s, the quantitative restrictions on imports were still very binding. As Virmani (2003) mentions, the duty-free input imports in particular had a lot of restrictions. In 1991, import licenses on almost all the intermediate and capital goods were dismantled. The government introduced Special Import Licenses (SIL), which could be used for importing restricted items as way of promoting exports. Exporters were allowed to obtain SILs proportional to their export trading volume. That is, import concessions were tied to export excellence for some commodities. Profits earned from exports became 100 percent tax free. The export promotion zones were given an additional incentive of a tax holiday for 5 to 8 years. Import licensing was abolished in 2001 after the dispute between India and its trade partners in the WTO. Now

only a few canalized[6] and environmentally sensitive goods need import licensing. All the quantitative restrictions on imports from member countries of the South Asian Association for Regional cooperation, SAARC, were given up unilaterally in 1998 by India (Virmani 2003).

As far as tariff rates are concerned, the Indian economy faced very high tariffs in the 1980s, partly for protectionist arguments and partly for revenue reasons. In 1990-91, the highest tariff rate was 355 percent. This was brought down to 50.8 percent in 1998-99 (Kumar 2000). Tariff rates on capital goods, among others, were brought down from 35 percent to 25 percent in 1994-95. While India may still have very high tariff rates when compared to other Asian countries, there has nonetheless been a spectacular decrease relative to the pre-reform tariffs in India.

There was also a conscious effort to attract more foreign direct investment (FDI) to India. FDI can be a very significant factor in accelerating industrialization in developing countries. FDI, along with financial flows, brings modern technology, skill levels and even market access.[7] The government declared the New Industrial Policy in 1991, which liberalized rules about FDI. This new policy allowed for an 'automatic approval' or an 'automatic route' for FDI in 34 priority industries. Automatic route means that in these sectors, investment can be made without approval of the central government. Only the regional office of the Reserve Bank of India needs to be notified.

[6] The government has a monopoly in importing these items.

[7] The extent to which foreign direct investment (FDI) can provide a stimulus to economic growth and development is a widely debated question. There are many empirical papers that study the relationship between FDI and economic growth and find mixed results (Carkovic and Levine 2005; Borensztein, Gregorio and Lee 1998). FDI by itself, may not boost economic growth that is independent of other factors.

After the approval for FDI by the automatic route, FDI can take place after getting the necessary regulatory approvals at the state and local level. Up to 51 percent foreign equity was allowed in 35 priority industries. For some of the infrastructure industries, this could be up to 71 percent. In the sector of ports and roads development, up to 100 percent foreign ownership was permitted by the end of the 1990s. Non-resident Indians were allowed 100 percent ownership even in priority industries (Kumar 2000; Virmani 2003; Panagariya 2004).

The government also established the Foreign Investment Promotion Board (FIPB), which aims to promote FDI in India through undertaking activities in India and abroad. The FIPB facilitates investment in India through non-resident Indians, international companies and various foreign investors. FIPB approves all other investment cases which do not fall under the purview of automatic approval. There is a limit of 4-6 weeks on the processing time of these applications by FIPB. According to the FIPB, if the foreign investor wants to hold less than the entire equity of the company, there is no need for a local partner. The rest of the equity can be offered to the general public (FIPB 2007).

As is clear from the above discussion, India made a serious and much more comprehensive effort of opening up its external sector in 1991[8].

1.3 Why is a study at the regional/state level important?

As can be gleamed from the above discussion, the economic liberalization undertaken in 1991 reduced the extent of control by the central government in many

[8] On the domestic front there was also an effort towards disinvestment of government ownership in public sector corporations. A commission on disinvestment was set up for recommending the phases of this disinvestment.

areas. Specifically, decentralization in areas related to investment led to a higher scope for initiative on the part of state and local governments. With less central government control and intervention, the states had the freedom to frame policies to attract foreign as well as domestic investment. Therefore it is important to study the patterns in economic growth before, and after, liberalization was undertaken. Besides looking at the national economic growth, it is important to compare the economic performance at the sub-national level. A study aimed only at the national level can mask the dynamics at the state level. Finding out whether all states enjoyed the same rate of economic growth or only the richer states continued to grow faster will have important policy implications for a balanced regional growth objective. Analyzing the differences, and/or similarities between economic performances of various states would shed light on the distribution of high economic growth experienced in the post-liberalization period.

Another reason a regional level study is interesting is the structure of Indian government and the relations between the central and state governments. As far as the tax raising powers of the state and center are concerned, the Indian Constitution gives most powers to the central government, which leads to an imbalance as far as the sources of tax revenue for the states are concerned (Cashin and Sahay 2000). However, to ensure balanced regional growth, the constitution also has made provisions for the transfer of grants from the center to the states in three forms: statutory transfers (like tax sharing), grants in aid, and plan and discretionary grants (usually given to support central government projects). Study of the allocation of funds shows that poorer states have indeed received a relatively higher proportion of funds than the richer states (Ghosh 2007). For states like Bihar, which has very low economic and social development, the

transfers of funds from the central government form a major source of state income (Luce 2004). Studying whether the regional inequalities have declined over time, and whether the poorer states have been able to catch up with the richer ones will be able to indirectly shed some light on the impact of such fund transfers to state governments. I will analyze the growth experience at the state level in the next section.

1.4 State level growth experience in the pre- and post-liberalization period

A brief look at the state domestic product's growth rates of various states in India indicates significant regional disparities. The Indian states are characterized by very different socio-economic conditions. This is true for indicators of economic well-being such as the growth of state domestic product as well as various measures of social well being such as the demographic indices. The growth experience at the aggregate level masks a lot of what is happening at the sub-national level. Aiyyar (2000) notes that the sub-national dispersion of per capita income and urbanization in India is greater than that found in relatively homogeneous groups of countries like those in the European Union. While emphasizing the geography of development, Bhandari and Khare (2002) point out that, on average, the western parts of India have grown faster than the eastern parts of India.

In this section I present some observations about NSDP growth in 15 states in the pre- and post-reform periods. Table 1.2 and Figure 1.1 give the average annual growth rates for 15 states in the pre-reform and post-reform years. At the aggregate level, the average annual growth rate of these 15 states, increased from 2.03 percent before reforms to 2.21 percent in the post-reform period.

Some states, like Tamilnadu, Kerala, and Maharashtra, grew faster in the post-reform period compared to states like Bihar, Uttar Pradesh and Assam. Of the 15 states in my sample, nine states show acceleration in growth after reforms. Kerala and West Bengal, which initially were middle income states, grew very rapidly after 1991. These two states, in spite of having lower growth in the pre reform period, show high growth rates in the post-reform years. Kerala's result is especially interesting because Kerala's 'development paradox' is often talked about in the socio-economic literature. Kerala has achieved high development in literacy, life expectancy and other indicators of human development. For example, the literacy rate in Kerala is almost 91 percent. In spite of this, its economic performance in decades prior to the reforms was not good. However, in the post-reform decades Kerala actually grew faster than most of the other states, from NSDP of Rs. 6,992 in 1991 to almost Rs. 23,199 in 2005.[9] Likewise Andhra Pradesh almost tripled its per capita NSDP, going from Rs. 6,886 in 1970 to Rs. 19,858 in 2005. For initially rich states like Maharashtra and Gujarat, economic growth continued in the post-reform period.

Now turning to some poor states, in 2005-2006, the net state domestic product for Bihar was only Rs. 5129. If we consider the evolution of state domestic product per capita in various states over the period of 1970-2006, we see that Bihar stagnated around the income of Rs. 4746 for almost a decade, picking up only in late 1980s, and again falling in the post-reform period to reach only Rs. 5129 in 2005. Uttar Pradesh also could not accelerate pace of growth in the post-reform period. However, the two initially low

[9] Kerala's better performance in NSDP per capita can in part be attributed to the low growth rate of population in the state and high growth of its service industry.

income states of Madhya Pradesh and Orissa show marked improvement in their performance. This diversity makes understanding the pattern and transition of economic growth across states of fundamental interest. In the next section I present a review of some papers that discuss regional convergence in India.

1.5 Sub-national convergence in India

The literature on testing for income convergence across Indian states is relatively recent.[10] There have been various studies on economic growth and productivity in India, both at the national and regional levels, but the empirical study of income convergence began only in the mid 1990s. Starting with a 1995 study done by Cashin and Sahay, there has been a range of analytical studies on sub-national income convergence. Many of these theoretically model and empirically test for absolute and conditional beta convergence as well as sigma convergence of income. The empirical papers test for and explain the differences across Indian states in per capita income and other human development indicators using variables like inter-state migration, investment, transfer of funds from the central government to the state governments, and infrastructure. However, there does not seem to be a consensus among researchers on whether or not there is income convergence across Indian states. Various papers reach diverse conclusions using a range of differing samples, methods, and explanatory variables. I review several of the most prominent studies below and provide a more extensive list in Table 1.1.

[10] India has 28 states and 7 union territories. Union territories are areas which do not have a separate state government and are administered directly by the central government.

As mentioned above, Cashin and Sahay (1995) were the first to empirically test for sub- national convergence in India. They use data for 20 states for the period 1961-91 to test the Solow-Swan neo-classical growth model and find strong evidence of absolute convergence. Specifically, they show that the states that were initially poor in their sample grew faster than the states that were initially rich. They theorize that interstate migration and grant transfers from the central government to state governments could be the main sources of cross state equalization of incomes. Resources transferred in the form of tax sharing, grants in aid, plan grants, loans, or allocation of credit may have reduced interstate disparities in income. While migration from poor states to richer states and grant transfers from richer to poorer states are good potential reasons for income convergence, their data shows only weak evidence for such migration and grant transfers.

Nagaraj et al. (2000) use a dynamic panel to study the period from 1970 to 1994 for 17 states. Unlike the previous paper, the authors explain growth differences across states at least in part by differences in infrastructure development. The authors construct an aggregate infrastructure variable using principal components analysis and show that the role of public expenditure on infrastructure is an important determinant of the conditional convergence in their sample. Aiyyar (2001), however, in a study of 19 Indian states over the period 1971-1996 finds strong evidence of absolute divergence. However, when he controls for factors like the literacy rate and private capital formation, the data shows support for conditional convergence.

Unlike the papers discussed above, Das (2002) studies agricultural wages for 14 Indian states from 1956 to 1993 and finds evidence of absolute convergence in wages. Later he goes on to classify the states in his sample into high, middle, and low income

categories and tests for convergence within these groups. Here again he finds evidence of absolute income convergence, with the rate of convergence being the fastest in the group of the poorest states.

Adabar (2004) extends the period under study by including the late 1990s and early 2000s. With data on 14 states for 1976-2001, the author uses dynamic fixed effects estimation and also finds support for absolute and conditional convergence in per capita income. The rate at which the poorer states caught up with the incomes of richer states is about 12 percent per five year time period. The author shows that population growth, credit extended by commercial banks and capital expenditures by state governments are significant factors in explaining this convergence.

Most recently, Nayyar (2008) studies 16 Indian states for the period 1978-2003 using Generalized Method of Moments estimation. Like Aiyyar (2001), the author finds no evidence of absolute convergence. States do not seem to converge to the same steady state. Nevertheless, once variables like literacy rate, investment, and infant mortality are taken into account, the author does find evidence of conditional convergence. In sum, it is clear from the above discussion, that there is no clear cut conclusion about income convergence in India. The findings about convergence vary depending on the explanatory variables considered, the period under study, and the states in the sample.

1.6 Income growth in state economies - convergence or divergence?

As can be seen from the above discussion, the most common starting point for a regional growth analysis of India has been the neo-classical growth model (NGM) (Solow 1956). One important implication of the NGM is income convergence between regions. If countries have similar population growth, savings, and technology, the NGM

implies that the output or income across countries will tend to converge to the same steady state. Convergence as implied by NGM means that countries that are poor grow faster than the rich ones; that is they 'catch up' with them in the long run. This catch up is based on diminishing returns to scale. A rich country will grow slower as diminishing marginal returns to capital set in after accumulating more and more capital. On the other hand, a poor country, where capital is scarce, will have a higher return to capital and grow faster.

There is a wide range of literature that studies the implications and empirical validity of the NGM in various ways. One way to test whether countries have converged in income is to study the standard deviation of income of the sample over time (Grier and Grier 2007). This concept of convergence is called σ convergence and refers to a decrease in dispersion of income in a group of economies. Sala-i-Martin (1996) defines this type of convergence as follows, 'a group of economies are converging in the sense of sigma (convergence) if the dispersion of their real per capita GDP levels tends to decrease over time'.This type of convergence is non parametric in the sense that it relies completely on how the data behaves and does not impose any restrictions on the data. Studying sigma convergence in income or output may not help us make inferences about conditional convergence directly as implied by NGM. However, if we conduct similar convergence tests for some of the determinants of steady state determinants, we may be able to comment on conditional convergence (Grier and Grier 2007).

In the recent literature, in addition to testing absolute and conditional convergence based on classical regression methods, various different techniques of testing for convergence have been used. These help us understand the underlying dynamics of

income distribution that may get ignored while using sigma convergence. Kar, Jha and Kateja (2010) study the convergence among India states using the distribution dynamics approach. The authors study per capita income in 21 Indian states over the period 1993-2005. The study of distribution dynamics of per capita income across the states finds evidence for polarization: two convergence clubs among the states. Some middle-income states moved to the relatively higher income states while others fell back to the lower income states forming two convergence clubs over time. Another paper that uses a different approach for studying convergence analysis is Kalra and Sodsriwiboon 2010. The authors use non-stationary panel data methods to analyze income convergence during the period 1970-2004 across 15 Indian states. This approach also helps to investigate for spill over effects across the states. The authors find evidence for divergence over the whole sample period and convergence clubs among the high and lower income states and small spill over effects.

For the current paper I use sigma convergence. As pointed out earlier sigma convergence does not impose any restrictions on data and can help understand the dispersion of income across states. In the following section I explain my data and methodology for testing convergence among Indian states.

1.7 Empirical testing of convergence : Data and methodology

My sample covers the period 1970 to 2005 and includes data from 15 different states including Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Orissa, Punjab, Tamilnadu, Uttar Pradesh, and West Bengal. These states taken together account for almost 85 percent of

India's population, and include both poor as well as rich states, thereby making this sample fairly representative of the Indian economy.

To test for sigma convergence in output I need to estimate the dispersion of output over time. In this paper, I use the standard deviation of per capita state domestic product as a measure of dispersion of output. The method is as follows. I calculate a time series of the standard deviation of income across the 15 Indian states in my sample. Then, I fit a time trend to this series. Convergence of output across states would imply that this trend is negative and significant. If the time trend is positive and significant, then I can conclude that the output is diverging.[11] To test if the divergence or convergence can be explained by the steady state variables, I test for convergence in input variables in the same way. I use the following variables as input variables: population growth, literacy rate, capital expenditure by state government, and commercial credit given by banks. I discuss each of the variables below. Details about the data and their sources are given in Table 1.3.

i) Literacy Rate:

The literacy rate is an indicator of human capital and a possible determinant of economic development. One would expect to see a positive relationship between literacy and economic growth although it is not always so.[12] Specifically, higher levels of literacy should be associated with higher quality of labor force and therefore higher economic

[11]See Grier and Grier (2007) for more on this.
[12] For example, see Pritchett 2004.

growth. Literacy can increase the efficiency of economic and political institutions and help in scientific advances.[13]

In India, at the national level, 64 percent of the population was literate in 2001[14]. This was an improvement from about 34 percent in 1971. Table 1.4 gives the evolution of literacy rates in selected states from 1971-2001. From the table, it is clear that literacy levels vary a lot across regions. For example in 2001, only 41 percent of the citizens of Bihar were literate, while 90 percent of people in Kerala were literate. Kerala, which had about 70 percent literacy in 1970, has now reached a par with highly developed countries in literacy standards. Most of the states have shown a steady increase in literacy rates over the period of 1970-2001.

ii) Population Growth:

There is no consensus in the literature on the effect on population growth on economic development. There are three schools of thought, namely the pessimists, the optimists, and the revisionists (Birdsall 1991). The pessimists, like Malthus (1806), Solow (1956), Coale and Hoover (1958), argued that faster population growth and the corresponding increase in labor supply compared with capital formation would lower per capita consumption. According to the NGM, we would expect to see a negative impact of population growth on economic development. On the other hand, optimists look at population as a 'net contributor' to economic growth (Birdsall 1991). Increased population can bring about scale economies and encourage technological

[13] For a detailed discussion of relationship between human capital, literacy and economic growth see Schultz 1991; Cameron, J. and Cameron, S. 2006.

[14] The Census of India publishes data at the beginning of every decade. The latest data on literacy rates that is available for now is for 2001. The next census data will be available in 2011.

innovations.(Boserup 1965,1981; Kuznets 1966). Revisionists do not admit to any generalization about consequences of population growth and focus on micro-level case studies which may vary by time, place, and circumstances (Birdsall 1991).

In the case of India, population has been growing at a rapid rate. With a population of 1,124.8 million people in 2007, India was the second most populous country in the world (World Bank 2009). There has been a lot of discussion about the economic consequences of this rapid population growth in the development literature. Particularly, Nayyar (2008), and Adabar (2000), among others, find a negative impact of population growth on economic development in India. Table 1.5 summarizes the population and average annual population growth rate in selected states in India for the period 1971-2001. Over the entire period, the average annual growth rate of population was 2.03 percent. Bihar, Madhya Pradesh and Uttar Pradesh grew at annual growth rates higher that the national average. Kerala, on the other hand has achieved spectacular demographic developments. With the population growth at 1.29 percent Kerala, was the state with the lowest population growth.

iii) Investment:

According to the NGM, we would expect that higher investment would promote economic growth. For the purpose of this paper, I divide investment into two types: private investment and public investment. Getting a long and reliable time series data on investment across states is not possible. Therefore one has to look for proxies for measures of investment. For a measure of private investment, the closest proxy is the amount of credit given by commercial banks. I use the total credit given by ‘scheduled

commercial banks' (SCBs) for this purpose.[15] Although this is not the perfect measure of private capital formation or investment, SCBs credit is a good indicator of the same. Below, I present a few reasons for choosing this proxy. SCBs in India have almost three fourths of the total financial assets of financial institutions in India, thereby conferring prime importance to them in financial intermediation (Rajkumar 2005). SCBs consist of the following 5 groups according to their ownership and nature of operation: i) State Bank of India and its subsidiaries, ii) nationalized banks, iii) regional rural banks, iv) foreign banks, and v) other Indian SCBs (private sector).[16] Aiyyar (2000) found that at the national level the correlation coefficient between credit extended by SCB and gross private capital formation was 0.93 for the period 1970-1995. Also, Nayyar (2008) finds a strong correlation between loans extended by financial institutions and levels of private investment at the national level. Therefore given the limitations posed by data availability, SCB credit seems like a good proxy for private investment.

Like private investment, there is no reliable information for all the states. Comprehensive public investment data at the sub-national level is not available. The data is available at the national level but this cannot be subdivided into state level data (Ahluwalia 2000). Hence one also has to look for proxies for public investment levels. Some papers in the economic literature use various proxies like developmental expenditure by the state (Ahluwalia 2000) and capital expenditure by the state (Adabar

[15] Scheduled commercial banks (SCBs) are all the banks that are included in second chapter of Reserve Bank of India's act of 1934 (RBI (2009)).

[16] There are 19 nationalized banks in India. Some of these were nationalized in 1969 and some were nationalized in 1980 (india.gov.in 2009).

2000; Nayyar 2008).[17] Nayyar (2008) finds that at the national level there is a strong correlation between state wise capital expenditure and gross capital formation in the public sector for the period 1975-2003. Following Nayyar (2008) and Adabar (2000), in this paper I use capital expenditure by the states in India as an indication of public investment expenditure at the state level.

1.8 Results

As mentioned earlier, testing for σ convergence involves analyzing the standard deviation of NSDP per capita across states. Figure 1.2 plots the standard deviation of income for the full sample period. It finds that the standard deviation of NSDP has been increasing over time. Thus there is an evidence of σ divergence in income for the full sample period across states. Figure 1.3 and 1.4 divide the sample in pre- and post liberalization years. Figure 1.3 presents behavior of the standard deviation of income from 1970 to1990 (pre liberalization period). It is clear from the figure that states have diverged in income over time. This suggests that income divergence in not just post-reform phenomena: Indian states have been diverging in income long before the reforms were undertaken. To check whether this divergence continued in later years, Figure 1.4 plots the standard deviation for years 1991 to 2005 i.e. the post liberalization period. I find that even in post reform years, the incomes have been diverging. The plot shows a positive and significant trend in standard deviation thus showing evidence of σ divergence. This indicates that incomes have diverged before as well as after the reforms.

[17]Capital expenditures by the states are classified as developmental and non developmental expenditures. The expenditure on social and economic services constitutes developmental expenditures, while expenditure on general services is treated as non-developmental (RBI 2004). Kurian (1999) mentions that almost 80 percent of the capital expenditure can be classified as development expenditure.

Therefore I conclude that there is no evidence of σ convergence in output in the pre- or post-reforms period in Indian states.[18] As Table 1.6 shows the coefficient on time is positive and significant at the one percent level in the case of full, pre- as well as post-reform period. This finding is supported by Trivedi (2002) who uses data for the period 1962-92, for 19 Indian states and finds income divergence. Also, if one looks at the pre- and post-reform estimations, the divergence becomes more prominent in the post-reform period. The slope coefficient in case of post-reform income dispersion is higher than the pre-reform period. The trend line in the post-reform diagram is a lot steeper than the one in the pre-reform diagram. This means that for a given change in time, the change in standard deviation of output was much more during the post-liberalization years than the change in standard deviation of output before reforms were undertaken. The states moved away from the mean output much faster after the liberalization was undertaken, disparities in income among states have increased after the economic liberalization.

Given the output divergence discussed above, it will be interesting to see whether there is any evidence of divergence in the inputs also. I test for sigma convergence in the determinants of economic growth discussed above. There is a strong evidence of divergence in population, state capital expenditure and commercial bank credit. As seen in Figure 1.5, population growth has diverged over time. Figures 1.7, 1.8, and 1.9 show a significant positive trend in standard deviation of commercial bank credit for the full

[18] Some studies like Cashin and Sahay (1996) reach opposite conclusion in that they find convergence among Indian states during 1961-1991. However, the authors test for conditional beta convergence. Therefore the method of testing for convergence is different from that of this paper. Adabar (2004) as mentioned earlier also finds income convergence during the period 1976-2001. Nevertheless similar to Cashin and Sahay, Adabar (2004) focuses on beta convergence and not sigma convergence.

period as well as pre and post-reform periods. Again, as was the case with income, this divergence is more pronounced in the post-reform period of 1991-2004. The slope coefficient increases significantly after the reforms. In addition to bank credit, state capital expenditure also has diverged in the pre-reform as well as post-reform period as can be gleamed from figures 1.10, 1.11, and 1.12, the dispersion being much higher in the post-reform period as compared to the pre-reform years. This can to some extent explain the output divergence that is evident from the earlier analysis. However, literacy shows evidence of convergence across states. Figure 1.6 shows a negative trend in standard deviation of literacy rates across 15 states in the sample. The coefficient on time for the whole period is negative and significant at the one percent level as seen in Table 1.6. This is puzzling since for output divergence, NGM would imply that literacy rate diverges too. However, Pritchett 2004 finds that similar result that the schooling per worker in India over the period of 1960-1995 has converged. Grier and Grier (2007) reach similar conclusions while studying country-level data. The fall in the disparity in literacy rates over time across states may be explained by various factors. In India, overall, there has been a slow but steady growth in literacy as mentioned earlier in the paper. Improvements in education and literacy rates among the states are significant especially in case of Himachal Pradesh and Tamilnadu. The states seem to be getting more comparable in literacy rates. Various government and non-government initiative may have created this 'push-factor' towards reaching better literacy levels. Increase in private schooling also could have promoted literacy in Indian states. Tooley (2009) describes the successes of private schooling among some states in India.The National Literacy Mission was undertaken in 1988 to conduct widespread campaigns for adult literacy across states.

Subsequently, many states also took initiatives to promote literacy through different initiatives like for example *Kala Jathas* (cultural troupes) and *Saksharta Pad Yatras* (Literacy Foot Marches) in Kerala, organized to generate awareness about literacy. The state government of Tamilnadu had started a program to provide mid-day meals to schoolchildren in 1982 thereby encouraging the school attendance and providing a boost to literacy. Many states have adopted this policy of providing school lunches to encourage school attendance. *Sarv Shiksha Abhiyan* (Literacy for all) was undertaken in 2000 to promote primary education among children. Various initiatives were taken by the governments and non-governmental organizations in providing infrastructure for schools and providing training to teachers. These different programs may have helped in decreasing the disparity in literacy rates among states and creating awareness about education.

1.9 The effect of economic policy reforms on the state economies- some case studies

Undertaking a study to test whether economic reforms contributed to economic growth across states poses data problems. Comparable data on variables like foreign direct investment and portfolio investment at the state level for the period 1970-2005 is not available. Therefore, in this section I will discuss some descriptive evidence of the effect of liberalization in selected states.

Gujarat was one of the states that benefitted the most in India from liberalization. Scholars have pointed out various factors responsible for this, including the fact that Gujarat has the longest coastline in India and also has oil and natural gas resources. In addition to these geographic advantages, Gujaratis are believed to have a more open mind

for entrepreneurship, being traditionally and culturally business oriented. The state government in Gujarat has shown a very welcoming attitude towards private investment in the post-reform period. After liberalization, Gujarat took the initiative in developing infrastructure for the new industries. As a part of the reforms, the electricity sector in the state was opened to the private sector. As a result of this step, Gujarat has not faced a power shortage in the post reform period. Whereas Gujarat was a state ridden with frequent power shortages in the pre-reform period, Gujarat has become a state with a marginal surplus of power in the post-reform period. (Dholakia 2000). In building ports and roads too, the state promoted private enterprise. The state government adopted a policy of involving private businesses in policymaking, which improved the state's ability to match industry needs. Dholakia (2007) discusses growth experience in Gujarat in various sectors in the pre- and post-reform period. Recently, the government has been hosting 'Vibrant Gujarat Investment Melas' (get-togethers of investors) for promoting investment in Gujarat.

For some southern states, namely Karnataka, Andhra Pradesh and Tamilnadu, the gains from liberalization came mostly in the form of development of the information and technology (IT) sectors. A lot of software industries developed in India after reform as a result of the opening up of the economy. Today, software related exports constitute almost twenty percent of India's total exports to the outside world. The United States and United Kingdom have emerged as India's major trading partners, accounting for almost 75 percent of software related trade (Electronics and Computer Software Export Promotion Council of India, 2009). Karnataka, a leader in attracting software-based FDI in the post reform period, has a highly developed software industry which is often

referred to as the ‘‘Silicon Valley of India”. As shown in Table 1.7, the amount of FDI inflows that Karnataka attracted during 2000-2006 was almost Rs. 85000 million. As mentioned by Joseph (2003), Karnataka accounts for almost one fourth of India’s total software exports. Table 1.8 gives the magnitude of software related exports for selected states.

Andhra Pradesh also made a spectacular progress on the IT front in India, developing Hyderabad, also called ‘Cyberabad’, as a major IT hub in the country. Rao (2003) attributes this great development potential in Andhra to the large amount of good human capital and strong government commitment towards IT industry promotion. Major developments in the areas of infrastructure were undertaken to attract industry in areas like electricity generation. The state government took focused efforts on software development and the expansion of related exports. The business processing outsourcing (BPO) industry flourished in Andhra[19]. Andhra Pradesh was the first state in India to come up with specific information development-enabled services related policy. IT enabled services were encouraged for employment generation. As far as e-governance is concerned, Andhra has emerged as a leader[20]. There were many IT based modifications in the governance of various government departments. For example, Andhra’s

[19] The business processing outsourcing (BPO), is the subcontracting of some business functions or processes to a third party. Back office outsourcing may involve subcontracting services like finance or accounting of the company. Front office outsourcing involves delegating customer care units.

[20] United Nations Educational Scientific and Cultural Organization (portal.unesco.org) states that ‘E-governance is the public sector’s use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective’.

government introduced ‘E-Seva’ under which all the public utility bill payments, tax payments, and reservations can be completed on a single website. FAST, Fully Automated System for Transport was also introduced to computerize services like the issue of driver’s licenses and vehicle registration.

Lastly, Tamilnadu is another state that has taken advantage of economic reforms through software development. Tamilanadu ranks third in software exports in India after Karnataka and Delhi. In 2002 the state government announced a new policy related to the Information and Technology (IT) sector. Its objective was to develop the state for becoming the ‘destination of choice’ for IT investors. In addition to promoting software based exports, this policy also aimed at expansion of the IT services to rural areas, and minimization of the ‘digital divide’ between urban and rural areas. In Madurai District a project named ‘Sustainable Access in Rural India’ (SARI) was implemented under which telephone and internet access was given to all villages. The IT and IT enabled services policy also gave capital subsidies among others to promote investment. Chennai, the capital of Tamilnadu has today emerged as one of the biggest hosts for BPO, housing BPO’s of the World Bank, Citibank, and others. Tamilnadu has also succeeded to some extent, in computerizing its government departments.

1.10 Conclusion and discussion

I have shown that there has been sigma divergence in the per capita NSDP of 15 states in India in both the pre-and post-reform periods. The dispersion of the per capita NSDP has grown in the period prior to liberalization as well as after the economic liberalization. Further, the analysis of input variables like population and investment suggests divergence as well. Only literacy shows signs of convergence across states.

Perhaps the answer to curb this divergence does not lie in reversing the reform process or holding back the richer states. Acceleration of economic reforms in the backward areas may be beneficial. As I have pointed out, the determinants of growth like investment are diverging too. Therefore, particular attention needs to be given to improvements in states which are economically backward. Also, as noted earlier, after liberalization, the role of state government and state policy have become an important launch pad of economic growth. This is especially the case with investment (Ahluwalia 2000). Therefore rapid growth of the lagging economies may call for a proactive role for state governments as a facilitator of benefits of the reform process. The recent growth spurt in Bihar can be an example that better governance and infrastructure can help the socio-economic development of the state. The efficiency and quality of governance and institutions should be improved in the laggard states (Sakthivel and Bhattacharya 2004). Public investment is a poor substitute for private investment; nevertheless public investment can be used to build social and economic infrastructural facilities (Ahluwalia 2000). This may help the poorer states to benefit from the more open and less controlled economy and thereby achieve higher economic growth. Therefore there can be efforts for increased public investment for developing infrastructure. As far as central government is concerned, the central assistance to the states may be linked to economic performance instead of current practice of unconditional transfers (Ahluwalia 2000). Thus the observed economic divergence seems to call for acceleration of reforms and better infrastructural facilities in the poorer states. Efforts should be made to make this recent economic growth more inclusive. A well- balanced growth across all regions can provide

political stability and boost unity in the country. This is important for the onset of the second-generation economic reforms in India.

Continued economic reforms and inclusive growth in India are important not only for the country itself, but also for the rest of the world. As mentioned in the introduction, India's fast economic growth, combined with its large population, democracy, diversity and strategic importance, make India a case worth paying attention to. Fast and sustained growth of India, which houses 20 percent of world's population, has long term implications in terms of increased consumption, investment and savings that get pushed in the domestic as well as the world economy. With the demographic transition underway, as the younger, working age population gets added to this force, the effect is only going to multiply.[21] In addition to this, India is the world's largest democracy. This fact, coupled with the fast growing economy, can put an end to the belief that democracy and economic development do not co-exist. India stands apart from the other 'Asian models' like Singapore that combine fast growth and authoritarian governments. Lee Kuan Yew, minister mentor of Singapore believes that democracy does not often lead to development because governments do not establish the stability and discipline necessary for government (Schuman 2009). In contrast to this, Manmohan Singh, India's Prime Minister believes that democratic process builds a stronger consensus behind the policies and creates more sustainable growth (Schuman 2009).

Last but not least, India's growth is also of strategic importance to the rest of the world. India's strained relations in the past with the USA have changed in recent times to

[21] Demographic transition refers to the process of the transformation of countries from high birth rates and high death rates to low birth rates and low death rates as part of the economic development of a country.

warming up of relationships between the two countries (Panagaria 2008). A fast growing and regionally balanced India has political and strategic implications for the USA and the rest of the world.

That said, an open, strong, fast growing and regionally balanced India may have a lot to contribute to the changing world dynamics.

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Table 1.1 Literature on economic growth and convergence in India

Author and year	Period of study	Econometric method	Results
Sachs, Bajpai and Ramiah (2001)	1980-98	Ordinary Least Squares	Sources of Convergence are found to be very weak
Dasgupta, Maiti, Mukherjee, Sarkar and Chakrabarti (2002)	1960-1996	Ordinary Least Squares	Per capita SDP diverges
Trivedi, K (2002)	1962-1992	OLS, Re-weighted least squares	No evidence of unconditional β Convergence, Evidence of conditional β convergence, σ divergence
Bandyopadhyay S. (2002)	1965-97	Distribution Dynamics Approach	Twin peaks: two income convergence clubs
Ghate and Wright (2009)	1970-2004	Non-stationary panel data	Different convergence rates for different states

Table 1.2 Average annual growth rates of the net state domestic product per capita for 15 Indian states

State	Pre-reform period (1970-1990)	Post-reform period (1991-2004)
Andhra Pradesh	2.22	4.08
Assam	2.38	1.31
Bihar	1.43	1.10
Gujarat	1.79	4.48
Haryana	2.72	3.07
Himachal Pradesh	2.08	4.92
Karnataka	1.83	3.69
Kerala	1.76	5.54
Madhya Pradesh	2.60	2.38
Maharashtra	3.24	3.40
Orissa	1.22	2.58
Punjab	2.24	1.78
Tamil Nadu	2.73	4.38
Uttar Pradesh	1.98	1.08
West Bengal	1.32	4.00
Full Sample*	2.03	2.21

Source: Author's calculations using data from Economic and Political Weekly Research Foundation. Numbers are percentages. * Total of 15 states.

Table 1.3 Explanation of the variables and their sources

Variable	Description
Growth rate of per capita net state domestic product	The growth rate of Per Capita Net State Domestic Product over 5 year intervals. The data is in 2000-01 prices. Sources: 'Domestic product of states of India, 1960-61 to 2000-01', Economic and Political Weekly Research Foundation and Central Statistical Organization.
Population Growth	The growth rate of population over 5 year intervals. Sources: Economic Survey (2007-08), www.indiabudget.nic.in and Census of India, Office of Registrar General.
Literacy	Literacy rates for 1971 are for the population aged 5 and above and for 1981, 1991, 2001, they are for the population aged 7 and above. The Census was not conducted in Assam during 1981; in this case the average of the preceding and succeeding figures is taken. Sources: Economic Survey(2007-08), www.indiabudget.nic.in and Census of India, Office of Registrar General
Credit extended by commercial banks	The total credit extended by commercial banks over each 5 year period. Source: 'Database of commercial banks in India', Economic and Political Weekly Research Foundation.
State government capital expenditure	Source: Budget documents of the state governments, rbi.com

Table 1.4 Literacy rates in selected states

State	1971	1981	1991	2001
Andhra Pradesh	24.57	35.66	44.08	60.47
Assam	33.94	43.00	52.89	63.25
Bihar	23.17	32.32	37.49	47.00
Gujarat	36.95	44.92	61.29	69.14
Haryana	25.71	37.13	55.85	67.91
Himachal Pradesh	35.00	50.00	63.86	76.48
Karnataka	36.83	46.21	56.04	66.64
Kerala	69.75	78.85	89.81	90.86
Madhya Pradesh	27.27	38.63	44.67	63.74
Maharashtra	45.77	57.24	64.87	76.88
Orissa	26.18	33.62	49.09	63.08
Punjab	34.12	43.37	58.51	69.65
Tamilnadu	45.50	54.39	62.66	73.45
Uttar Pradesh	23.99	32.65	40.71	56.27
West Bengal	38.86	48.65	57.70	68.64
India	34.45	43.57	52.21	64.84

Source: Economic Survey 2007-08.

Table 1.5 Population and average annual population growth rate in selected states (in '000)

State	1971	2001	Percentage Change from 1971-01
Andhra Pradesh	43,503	76,210	1.81
Assam	14,625	26,656	1.94
Bihar	42,126	82,999	2.19
Gujarat	26,697	50,671	2.07
Haryana	10,036	21,145	2.40
Himachal Pradesh	3,460	6,078	1.82
Karnataka	29,299	52,851	1.90
Kerala	21,347	31,841	1.29
Madhya Pradesh	30,017	60,348	2.25
Maharashtra	50,412	96,879	2.11
Orissa	21,945	36,805	1.67
Punjab	13,551	24,359	1.89
Tamilnadu	41,199	62,406	1.34
Uttar Pradesh	83,849	1,66,198	2.21
West Bengal	44,312	80,176	1.91
India	5,48,160	1,028,737	2.03

Source: Author's calculations using data from Economic Survey 2007-08.

Table 1.6 Estimating time trends for output and input variables

	Full period	Pre-reform period	Post-reform period
Per capita NSDP	140.80*** (18.32)	72.27*** (7.65)	201.02*** (13.36)
Population growth	676.73*** (25.05)	-	-
Literacy rate	-0.04* (-2.08)	-	-
Credit by commercial banks	126701.2*** (11.04)	51666.27*** (16.30)	283342.40*** (10.77)
State capital expenditure	39.77*** (3.61)	9.63* (1.70)	98.73** (2.15)

The numbers in parentheses are t-statistics. ***, **, and * represent statistical significance at the one, five, and ten percent level.

Table 1.7 FDI inflows received in selected states in India

State	2000-2006 (Millions of Rs.)	2000-2006 (Millions of USD)
Andhra Pradesh	48250.0	1061.4
Assam	417.4	9.0
Bihar	33.4	0.8
Gujarat	41127.3	898.8
Haryana, Punjab and Himachal Pradesh	15238.3	329.5
Karnataka	84853.8	1876.1
Kerala	3397.7	75.1
Madhya Pradesh	2359.1	51.8
Maharashtra	256854.5	5650.1
Orissa	3650.0	81.2
Tamil Nadu	76912.0	1691.7
Uttar Pradesh	152.7	3.3
West Bengal	15230.6	334.8

Source: Fact sheet on FDI, October 2006, www.dipp.nic.in (Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Government of India).

Table 1.8 India's electronic and computer software related exports in selected states (Millions of Rupees)

State	2005-2006	2006-2007
Karnataka	41429	52175
Tamilnadu	14573	21325
Andhra Pradesh	12620	19140
Maharashtra	19644	32100
Total	114625	158500

Source: Electronics and computer software export promotion council (2009)

Figure 1.1 Average annual growth rate of per capita net state domestic product before and after reform in selected states

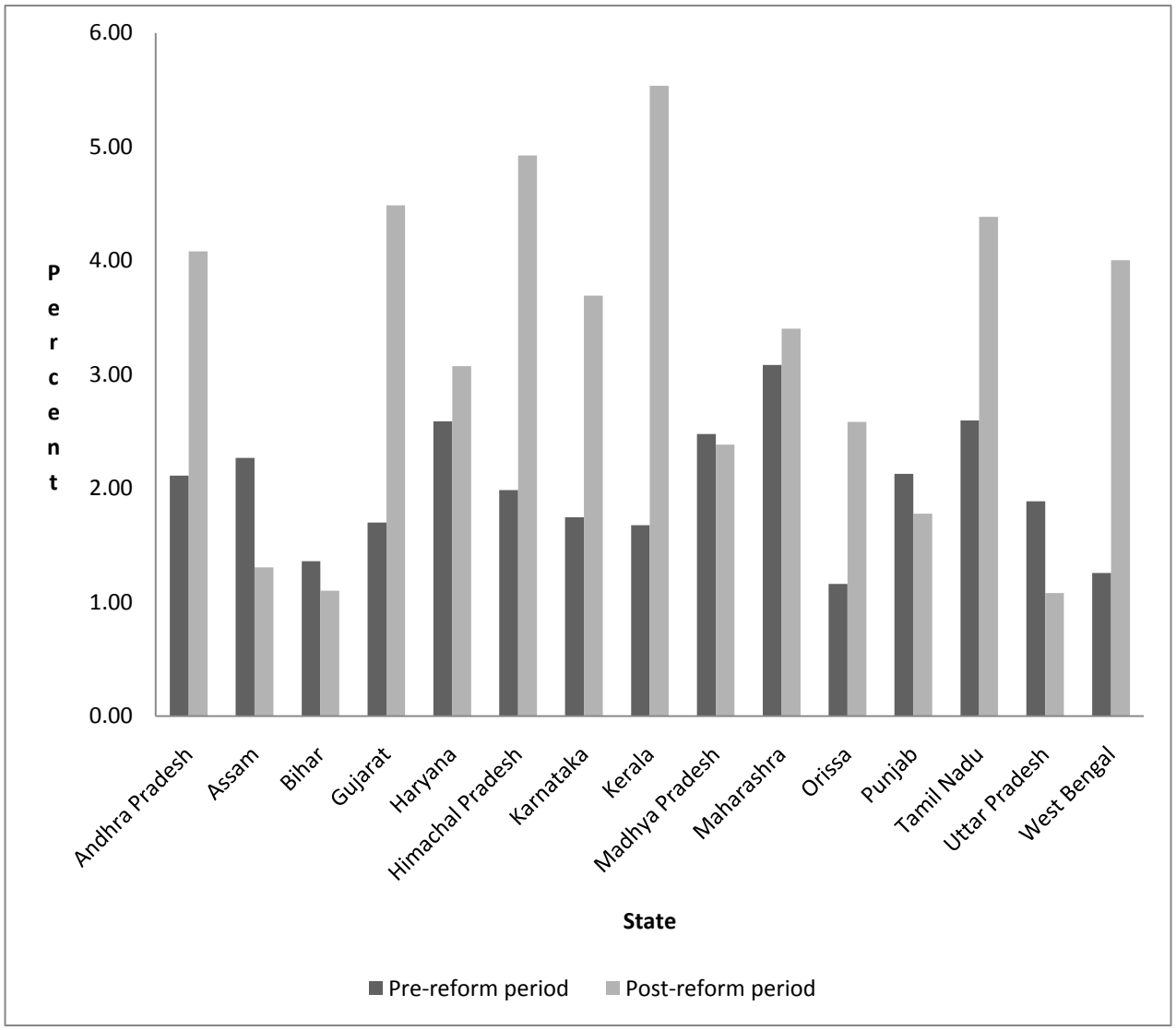


Figure 1.2 The dispersion of per capita state domestic product across 15 states from 1970 to 2005

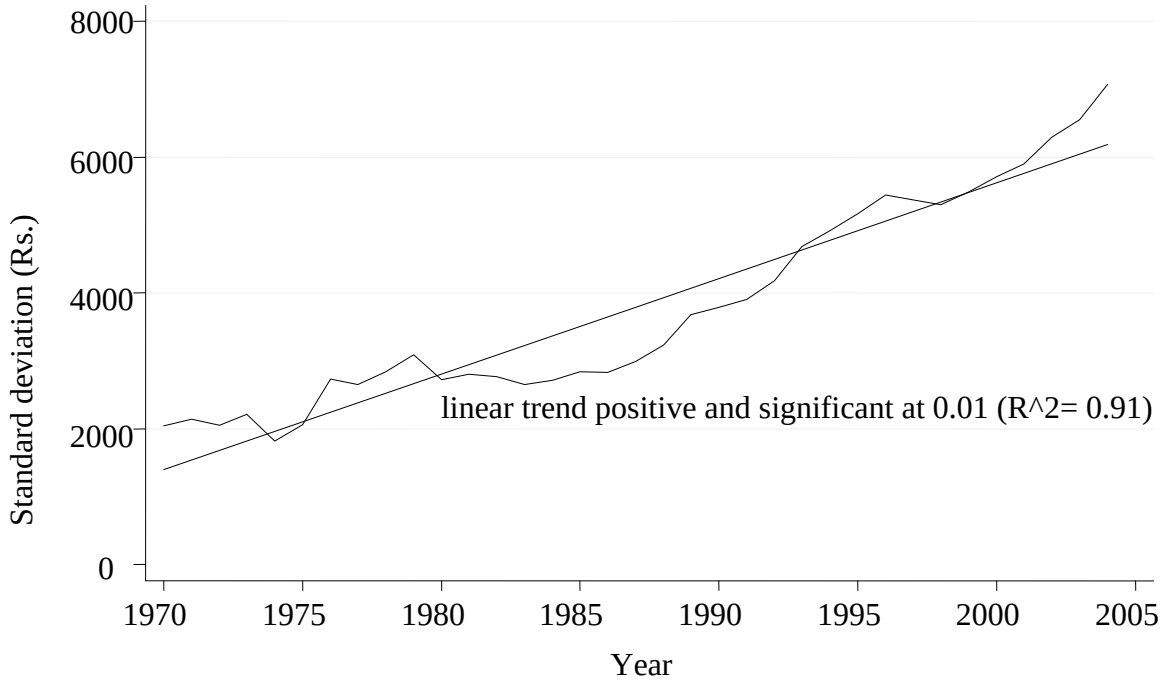


Figure 1.3 The dispersion of per capita state domestic product across 15 states in the pre-reform period

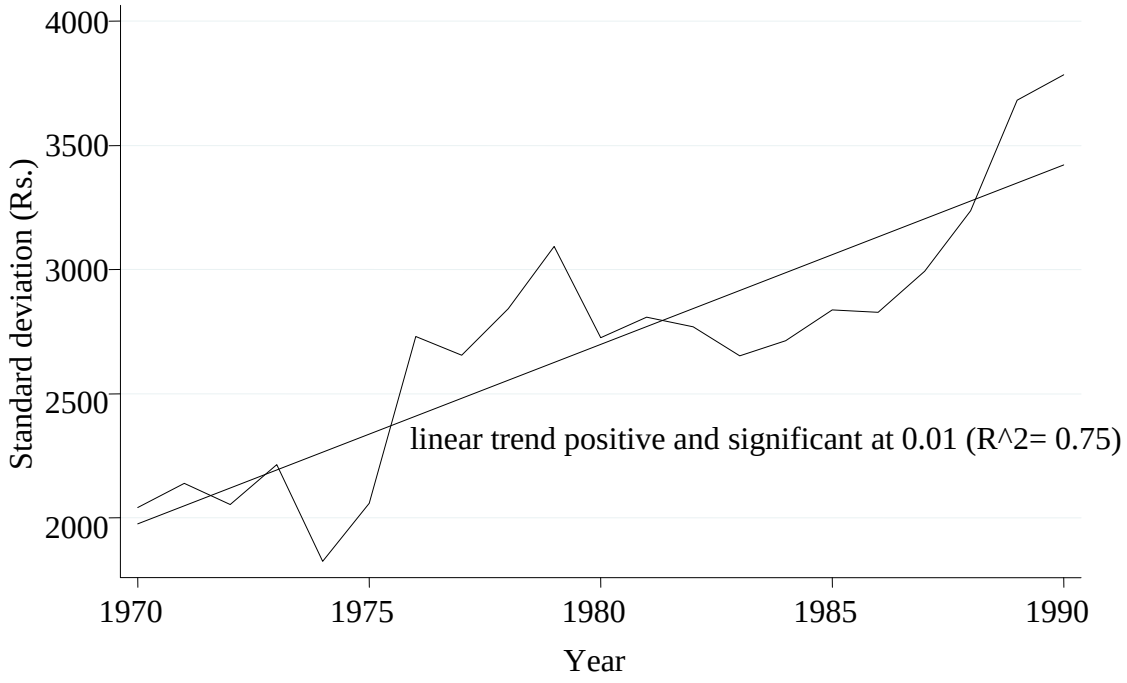


Figure 1.4 The dispersion of per capita state domestic product across 15 states in the post-reform period

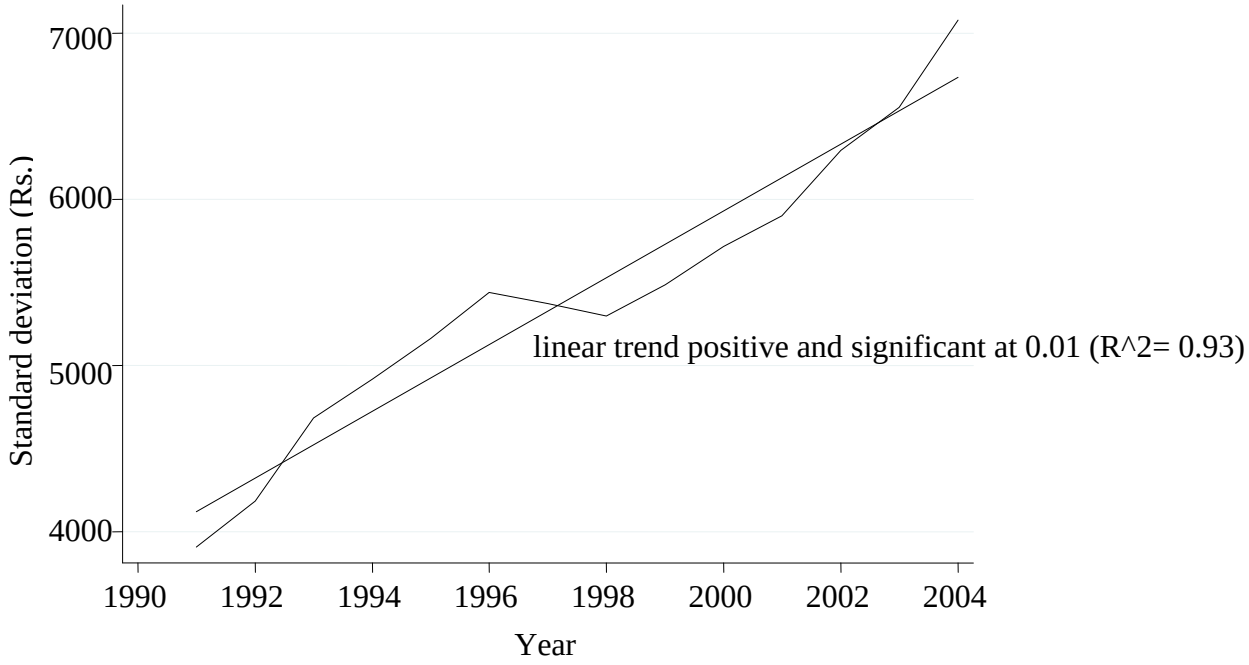


Figure 1.5 The dispersion of population growth across 15 states from 1970 to 2005

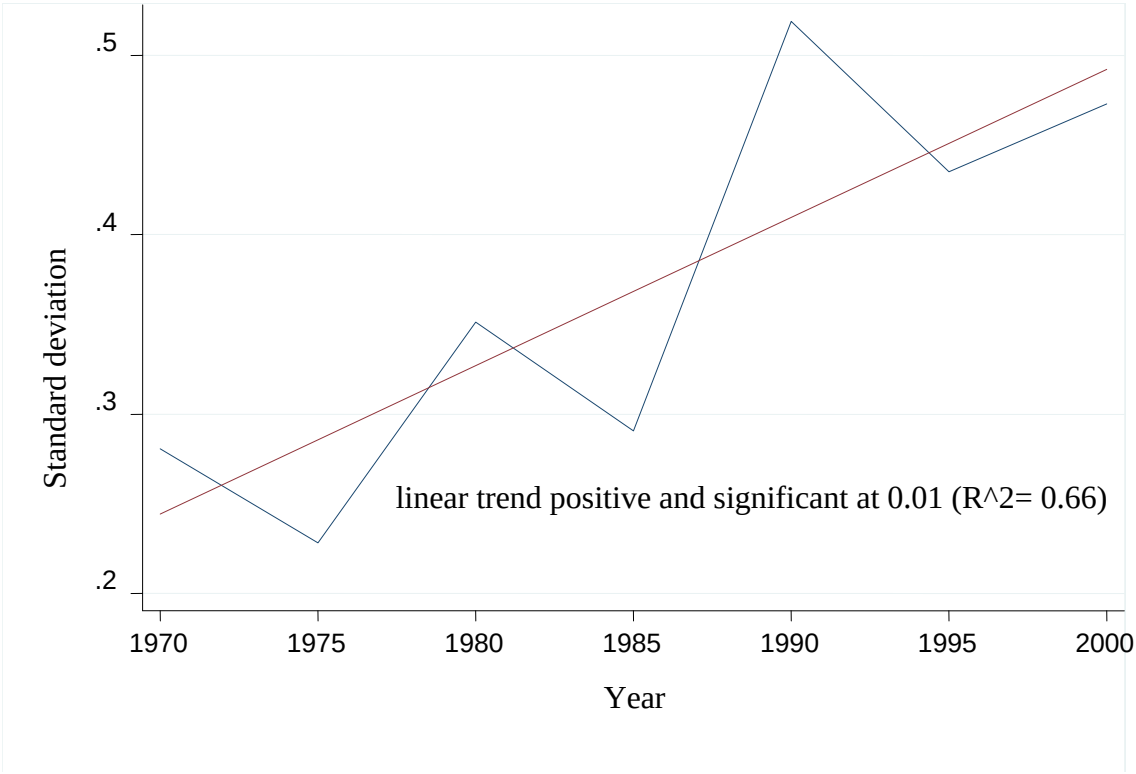


Figure 1.6 The dispersion of literacy across 15 states from 1970 to 2005

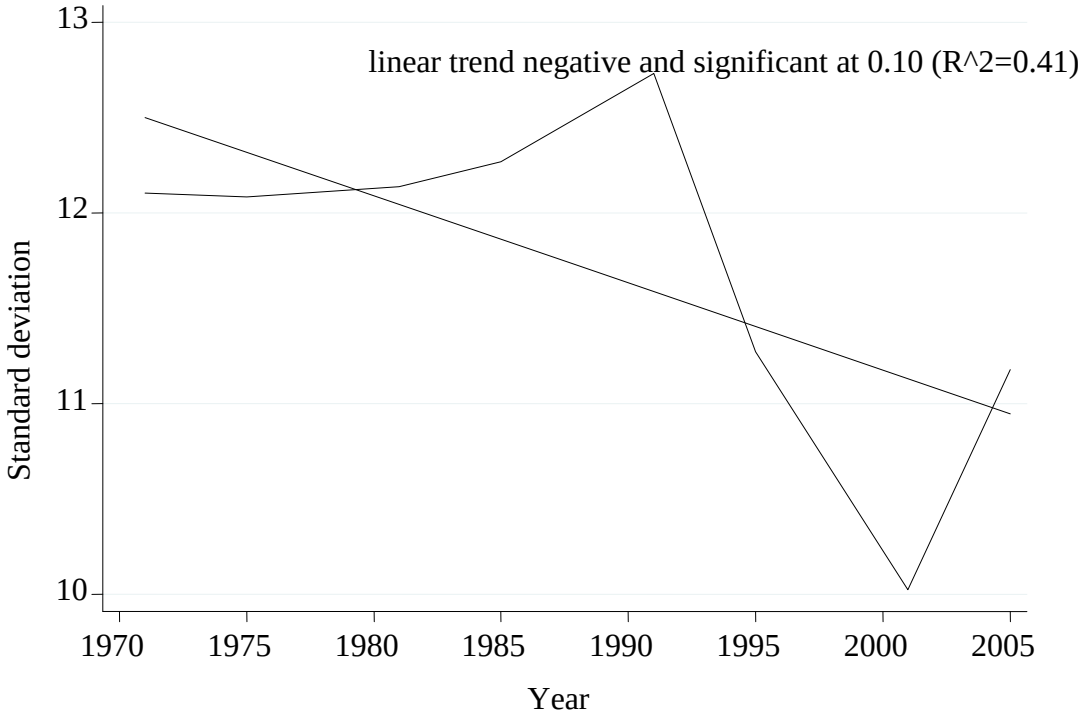


Figure 1.7 The dispersion of commercial bank credit across 15 states from 1970 to 2005

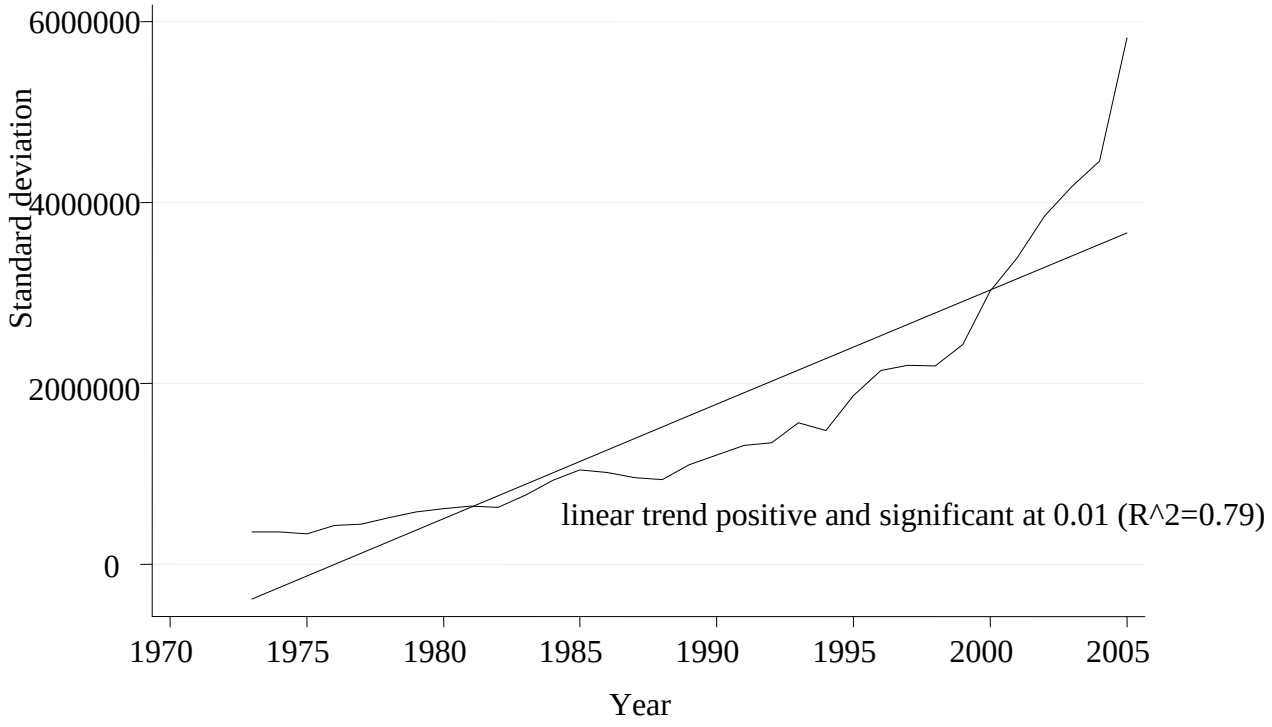


Figure 1.8 The dispersion of commercial bank credit across 15 states for the pre-reform period

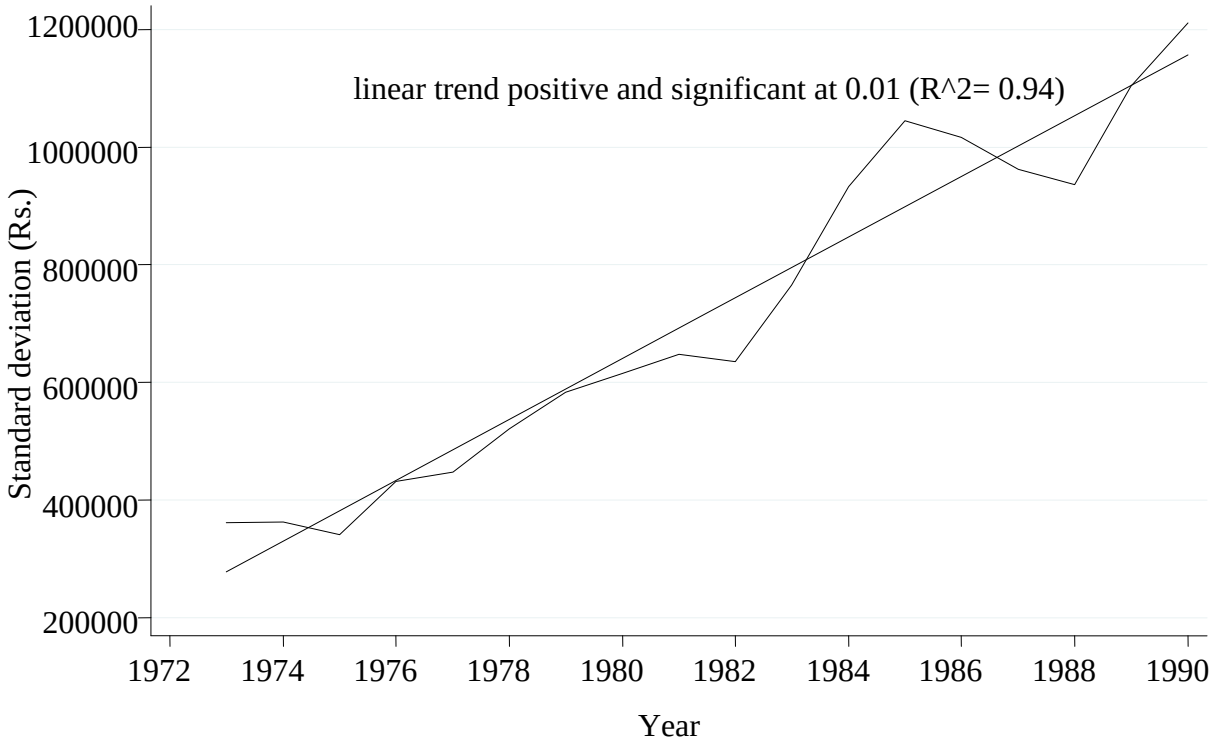


Figure 1.9 The dispersion of commercial bank credit across 15 states for the post-reform period

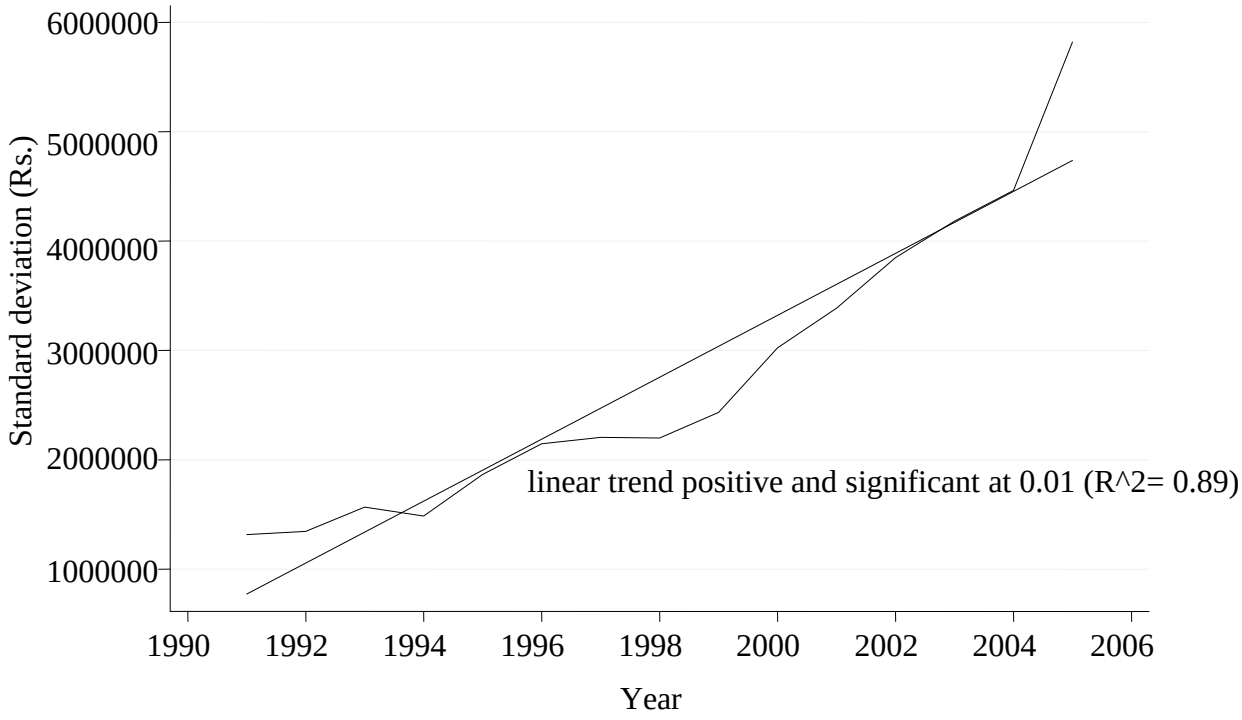


Figure 1.10 The dispersion of state capital expenditure across 15 states from 1970 to 2005

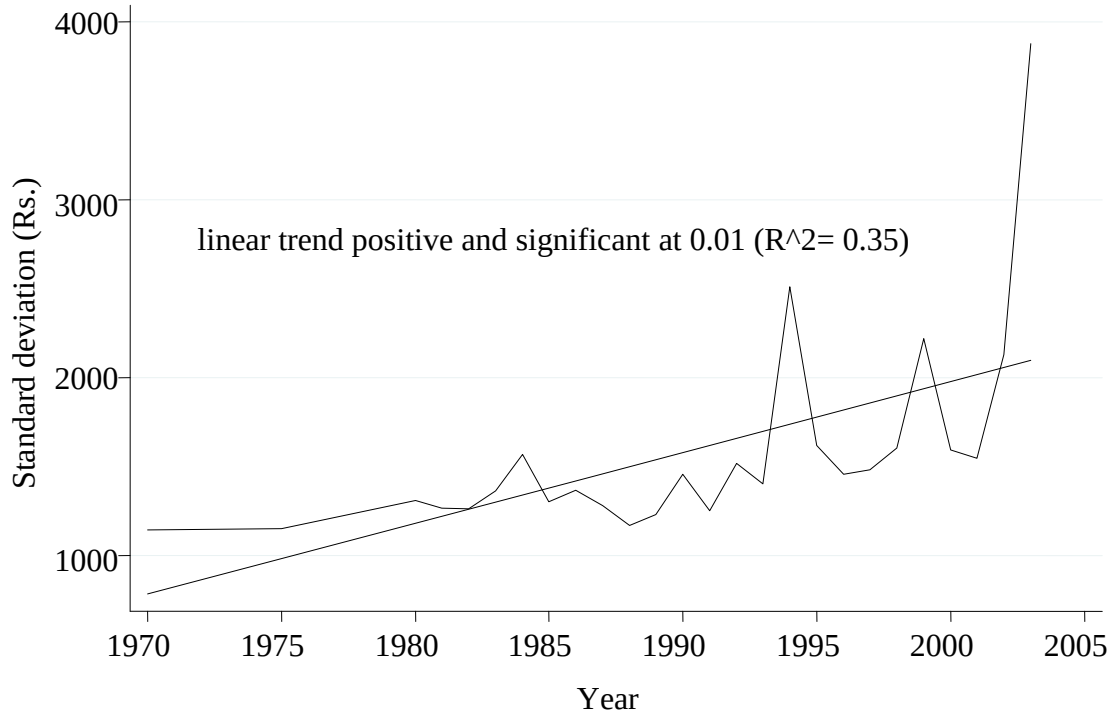


Figure 1.11 The dispersion of state capital expenditure across 15 states for the pre-reform period

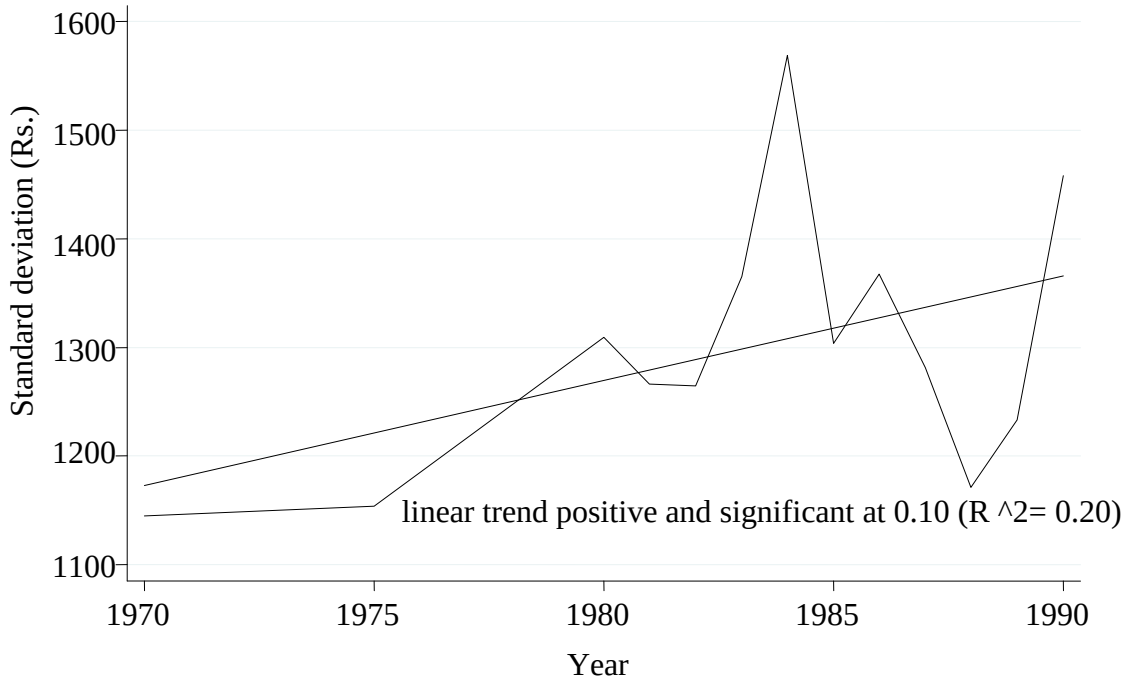
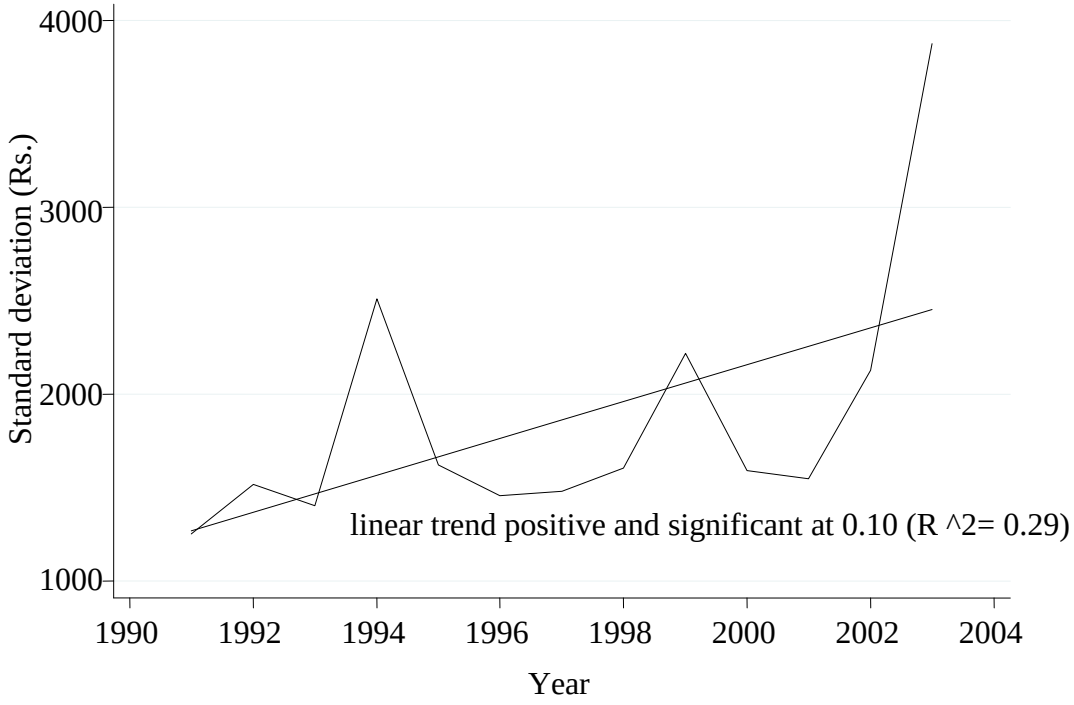


Figure 1.12 The dispersion of state capital expenditure across 15 states for the post-reform period



2 Sectoral output growth and income in India at the state level

2.1 Introduction

India has become one of the world's fastest growing economies with average growth rates of nine percent over the past four years (2005-2009) (World Bank 2009). This is in stark contrast to the post independence decade (1950-1960) growth rate of about three percent per year and the five to six percent average rate of growth which prevailed in the 1980s (Economic Survey 2008).

In this paper I study the sectoral output across 15 Indian states for the time period 1970-2005. I find that India's fast economic growth is characterized by unique and distinctive structural changes in the economy that make the country stand apart from other lower middle income developing countries in Asia.[22] The theory of structural changes and economic growth proposed by scholars like Fisher (1939) and Clark (1940) argues that as the economy of a country progresses, the output and employment in the primary sector will fall and that of the industrial sector and the service sector will increase. However, the Indian growth experiences do not match the historically proposed and commonly observed trends in sectoral changes in output in other countries.

First, despite the decline in the agricultural sector's share in GDP, the secondary sector's share in GDP did not take off as expected. Since the 1970s, the share of the secondary sector as a percentage of GDP has hovered around 25 percent. As shown in Table 2.1, average share of the secondary sector in GDP for lower income countries is around 40 percent or more (World Bank 2010). Historically, most of the developed

[22] In section 3, I compare India's sectoral growth to other developing countries in Asia with similar income levels. A detailed analysis brings out the distinctive features of Indian sectoral output and employment as compared to other developing countries.

countries became service sector dominant economies only after going through an elaborate phase of industrial development, where the secondary sector typically contributed around 50 percent to GDP (Papola 2005).[23] Indian economic growth has come about mostly by bypassing growth of the secondary (industrial) sector.[24]

Second, the share of the tertiary sector has grown very rapidly, making India a 'tertiarized' economy- an economy in which the tertiary or the service sector dominates the primary and the secondary sector. Table 2.1 shows that despite having an income level of a low middle income country, the share of the service sector in GDP in India is close to that of a high income country.

Third, the employment in the service sector is very low. Thus some scholars have dubbed Indian economic growth as 'jobless growth' (Bhattacharya and Sakhtivel 2002). The service sector, which is recently the fastest growing sector, makes up the biggest part of the GDP, but employs only 28 percent of the population. Thus, the service sector is a "major economic sector" but a "minor contributor to employment" (Papopla 2005).This feature distinguishes India from other developing countries in Asia, where the share of

[23] As mentioned by Gardner (1997) the US moved more quickly from an industrial economy to a service sector economy than other industrialized countries. Specifically, he says that "industry dominated the economy for less than 30 years (early 1900s to mid 1920s)" and that this contrasts with Britain, where industry "held dominance for over 100 years (from the 1840s until the late 1960s)."

[24] As far as less employment growth and output stagnation in case of the industrial sector is concerned, India is a part of a broader phenomenon that needs to be explained. However in this case too, during 1980's and 1990's most Asian economies continued industrializing at a rapid pace. In contrast to this, during the 1980's Latin American and South African developing countries experienced a stagnant industrial output growth (post 1980's and 1990's) (UNCTAD 2003). Thus the lack of industrial growth has been more a feature of Latin American and South African countries than Asian countries.

services in total output and in employment match more closely (Papola 2005; Banga 2005).

In this paper I study sub-national sectoral output growth patterns and find that these unique characteristics also apply at the state level. I examine whether the transformation of economic structure at the state level was significantly different in the periods before and after these economic reforms were undertaken in India in 1991.[25] My paper contributes to the literature in two important ways. First, I study the relationship between per capita and the sector shares at the sub national level. Such studies have been carried out previously at the national level but not at the state level. I also include other development inputs like investment, literacy rates and population growth to see their effect on sector shares. Second, I break the period into pre- and post-reform phases to better understand changes in sector shares and growth.

[25] In this paper I do not study the effect of liberalization on sectroal growth. To get data on liberalization indicators or proxies like FDI at state level is impossible. The effect or non-effect of the various liberalization policies is extensively studied in the literarture. The failure of various policies that were a part of 'Washington consensus' to act as growth panacea for developing countries is widely discussed in the literature. There are two main classes of arguments: one that attributes reform failures to the problems in the very nature of the suggested policy reforms and the other that rests on the erroneous or at times half-hearted implementation of these reform policies by the governments. Rodrik (2006) discusses the various inherent problems associated with the Washington consensus and its failure to provide successful growth strategies. He mentions that these policies lacked a strategy of eliminating the fundamental distortions that prevail in government and markets affecting accumulation and /or productivity. Instead it only emphasized the elimination of deadweight losses resulting from inefficiency. Also, the broad objectives of these reform policies can not translate into a 'one size fits all' or a unique set of actions. On the other hand, Krueger (2004) attributed the failure not so much to the nature of reforms or to the inherent problems with reforms but to the absence of full implementation of these reforms in effective ways. She refers to the policy reforms as "meant well tried little and failed much". Giving examples of Argentina and Turkey, she argued that the disappointment with reforms was because of lack of ambitious reforms and follow through that was needed to reap the benefits of reforms.

The paper is organized as follows: in the next section, I present the theory behind structural change and economic growth. Then in section 2.3, I compare India with other countries to highlight the unique features of the Indian economy. I discuss the importance of a state level study for India in section 2.4. In section 2.5, I discuss the background for the economic reforms undertaken since 1991 and detail the sectoral reforms. The state level growth experience in the context of the sectoral net state domestic product in the pre- and post-liberalization period is explained in section 2.6. Later in section 2.7, I discuss the data, the methodology for examining the relationship between income and sectoral output shares. Section 2.8 presents results. Section 2.9 concludes.

2.2 Structural economic change and economic growth

The development literature claims that as an economy grows its economic structure evolves from an agrarian to a non-agrarian one. [26] Changes in the allocation of output across sectors are expected to be accompanied by similar changes in employment shares.[27] There are various reasons for such structural transformations during

[26] Early work regarding the structure of the economy and economic growth dates back to Fisher (1939) and Clark (1940). Clark (1940) emphasizes a three-sector economy (the primary sector, the secondary sector and the service sector) and implies that as the economy develops, the focus of the economy shifts from the primary to the secondary and then finally to the service sector. Kuznets (1971) argued that as the economy develops, there will be shifts in the inter-sectoral output: there will be a notable decrease in the primary sector's share in the total output as the economy advances. This will be accompanied by a significant increase in the industrial output and the service sector output.

[27] However, such a structural change in employment shares will depend upon other factors. One is whether this structural change in output shares is capital intensive or labor intensive. If the non-agricultural industry remains highly capital intensive and skilled-labor intensive then this may affect the rate of transition of labor from agriculture to non-agricultural sectors (Pangariya 2008). Secondly, the degree of substitution between capital and labor also needs to be taken into account. Also, the presence and types of

development. From the demand side, the argument for a shift from primary to the secondary sector is based on Engel's law, which has to do with the differences in income elasticity of demand for products (Fisher 1939; Clark 1940). According to this argument, the income elasticity of demand for primary or agricultural sector products is low. However, for secondary sector's products such as manufactured goods, and also for service sector products, the elasticity of demand with respect to income is higher. Therefore as the income levels rise, the relative demand for food or agricultural products declines and that for manufactured goods and services increases. As a result of changing demand, the shares of different sectors of the economy change as the economy develops. [28]

There is also a supply-side explanation for the changing sectoral distribution of output as an economy progresses (Papola 2005). The primary sector is mainly dependent on factors of production like land that are fixed in supply; thus, there is a limit to growth without technological growth. This means that diminishing returns set in early without corresponding technological changes. In comparison, in the industrial sector, most of the factors of production can be augmented with the help of technology and innovation. The

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government regulations on services and industries and domestic policy constraints may stand in the way of employments transition.

[28] Kuznets (1966) also based his explanation of shifting patterns of production on demand side factors. He pointed out that with the technical advancements in industrial development, large-scale manufacturing and geographical concentration of production might take place. This leads to a demand for services like transport and communication. In addition, higher incomes may necessitate demand for personal services. Kuznets proposed that inter-sectoral shifts also reflect technological effects and newer institutional arrangements. According to Kaldor (1966), who related the growth of GDP to the growth of manufacturing sector, growing services were a by-product of the expansion of the secondary sector and increasing levels of income.

service sector also can make use of the technical advances for its growth and is not dependent on fixed factors of production like the primary sector (Papola 2005).[29]

More recent studies such as Inman (1985), Ichevarria (1997) and Kongsamut et al (2001) also find similar patterns of structural changes in countries. For example, Kongsamut, using data for 123 countries over the period of 1970-1989, shows that rising per capita income is associated with declining agriculture sector output and employment shares and rising service sector output and employment.

Eichengreen and Gupta (2009, 2010) analyze the relation between per capita income and sector shares for the industry and the service sector in India for the 1960 to 2005 period at the national level. Their results indicate that the industry's share in GDP has remained stagnant after 1990s. For the service sector, Eichengreen and Gupta (2010) note that the share of the service sector in GDP was stunted until1990. However, the share picked up in the 1990s to be significantly above the level predicted by the international cross section for a country with its level of per capita income.

As is clear from the above discussion, historically the pattern of structural changes as the economy develops has been a decline in primary sector output and employment and increase in the industry and tertiary sector output and employment. There may have been differences in explaining the reasons behind such output shifts across sectors, but the basic pattern of the structural change in economies accompanying

[29] Baumol (1967, 2001) also proposed that there will be a shift from an agrarian to a non-agrarian economy as a country developed. However he emphasized that changes in sectoral shares take place not as a consequence of changes in demand but because of changes in the productivity. According to him, because productivity in the service sector rises slower, the employment share of the tertiary sector rises faster. Fuchs (1968) found similar results and stressed the differentials in productivity across sectors rather than the demand changes.

development remains the same. In the next section, I will present a comparison of India with other countries with similar income levels and point out what makes India a unique case and sets it apart from this historical pattern of structural changes outlined above.

2.3 Is India unique?

As discussed in the introduction, the recent growth of India is characterized by some distinctive structural changes that separate it from the other developing countries of similar income levels in Asia. India falls in the category of a lower middle-income county (World Bank 2007).[30] In 2007, India had a per capita gross national income (PCY) of $950. China, which also belongs to the lower middle-income group, reached a similar level of income in 2000. If we compare the sectoral output shares in PCY of China in 2000 with India, we see a stark difference in the shares of industry and service sector. As can be seen in Table 2.2, India had a low share of industry in total output amounting to only 29 percent. In contrast, China's secondary sector contributed close to 48 percent to total output in 2000. The same is the case with countries like Indonesia, Bhutan, Thailand and Philippines. Also, in all these countries, the share of services in total output has been much lower than India. For example, whereas India's service sector contributed around 53 percent to PCY, Indonesia had only about 43 percent PCY from tertiary sector and China's service sector contributed only 39 percent to the PCY.

[30] The World bank's country classification based on per capita gross national income (PCGNI) in 2008: 1) Low income countries- countries having PCGNI of 975 USD or less; 2) Lower middle income countries- countries having PCGNI of USD 976 to USD 3855; 3) Upper middle income countries- countries having PCGNI of USD 3856 to USD 11905; 4) High income countries- countries having PCGNI of USD 11906 or more.

Table 2.3 gives the shares of sectors for selected lower middle countries for the years 1970 and 2008. As can be seen, India had a very low industry output share even in 1970. The secondary sector in India has been a poor contributor to PCY compared to all the rest of the countries in this income group. In 1970, China had 40 percent industry share in PCY but India had only 21 percent. Indonesia, which had a similar secondary sector share in 1970 (around 19 percent), shot up to 48 percent in 2008, while India stagnated at 29 percent. Thus, slow growth and poor contribution of the industrial sector in India set it apart from the rest of the developing countries in this income category.

While India belongs to the lower middle-income group of countries, if we look at the sectoral composition of output in 2005, India more resembled an upper middle-income country. Table 2.1 gives the shares of the three economic sectors across country groups in 2005. India's service sector output was closer to that of the 61 percent characteristic of an upper middle-income country. Also, in case of the manufacturing sector, India's profile came close to a high-income country.

In addition to the differential patterns in the sectoral output, the patterns in employment across sectors in India are different as well. The service sector in India employs a lot less people than the service sector in other developing countries. Thus it has been less 'employment intensive' as compared to other countries like China and Indonesia (Papola 2005). In China and Indonesia, the share of service sector in output was similar to the service sector's share in employment. For example, according to Table 2.4, in 2002, China's service sector contributed 34 percent to GDP, and employed 31 percent of the labor force. Indonesia's tertiary sector contributed 38 percent to GDP and employed 39 percent of the labor force. In contrast to this, India had only 22 percent of

its people employed in the service sector, which produced 51 percent of the output (Papola 2005). This is different from the historically observed patterns in structural changes employment that accompany sectoral changes in output. Banga (2005) discusses some possible reasons responsible for slow growth of employment in the service sector. The author mentions that some services such as community, social and personal services that have grown faster and have relatively higher contribution to the GDP have experienced a fall in employment elasticity. Also, sectors like the telecommunications and software services which are growing fast have higher labor productivity and therefore less employment growth. Growth has been concentrated in services that are skilled-labor intensive according to Gordon and Gupta (2004).

Thus there are several interesting structural features of Indian economy. First, despite the decrease in agriculture share that accompanied Indian economic growth, contribution of industrial sector in the total output was low as compared with other lower middle-income countries in Asia. Second, the service sector grew rapidly as compared with other countries. Third, the share of service sector in employment was very low compared to other countries.

In the next section, I will discuss the importance of undertaking a state-level study of India.

2.4 Why is a sub-national study important?

There are several reasons why it is important to study the sub-national economic development. First, understanding the regional and sectoral differences after economic liberalization has important implications for continuation of economic reforms and the development of second-generation reforms. It is important to look at pre- and post-reform

dynamics in the economic picture. The economic liberalization undertaken in 1991 reduced the extent of control by the central government in many areas. Specifically, decentralization in areas related to investment led to a higher scope for initiative on the part of state and local governments. With less central government control and intervention, the states had the freedom to frame policies to attract foreign as well as domestic investment. Therefore it is important to study the patterns in economic structure and growth before, and after, liberalization was undertaken. Second, it is important to note that high rate of economic growth at the national level or the pattern of structural transformation observed at the national level need not mean that all the states enjoyed equal benefits of this growth spurt. An analysis at the national level may mask the state level dynamics of growth. Therefore a regional level analysis is important for getting a clearer picture of economic growth. Third, for a diverse country like India, a regional level analysis is very important.[31] Balanced regional growth could provide a strong foundation for the political and economic unity of the country and continuance of the economic reforms. In the next section I describe the background for economic reforms undertaken since 1991 and discuss sectoral reform policies.

2.5 Economic reform

In 1991, economic liberalization was officially undertaken in response to the balance of payments crisis that India faced at that time.[32] It was an important and

[31] Diversity is yet another distinguishing aspect of India. No single religion, culture or language represents India. It is a secular country and a home to five of world's major religions. India has 22 official languages. India epitomizes the blend of myriad cultures, languages and religions in co-existence.

[32] Trade liberalization started in India in the late 1980s, but a more comprehensive set of reforms was only implemented in 1991. Therefore, there is a lot of debate in the literature

definitive step toward having a more open economy, indicating a shift from the socialist thinking of the Indian National Congress (Congress) government that prevailed until the mid-1980s. These economic reforms included changes in industrial policy, fiscal policy, external sector policies and financial sector policies. Following its devaluation, the Indian Rupee became fully convertible on the current account. Foreign direct investment and technology transfers were encouraged, and Indian industries were allowed to access international capital markets.

2.5.1 Reforms in the agricultural sector

Being a predominantly agrarian economy in terms of employment, the performance of the agriculture sector is of utmost importance in India. Agriculture employs almost 50 percent of the total labor force in India (Economic survey 2008). However the contribution of this sector to the economy has been declining in recent years. In 2007-2008, agriculture and allied activities sector accounted for only 17.8 percent of the gross domestic product (GDP) in India. In 2003-04, this share in GDP was around 22 percent (Economic survey 2008). In this section, I will discuss agricultural reforms that were undertaken in India since 1991.

The economic reforms that were initiated in 1991 did not contain a comprehensive reform agenda for the agricultural sector per se (Thamarajakshi 2000). Though there has not been a wide discussion of the reasons behind this, Vyas (2001)

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about whether to consider the reforms undertaken in 1985-86 as an indicator of economic policy shift or whether the 1991-92 measures be deemed as policy shift. An examination of these counterarguments is beyond the scope of this paper. For the current paper, I have treated the 1991 economic reforms as an indication of policy shift since these were more far reaching than the earlier generation of reforms.

presents a few possible reasons for the lack of reform in the agricultural sector. First, when it came to agriculture, the issue of food security was important. This made the government cautious about radical policy changes to the market. Also, agriculture was a state subject (instead of federal/ central), which left more of the policymaking initiative in the hands of the state government.

If we take a brief look at the 1991 reforms, the route to reforming agriculture was thought to be through a reduction in the protection of the industrial sector and the transformation of trade policy. As Singh (1995) puts it, the all- pervading protection to the industry that was prevalent before 1991 had hurt agriculture in many ways. The most important effect of protection and import substituting industrialization was that it had raised the prices of non- agricultural products and made it replete with price distortions. As buyers of industrial goods, such as agricultural machinery, this had hurt the economy's rural sector. The pre-reform industrial policy had made industrial production more profitable than agriculture, which led to a diversion of investment away from agriculture. To take care of this, it was thought that correcting the distortions in the industrial sector would benefit the agricultural sector. Once the industries were open to competition, the prices of industrial goods would fall and thereby improve the terms of trade for agriculture. That is, the relative prices were expected to be altered in favor of agriculture by unleashing the industrial sector. In addition, after liberalizing trade and devaluing the Rupee, agricultural exports would increase and make the sector more profitable.[33]

[33] However, assuming this has ignored other factors. For example, the impact of trade liberalization on the agricultural commodities exports will depend upon relative supply

There were several piecemeal reforms that were undertaken in the agricultural sector. The most important reform was the abolition of the zonal restrictions on the movement of agricultural commodities (Gupta 1998), especially for food grains (Vyas 2001). In 1993, the central government declared the whole country to be a 'single food zone'. In 1998 in a chief ministers' conference, states showed willingness to remove the movement restrictions.[34] All limitations, even the informal ones, were to be done away with at least in the case of essential commodities. However, this policy reform has not seen much success as most state governments have not translated their words into actions (Wadhwa 2001). Most states still impose some restrictions on the movement of some agricultural goods.

The next reform involved privatization. Vyas (2001) notes that privatization was given consideration in the agricultural sector after the first phase of reforms. The distribution of inputs such as fertilizers, agricultural extension and provision of services were opened for private enterprises. Agricultural extension is the application of scientific research and new knowledge in agriculture via education of farmers (Vyas 2001). Pre-reform, this was mostly run by government enterprises, but after the reforms, private parties like NGOs were asked to step in and promote education for improved agricultural

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and demand elasticity. In case of agriculture the supply elasticity of exports is considerably low.

[34] The chief minister is the leader of the ruling party in the state parliament and heads the cabinet ministers.

practices through communication and learning activities.[35] Knowledge about agricultural marketing also started getting imparted in these extension activities.

In the domestic market, some controls were done away with for particular agricultural commodities. For example, non-nitrogenous fertilizers were freed of all the controls. Reforms and trade liberalization also helped agriculture through increased exports (Ahluwalia 2002). There was an appreciable upswing in agricultural exports after reforms (Mishra and Rao 2003). Mishra and Rao (2003) mention that during 1990s, exports increased at 8.96 per cent per annum as compared to only 2.43 percent in the decade before the economic reforms. Also, India's share of agricultural exports as a percentage of world exports grew from 1.1 percent in 1990 to 1.9 percent in 1999. This share had actually declined in the decade before the onset of reforms (Ahluwalia 2002). In 2008 the agriculture sector contributed about 13 percent to national exports (Economic survey 2008).

2.5.2 Reforms in the industrial sector

Taking a reformist approach and recognizing the impediments in industrial development caused by the licensing system, the government redefined its role in the industrial sector. The new industrial policy in 1991 declared that, "Government policy and procedures must be geared to assisting entrepreneurs in their efforts. This can be done only if the role played by the government were to be changed from that of only

[35] There is an extensive literature studying the effects of privatization on economic growth and efficiency (see, for example, Gupta (2005), Bennett, Estrin, and Urga (2007), Cook and Uchida (2003), Baijal (2002a, 2002b), and Pangariya (2008)). The gains from privatization can depend upon the method and sequencing of privatization.

exercising control to one of providing help and guidance by making essential procedures fully transparent and by eliminating delays." (Government of India 1991) To accomplish this, the government abolished the system of industrial licensing. Irrespective of the amount of investment, almost all industries were free from the convoluted licensing procedures. Licensing only remained in effect only for eighteen industries that were related to security, strategic and environmental issues. Even this list was trimmed in subsequent years to bring down the number of regulated industries to five industries, including things like arms and ammunition, atomic energy and tobacco.

The next reform was with respect to the Monopolies Restrictive Trade Practices Act (MRTP). The new policy clearly states that the government interference in industry through MRTP was proving to be harmful to the health of industrial sector since this act limited the benefits of large scale production in industry (Government of India 1991). Therefore, there was need for the government to refrain from affecting the investment decisions of large firms. To achieve this objective, the new policy put an end to the pre-entry scrutiny of the MRTP firms (Mahajan 2006). Now it was no longer necessary for the firms to seek prior approval from the government for expanding their firm, merging with other firms or, acquiring or establishing new undertakings (Government of India 1991). The revised MRTP put more emphasis on controlling the unfair trade practices rather than influencing the investment decisions of business conglomerates.

Another important reform reduced the scope of the public sector in the economy. The new policies acknowledged the fact there were serious problems with the working and productivity of the public sector entrepreneurs. In the new policy, the government emphasized the need for measures to make public sector enterprises more 'growth

oriented and technically dynamic' (Government of India 1991). In addition to this, the policy limited the public sector monopoly to only eight sectors on the basis of security and strategic issues. In later years, this list was trimmed to only two sectors, namely, railways and atomic energy (Panagaria 2008).

In recent years, there has been an important development towards liberalizing the manufacturing sector in particular. Many industries previously reserved for small-scale production are now open for entry by the large-scale firms. Formerly, the Small Scale Industries (SSI) Reservation of 1967 included almost all unskilled labor-intensive products. This limited the growth of the labor-intensive products industry since the benefits of large-scale production could not be reaped in these sectors. However in recent years, there has been a shift in this reservation policy. In 2007, only 239 products were reserved for small-scale production against a staggering 821 products in 1998. Now, products such as, toys, footwear and apparel are off the reservation list (Panagaria 2008). In addition, for the products that are still on the SSI list, large scale production is allowed if fifty percent or of the more output is bound for exports.

As far as foreign investment is concerned, the reforms gave automatic permission for foreign equity investment up to fifty one percent in thirty four priority industries. This abolished the earlier limit of forty percent foreign equity investment in industries (Mahajan 2006). Later the procedure of automatic approval became applicable to almost all industries except the ones reserved for public sector monopoly. Industry was opened to foreign direct investment in all but four sectors. In the case of foreign technology agreements, the policy gave automatic permission for foreign technology agreements in high priority industries up to a lump sum payment of Rs. 10 million, five percent royalty

for domestic sales and eight percent for exports (Government of India 1991). In the subsequent years, this was extended to all industries.

2.5.3 Reforms in the service sector

As far as the reforms in the service sector are concerned, there was no separate policy package for the service sector per se. Unlike the secondary sector, the service sector did not get any comprehensive set of policy changes. However, the overall changes in policy regarding deregulation, opening up of FDI and privatization of services previously owned by government were important to the growth of service sector (Gordon and Gupa 2003).

After reviewing the economic policy reforms that were undertaken since 1991, I discuss the sectoral growth at the national and state level.

2.6 Sectoral growth at the national and state level

In this section, I present the pattern of sectoral shares in the net state domestic product (NSDP) in Indian states over time. I will also investigate the growth rates of the primary, secondary and tertiary sectors before and after the economic reforms.

In India, the share of the primary sector has decreased significantly over time. The agriculture and related activities' share in India's net state domestic product was around 51 percent in 1970, thus making it a mostly agrarian country[36]. However, as the country developed, this share came down to 35 percent in the next two decades. Even in the post-reform period of 1991-2005, the decrease in the primary sector's share continued, bringing it down to almost 23 percent in 2005. Figure 2.1 shows that there is a substantial difference between the mean percentage share of primary sector in the pre-reform period

[36] India here refers to the aggregate of 16 states and it represents almost 95 percent of the population. These are the states for which data is available.

and the mean percentage share in the post-reform period. The pre-reform period mean share is about 44 percent. This lowers to 31 percent primary sector share in the total NSDP in the post-reform years. This difference of almost 14 percent is statistically significant at the 1 percent level. Thus the mean share of agricultural sector has dropped significantly in the years after liberalization. As far as the growth rate of the agriculture and related activities' sector is concerned, there was a drop in the post reform period as compared to the pre-reform period at the national level. For the states of Punjab and Haryana, both leaders in agriculture, the growth rate of NSDP in agriculture was lower in the period after the economic reforms. However the percentage of primary sector output in the total NSDP in Punjab still remains higher than all other states at almost 36 percent. States like Andhra Pradesh, Kerala, and Tamilnadu which were leaders in service sector in the post-reform period registered a higher primary sector's NSDP growth rate in the post-reform period, thus growing both in services as well as agricultural sector.

The share of the secondary sector in NSDP has more or less remained stagnant over the sample period. At the national level, this sector contributed around 21 percent to the total NSDP in 1970. This percentage steadily grew in the pre reform period to reach 27 percent in 1990. After that, however, the share of the secondary sector declined. In the pre-reform period the secondary sector grew at the rate of 5.38 percent. This growth rate fell to around 4.95 percent in the post-reform period. For the entire period of 1970-2005, at the national level, the share has stayed within the range of 21 percent to 27 percent of NSDP. If we look at the pre- and post- reform mean difference in the secondary sector share, we hardly see any change. Figure 2.1 shows the mean percentage share of secondary sector in the years before and after the reforms. In the years before

liberalization, the mean share was 23 percent. This changed to 24 percent in the years after liberalization. Thus there is an increase of just 1.45 percent in the secondary sector mean share during post-reform period. This change is statistically significant at the 10 percent level.

The secondary sector's growth in the 1970s was dampened by various policies that hindered the growth of the manufacturing sector in India. The emergence of the 'License Raj' was one of these. This meant that before setting up any entrepreneurial initiative, one had to go through a lengthy process of procuring a license, and had to face numerous regulations (Panagaria 2008; Das 2001). Second, in addition to these licensing processes, the imports of raw materials and capital goods were restricted. There were multiple excise duties on goods.[37] Third, the public sector had monopolies in services like banking, airlines, and electric power. The sectors that were open for private investment were limited. Fourth, the Monopoly Restrictive Trade Practices act (1969) limited the size of existing firms. Even after the 1991 reforms, a lot of industries were reserved for the small-scale industries (SSI) by the SSI Reservation Act which limited the scope of large-scale manufacturing (Panagaria 2008). Fifth, stringent labor laws also posed an

[37] However, there is mixed evidence on the effect of removal of import substitution on economic development. The elimination of import substituting policy by itself may not lead to increased efficiency or productivity. Complementary policy changes in market integration, labor market reforms and other institutional policies are equally important to harbor positive effect of trade liberalization (Braer, (1972), Braga, (2006)). These points apply to domestic and external financial liberalization as well. For example Alves and Paula (2006) study the effects of foreign bank entry in Brazil and Argentina. The authors find that the entry of foreign banks did not contribute effectively to the macroeconomic stability and efficiency of the financial system. There was no evidence of a diversified portfolio. Other studies, like Schultz (2004) and Mougillansky, Studart and Vergara (2004) also study the effect of foreign banks in Latin America.

impediment in the path of efficiency and growth of industrial sector. These factors may have led to the bypassing of industrial development stage in India development experience since the 1970s.

Panagaria (2008) extensively discusses the employment and output growth in India in the industrial sector. A few points need to be mentioned while analyzing the Indian case. India has abundant unskilled labor. However, the Indian industry is mostly remained capital or skilled-labor intensive. As Panagaria (2006) mentions, the government began to enact policies aimed at the development of heavy industries right after independence in an attempt to be an independent and self-sufficient country. In Panagaria's words, "….Beginning in the 1960s, India gradually shifted to the autarkic path to development, which necessitated the creation of a large machinery sector. But in addition, starting with the Second Five Year Plan, the promotion of heavy industry was adopted as an explicit goal by the government. Later, in the early 1970s, the government confined the successful, large business houses (the so-called "dominant" undertakings) to a group of 19 heavy investment sectors. This naturally created further bias in favor of capital-intensive industries and scuttled the growth of the labor-intensive industry." (Panagaria 2006:16). Also, the encouragement of engineering and chemical industries called for extensive use of skilled labor. Some of the fastest growing sectors in India namely, Telecommunications, Automobile, Pharmaceuticals and Software industry have remained mostly skilled labor intensive. Therefore, the lack of development of unskilled-labor intensive sector in India may be one of the many causes that is holding back industrial development in India. The fact that in spite of various liberalization measures, the of growth in the industrial sector has not been impressive indicates that some domestic

policy restraints such as strict labor laws that discourage the entry of large scale unskilled labor intensive firms in the industrial sector, may be responsible for such stagnancy.

In a country like India that has a large population of unskilled labor, industrial development and availability of livelihood to the people through secondary sector jobs can play a vital role in reducing poverty (Panagaria 2008). As pointed out by the United Nations Industrial Development Organization (UNIDO), "a competitive and environmentally sustainable industry plays a crucial role in accelerating economic growth, thereby reducing poverty" (UNIDO 2010). Thus if India is to achieve a pro-poor and balanced growth, the development of industry cannot be ignored.

Another feature of sectoral output in India is the fast growth of the services sector. If we look at the early years in the sample, the tertiary sector's output in total NSDP was only about 28 percent of total output at the national level. Over time, the tertiary sector grew rapidly and its share in output increased to almost 53 percent in 2005. Today it is the fastest growing sector of Indian economy. The increase in the tertiary sector's share in total output in the post-reform period was 14 percent as against the 9 percent gain in share experienced by the sector in the pre-reform years. During the period before economic reforms were undertaken, the service sector's mean share in the total NSDP was around 31 percent. However this increased to almost 44 percent in the post-reform period. Figure 2.1 shows the difference in mean for mean tertiary sector output share. The 12 percent change in mean share is statistically significant at the 1 percent level.

As for the states, service sector has grown at a more rapid pace in some states than others. For example as shown in Figure 2.2, if we look at Gujarat and Andhra

Pradesh, both states started at similar tertiary sector share in the total output during 1970 (29.40 percent for Andhra Pradesh and 30.26 for Gujrat). However, in Andhra Pradesh the tertiary sector has a grown to have a higher share in total NSDP (52 percent in 2005) than Gujrat (42 percent in 2005). As is seen from Figure 2.2, for most of the southern states like Kerala and Tamilnadu, tertiary sector share in the NSDP has been growing at a faster pace.

Various scholars have analyzed the reasons for such rapid growth in the Indian service sector (Banga 2005; Gupta and Grodon 2003). Banga (2005) argues that demand side factors like high-income elasticity of demand for final product services, and structural changes in the manufacturing sector, have led to such a fast growth of services. Also, according to Banga (2005), supply side factors like economic liberalization, improvements in technology and higher foreign investment in the service sector might have boosted the growth of the tertiary sector. Gupta and Gordon (2003) claim that splintering and high foreign demand may be possible contributors of rapid service sector growth.

The following section presents data and methodology for examining the link between per capita income and other development inputs and sectoral output shares at the state level.

2.7 Relationship between income and sectoral output shares at the state level

My sample covers the period 1970 to 2005 and includes data from 16 different states including Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamilnadu, Uttar Pradesh, and West Bengal. These states taken together account for over 95 percent

of India's population, and include both poor as well as rich states, thereby making this sample fairly representative of the Indian economy.

The primary sector consists mainly of agriculture and related activities such as fishing, and forestry and logging. The secondary sector is comprised of i) mining and quarrying, ii) manufacturing, iii) construction, and iv) electricity, gas, and water supply. Lastly, the tertiary sector includes i) transport, storage and communication ii) trade, hotels and restaurants iii) banking and insurance iv) real estate, ownership of dwellings and business services v) public administration and vi) other services. The data on per capita net state domestic product is taken from EPW (2002).

I analyze the association between the per capita income and changes in economic structure at the state level in India. My purpose here is to study the relationship between per capita income and the primary, secondary and the tertiary sector's shares in the NSDP at the sub-national level. Many other factors besides just per capita income may have an effect on the shares of Primary, Secondary and Tertiary sectors in GDP. Therefore, I also take into account the other development inputs like investment, population, the literacy rate and study what effect these have on the output shares of these three sectors at the state level.[38]

[38] There are many other determinants of sectoral shares besides these common development inputs. There is a huge literature that talks about the determinants of sectoral growth in different aspects and in different countries. However, studying the causes and determinants of each sector's output and growth in detail is out of the scope of my paper. I study the patterns in sectoral growth at the regional level, nevertheless what might have caused the sectoral output growth or stagnation is beyond the subject of this paper. I have taken into consideration the factors for which consistent data is available for the time period in my sample. For example, primary sector output is affected by various factors such as arable land, climate, and usage of fertilizers, other inputs per acre of arable area, prices and policies of the government. Some studies that analyze determinants of agricultural output in countries like Kenya and Nigeria for example,

One point that needs to be considered while undertaking empirical analysis is that there is possibility of a feedback effect between sector shares and per capita income. As the theory predicts, per capita income has impact on the sector shares in output and resulting structural transformation but at the same time it is also possible that these sector shares have bearing on the per capita income. Thus there may be a problem of endogeneity. To take care of this, I use instrumental variable while estimating the equations. I have used the lagged value of per capita income as an instrument for per capita income. Based on the first stage results the lag of per capita income was found to be an appropriate instrument [in all cases in the first stage regression of per capita income (endogenous variable) on lag of per capita income (instrument) and other variables), the coefficient on lag of per capita income was statistically significant). Below I explain the other variables in the equation. Details of the variables and sources are given in Table 2.5.

1) Capital expenditure by the state government: I use capital expenditure by the state as a proxy for public investment. [39] Investment is a prerequisite for the

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conduct the study at the country level (see Odhiambo et al. (2004) and Oyekale (2007). But getting such data for a period of 1970-2005 at the state level is impossible. There is no consistent data on private investment at the state level in the agricultural sector. For manufacturing and service sector, factors like demand elasticity, foreign direct investment (FDI) and trade liberalization also may have an impact. I discuss this more in the discussion section on page number 31 and 32. Again to get data on liberalization indicators or FDI at the state level poses problems. For instance, consistent data on FDI at the state level is available only for 2001-2005.

[39] Comprehensive public investment data at the sub-national level is not available. The data is available at the national level but this cannot be subdivided into state level data (Ahluwalia, 2000). Hence one also has to look for proxies for public investment levels. Some papers in the literature use various proxies like developmental expenditure by the state (Ahluwalia, 2000) and capital expenditure by the state (Adabar (2000), Nayyar, (2008)). Nayyar (2008) finds that at the national level there is a strong correlation

development of primary, secondary and tertiary sectors in an economy. There are various types of investments, like investment in infrastructure, investments in better inputs for example, better technology and training to workers among others that facilitate the growth of output in various sectors of the economy. We would expect investment to be positively related to output in all the three sectors.

2) Literacy rate: The literacy rate is an indicator of human capital and a possible determinant of economic development. Higher levels of literacy may be associated with higher quality of labor force and therefore beneficial for the skilled labor intensive service sector and manufacturing sector. In the case of agriculture, literacy may also increase output if it leads to more informed production decisions.

3) Population growth: Population growth may have a positive effect on sectoral production in a labor-intensive economy through its effect on increased availability of labor.

4) Initial income: Initial income may affect the sector shares. A state that is better endowed and has higher income level may help boost the output as it has higher levels of income to start with.

5) Coastal Dummy: I create a dummy variable which equals 1 if the state is a coastal state and 0 otherwise. Sachs (2001) has found a positive link between economic growth and access to the sea (Sachs 2001). The states that are coastal have easier access to the ocean and therefore may benefit more easily from ocean trade as

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between state wise capital expenditure and gross capital formation in the public sector for the period 1975-2003.

compared to the landlocked states. Thus we would expect to see a positive relationship between sector shares and coastal dummy.

2.8 Results

Table 2.6 and Table 2.7 present the results for the primary sector for the full sample period (1970-2005). Table 2.6 provides the results of the OLS estimation, whereas Table 2.7 summarizes the results for the IV estimation. In each of these two tables, there are three columns, each with a different specification. In column 1, I have included time effects in addition to the other independent variables. In column 2, I have taken into account time as well as state fixed effects, which helps to control for unobserved heterogeneity across the states in the sample. In column 3, I include a dummy variable indicating whether the state in question is a coastal state or not.

Column 1, 2 and 3 of Table 2.6 show that per capita NSDP has no significant effect on the share of primary sector share in total NSDP. The coefficient on per capita income is negative however it is not statistically significant. The coefficients on the literacy rate and state capital expenditure have negative signs indicating that as literacy rates and state capital expenditures increase, the share of the primary sector in NSDP decreases. These coefficients are statistically significant at the one percent level. One interpretation of this negative effect of literacy rate in Indian states could be that as people become more literate, they concentrate on more non-farm activities, thus causing output in the primary sector to fall. Education may open the doors to alternative sources of employment for farmers. For the state capital expenditure, I expect that higher investment by the state in for example, better roads and electricity provision will help boost the primary sector's output. However, I find a negative impact of state capital

expenditure. This may suggest that most state capital expenditure gets translated into a boost for non-farm sector activities over farm-related ones. Neither population growth nor initial income has a significant impact on the primary sector share. In column 3, the coastal dummy has a negative and statistically significant coefficient. If the state is coastal then the share of primary sector in NSDP declines. This is intuitive in the sense that access to the sea will boost the activities related to trade and thus may cause a shift to non-farm activities.

Table 2.7 presents the results for estimation using instrumental variables (IV). As mentioned earlier in the paper the OLS estimated may be biased because of possible endogeneity of the per capita NSDP variable. I have used the lag of per capita income as an instrument. Based on the first stage results this was found to be a relevant instrument. Column 1, 2 and 3 show that using IV does not change the results very much. The coefficient on per capita NSDP is still statistically insignificant. Literacy and state capital expenditure continue to be negatively related to the share of primary sector in total output (the statistical significance level literacy rate coefficient changes to ten percent).

Next I will discuss the results for the secondary sector. Table 2.8 and Table 2.9 present the results of OLS and IV estimation on secondary sector share respectively. Similar to earlier tables, there are 3 specifications in each of these tables: Column 1 includes time effects, column 2 accounts for time and state effects, and column 3 has time effects and a seaside dummy. Column 1, 2 and 3 of Table 2.8 show that in case of secondary sector, per capita NSDP is positively related to the share of secondary sector in total NSDP. The coefficient on per capita income is statistically significant. Literacy rate and state capital expenditure is positively and significantly related to secondary sector

share. However, as seen in column 2, state capital expenditure is not significant once state effects are accounted for. Initial income has a negative and significant coefficient indicating that at lower levels of initial income the share of industrial sector is high. Including a costal dummy does not have any significant effect on secondary sector output.

Column 1, 2 and 3 of Table 2.9 show IV estimates of the effect of per capita income on share of secondary sector. The results of IV estimation are different in that the positive effect of per capita income on secondary sector share found in case of OLS estimation vanishes in IV estimation in all specifications. Literacy rate continues to have a positive effect. Population growth and capital expenditure by the state have a positive and significant effect. However, when I add state effects in column 2, state capital expenditure is not significant anymore. The coastal dummy remains insignificant in IV estimates.

Next, Table 2.10 and 2.11 give OLS and IV estimates respectively for the tertiary sector. Column 1 and 3 of 2.10 indicate that per capita income does not have any significant effect on the tertiary sector's output share. Literacy rate and state capital expenditure have positive and significant effect on share of the tertiary sector in total NSDP. Population growth has a negative impact on the tertiary sector share. When I include state fixed effects in Column 2; the per capita income has a negative and significant effect on tertiary sector share. The coastal dummy is seen to have positive and significant effect on tertiary sector output.

When I conduct the estimation using instrumental variables (Table 2.11), the results do not change much except that the negative effect of per capita income on

tertiary sector output found in OLS estimation (Table 2.10, column 2) turns into an insignificant effect.

To summarize, from the above discussion it can be said that in the full sample period (1970-2005), the per capita income fails to have a significant effect on the primary sector's and the tertiary sector's share. In case of the secondary sector, the significant positive effect of per capita income disappears when the estimation is done using IV.

2.9 Conclusion and discussion

In this paper I have studied the sectoral output growth and sectoral output shares at the state level in India, before and after the economic reforms in 1991. The data shows that the growth of secondary sector has stagnated during all the three sample periods namely, full period (1970-2005), pre-reform period (1970-1990) and post-reform period (1991-2005). In the years before liberalization, the mean share of the secondary sector in NSDP was 23 percent. This changed to 24 percent in the years after liberalization. Thus there was an increase of just 1.45 percent in the secondary sector mean share during post-reform period. The primary sector's share in the total output has declined with increasing per capita income conforming the theoretical prediction. There is a considerable and statistically significant difference between the mean percentage share of primary sector in the pre-reform period and the mean percentage share in the post-reform period. As far as the tertiary sector is concerned, it has experienced rapid growth over the sample period. During the period 1970-1990, the service sector's mean share in the total NSDP was around 31 percent. However this increased to almost 44 percent in the post-reform period of 1991-2005. This 12 percent difference in mean for mean tertiary sector output share is statistically significant.

I have also investigated for the effect of increasing per capita income and other development inputs like investment, population and literacy rate on the changes in sectoral shares. I find literacy rates and state capital expenditure to be positively and significantly linked to the increase in tertiary sector output.

It would have been interesting to include a variable that reflects the extent of economic liberalization to study the effect of policy reforms on sectroal shares. But such study at the state level poses data problems. There are various studies that analyze the 'realized' impact of liberalization policies in addition to the 'expected' benefits of policy reforms on economic growth and sectoral output. Levchenko, et al. (2007) study the impact of liberalization policies at the industry level on production, employment, firm entry, capital accumulation, and productivity. The indicators of financial liberalization used by them are Gross capital inflows (which is the sum of gross inflows and gross outflows) and indices of the extent of liberalization in the stock market, the banking system, and freedom of international transactions for 28 countries. Another study that talks about effect of liberalization and other policy reforms is Easterly (2001) Here he uses terms of trade and interest on external debt as one of the independent variables to see their effect on economic growth across countries. Gordon and Gupta (2003) use growth of export of services, FDI and liberalization dummies for reforms in service sector to study the reasons for rapid growth of the service sector in India. However, data for the different variables that above mentioned studies use which help in indicating the policy reforms or extent of liberalization, is not available at the state level in India. Thus there exists a data availability constraint in studying the realized impact of policy reforms on sector-wise employment and productivity growth in India.

Along with the socio-economic characteristics, role of economic liberalization undertaken in 1991 and state policies in service sector growth is important. The economic liberalization that began in 1991 reduced the extent of control by the central government in many areas. Specifically, decentralization in areas related to investment led to a higher scope for initiative on the part of state and local governments. It would be interesting to investigate the possible effect of differences in policies of tertiary dominant states and other states. The role of the state in taking advantages of the policy reforms, and taking necessary steps to implement these in their own states, may have played a significant role in their economic development. Some of the price-based interventions, like giving tax incentives, subsidies, and other direct interventions like providing better infrastructure to the businesses, could have enabled some states to reap higher benefits of economic liberalization. For example In 2002 Tamilnadu government announced a new policy specifically related to information and technology sector. Its objective was to develop the state for becoming the 'destination of choice' for IT investors and promoting software based exports. Andhra Pradesh also has a strong government commitment towards IT industry promotion. Major developments in the areas of infrastructure were undertaken to attract investments in the service sector. The state government took focused efforts on software development and the expansion of related exports. Even in E-governance Andhra has emerged as a leader.[40] There were many IT based modifications undertaken in the governance of various government departments. Thus some of these service

[40] United Nations Educational Scientific and Cultural Organization (portal.unesco.org) states that, 'E-governance is the public sector's use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective.'

sector dominant states may have benefitted from active government participation in development process. Studying this along with other socio-economic causes and effects of tertiary sector growth at state level in India can be an interesting future research.

There is an extensive literature that discusses the differential patterns of sectoral growth and development across countries and the failure of countries to move to next stage of industrialization given liberalization in various perspectives. Imbs and Wacziarg (2003) study the sectoral output concentration among countries. They use various indicators of sectoral concentration such as the Gini coefficient for inequality of sector shares, coefficient of variation across sector shares and the min-max spread in sector shares. The authors conclude that most economies go through two stages of diversification, in the beginning the sectoral diversification increases but after reaching a particular level of income countries start concentrating again leading to a u-shaped sectoral concentration. Krugman (1981) presents a model that analyses the unequal development across countries. The author shows that 'uneven development' depends upon the initial difference in capital-labor ratios between the two countries. Accumulation of capital will lead to the division of the world into a capital-abundant industrial region and agricultural region that lacks capital. The assignment of these industrial and agricultural roles depends upon which country has more capital to start with. Given the international mobility of capital, the second stage of development depends upon foreign investments that can be attracted.

Hausman et al (2007) shed light on the relationship between the type of goods that a country produces and exports and its subsequent economic growth. The authors conclude that countries that export goods which are linked with higher productivity levels

grow faster. Growth takes place as result of resource transfer from lower-productivity activities to the higher-productivity goods that is in turn a result of cost-discovery process on part of entrepreneurs. They suggest that the benefits that a country can garner from liberalization will thus depend upon how closely a country can align itself to production of such goods. Studying the Indian development experience on the lines of above-mentioned literature threads can be part of future research.

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Table 2.1 Average sectoral shares in per capita gross national income across country groups in 2005

	Agriculture (percent)	Industry (percent)	Service (percent)
Low income Countries	28	26	46
Low middle income countries	15	40	45
Upper middle income countries	6	33	61
High income countries	2	26	72

Source: www.worldbank.org

Table 2.2 Comparing India's sectoral shares in per capita income (PCY) with other lower middle income countries in Asia

Country	PCY in USD	Year	Agriculture's share in PCY	Industry's share in PCY	Service's share in PCY
India	950	2007	18	29	53
China	930	2000	15	46	39
Indonesia	900	1994	17	41	43
Bhutan	910	2003	26	39	35
Thailand	1020	1989	16	35	49
Philippines	920	1994	22	33	45

Source: www.worldbank.org

Table 2.3 Sectoral shares in per capita gross national income across countries over time

	Agriculture		Industry		Service	
	1970	2008	1970	2008	1970	2008
India	42	18	21	29	37	53
China	35	11	40	49	25	40
Indonesia	45	14	19	48	36	37
Thailand	26	12	25	46	49	43
Lower middle income countries' average	35	14	32	41	33	45

Source: www.worldbank.org

Table 2.4 GDP and employment shares in services across countries in 2002

Country	GDP share of services	Employment share of services
India	51	22
China	34	31
Indonesia	38	39
Philippines	53	47

Source: Papola (2005)

Table 2.5 Explanation of the variables and their sources

Variable	Description
Per capita net state domestic product	The average Per Capita Net State Domestic Product over 5 year intervals. The data is in 2000-01 prices. Sources: 'Domestic product of states of India, 1960-61 to 2000-01', Economic and Political Weekly Research Foundation and Central Statistical Organization.
Population Growth	The growth rate of population over 5 year intervals. Sources: Economic Survey (2007-08), www.indiabudget.nic.in and Census of India, Office of Registrar General.
Literacy Rate	Literacy rates for 1971 are for the population aged 5 and above and for 1981, 1991, 2001, they are for the population aged 7 and above. Sources: Economic Survey(2007-08), www.indiabudget.nic.in and Census of India, Office of Registrar General
State government capital expenditure	Source: Budget documents of the state governments, rbi.com

Figure 2.1 Mean sector share in NSDP during pe-reform and post-reform period

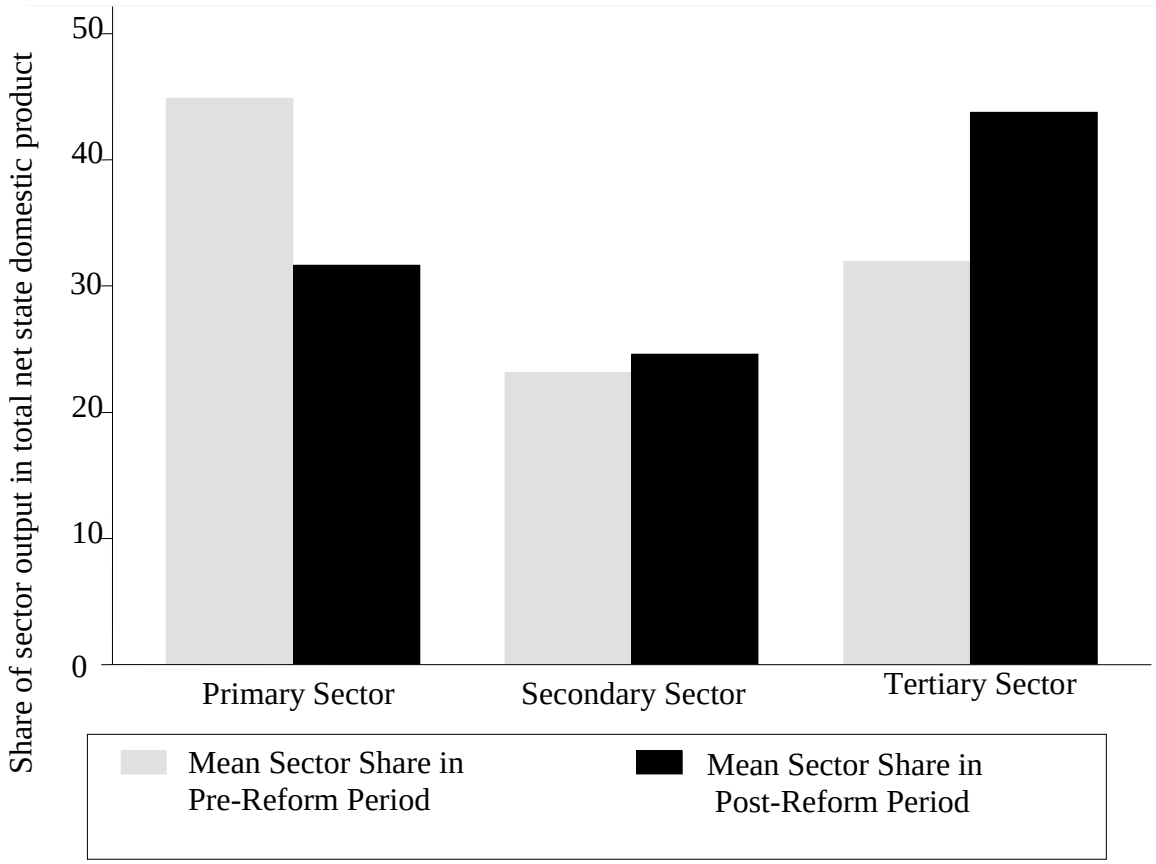

Figure 2.2 Tertiary sector's share in total NSDP for selected states

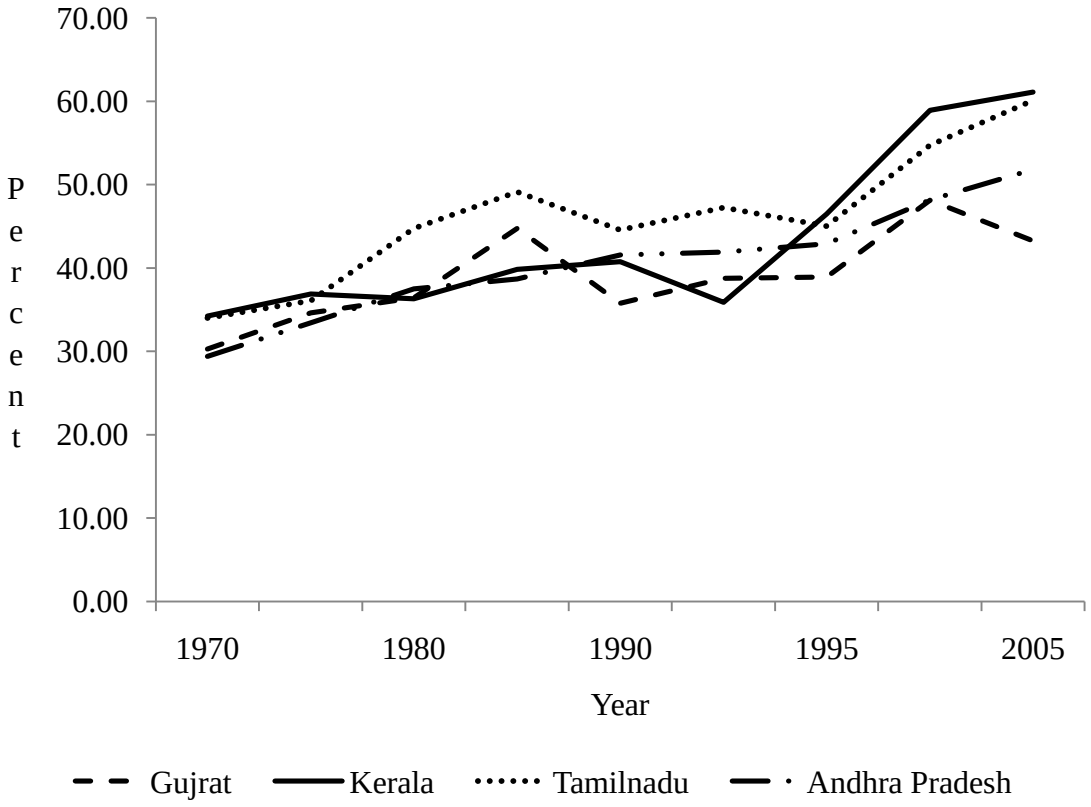

Table 2.6 The effect of per capita NSDP on the share of Primary Sector in total NSDP

Primary Sector	**OLS (1)**	**OLS (2)**	**OLS (3)**
Log of PCNSDP	-10.95	-1.84	-11.57
	(12.37)	(6.85)	(11.53)
Log of Literacy Rate	-23.99***	-16.11***	-20.35***
	(3.86)	(5.96)	(4.17)
Log of State Capital Expenditure	-7.36***	1.57	-5.78***
	(0.94)	(2.01)	(1.09)
Population Growth	0.05	0.99	-2.37
	(1.66)	(1.16)	(1.79)
Initial Income	9.09	-0.25	9.75
	(12.82)	(6.02)	(11.86)
Coastal Dummy	-	-	-4.70***
			(1.34)
State Effects	NO	YES	NO
Time Effects	YES	YES	YES
Observations	112	112	112
R^2	.78	.92	.82

Note: ***, **, * Significant at the 1%, 5% and 10% level of significance respectively. Figures in the parenthesis are robust standard errors.

Table 2.7 The effect of per capita NSDP on the share of Primary Sector in total NSDP

Primary Sector	**IV (1)**	**IV (2)**	**IV (3)**
Log of PCNSDP	-15.87	-33.35	-18.06
	(34.99)	(52.59)	(33.68)
Log of Literacy Rate	-23.69***	-14.81*	-20.15***
	(3.71)	(8.42)	(3.79)
Log of State Capital Expenditure	-7.37***	2.08	-5.8***
	(1.15)	(3.55)	(1.24)
Population Growth	0.54	-0.39	-1.64
	(1.94)	(2.30)	(2.00)
Initial Income	15.01	27.04	17.06
	(35.61)	(44.02)	(34.29)
Coastal Dummy	-	-	-4.10*
			(1.52)
State Effects	NO	YES	NO
Time Effects	YES	YES	YES
Observations	96	96	96
R^2	.75	.90	.76

Note: ***, **, * Significant at the 1%, 5% and 10% level of significance respectively. Figures in the parenthesis are robust standard errors. I have used lag of per capita income as an instrument for per capita income variable.

Table 2.8 The effect of per capita NSDP on the share of Secondary Sector in total NSDP

Secondary Sector	**OLS (1)**	**OLS (2)**	**OLS (3)**
Log of PCNSDP	16.52*	16.91***	16.68*
	(8.59)	(6.05)	(8.44)
Log of Literacy Rate	12.60***	23.96***	11.16**
	(3.27)	(4.64)	(3.28)
Log of State Capital Expenditure	3.06***	0.22	2.64**
	(0.80)	(1.64)	(0.86)
Population Growth	3.40*	1.85	4.06*
	(1.48)	(1.75)	(1.86)
Initial Income	-15.29*	-8.97*	-15.47
	(8.50)	(4.98)	(8.37)
Coastal Dummy	-	-	1.27
			(1.09)
State Effects	NO	YES	NO
Time Effects	YES	YES	YES
Observations	112	112	112
R^2	.47	.83	.60

Note: ***, **, * Significant at the 1%, 5% and 10% level of significance respectively. Figures in the parenthesis are robust standard errors.

Table 2.9 The effect of per capita NSDP on the share of Secondary Sector in total NSDP

Secondary Sector	**IV (1)**	**IV (2)**	**IV (3)**
Log of PCNSDP	7.74	36.28	8.23
	(27.13)	(31.52)	(27.12)
Log of Literacy Rate	12.21***	26.09***	11.42***
	(2.88)	(5.51)	(3.05)
Log of State Capital Expenditure	2.92***	0.56	2.57***
	(0.89)	(2.41)	(1.00)
Population Growth	2.95*	2.90*	3.44
	(1.50)	(1.70)	(1.61)
Initial Income	-6.49	-25.22	-6.95
	(27.61)	(27.08)	(27.61)
Coastal Dummy	-	-	0.92
			(1.22)
State Effects	NO	YES	NO
Time Effects	YES	YES	YES
Observations	96	96	96
R^2	.35	.80	.36

Note: ***, **, * Significant at the 1%, 5% and 10% level of significance respectively. Figures in the parenthesis are robust standard errors. I have used lag of per capita income as an instrument for per capita income variable.

Table 2.10 The effect of per capita NSDP on the share of Tertiary Sector in total NSDP

Tertiary Sector	**OLS (1)**	**OLS (2)**	**OLS (3)**
Log of PCNSDP	-5.56	-15.07***	-5.11
	(8.51)	(6.89)	(8.21)
Log of Literacy Rate	11.39***	-7.85*	8.74***
	(2.09)	(4.20)	(2.11)
Log of State Capital Expenditure	4.29***	-1.80	3.14***
	(0.70)	(1.56)	(0.85)
Population Growth	-3.45*	-2.84*	-1.68
	(1.39)	(1.58)	(1.32)
Initial Income	6.20	9.22	5.72
	(9.02)	(5.95)	(8.54)
Coastal Dummy	-	-	3.43**
			(1.06)
State Effects	NO	YES	NO
Time Effects	YES	YES	YES
Observations	112	112	112
R^2	.81	.92	.84

Note: ***, **, * Significant at the 1%, 5% and 10% level of significance respectively. Figures in the parenthesis are robust standard errors.

Table 2.11 The effect of per capita NSDP on the share of Tertiary Sector in total NSDP

Tertiary Sector	**IV (1)**	**IV (2)**	**IV (3)**
Log of PCNSDP	8.13	-2.92	9.83
	(25.70)	(32.60)	(24.68)
Log of Literacy Rate	11.48***	-11.28*	8.72***
	(2.72)	(5.70)	(2.78)
Log of State Capital Expenditure	4.44***	-2.64	3.23***
	(0.85)	(2.49)	(0.9)
Population Growth	-3.49*	-2.51	-1.79
	(1.42)	(1.75)	(1.47)
Initial Income	-8.52	-1.81	-10.11
	(26.16)	(28.01)	(25.12)
Coastal Dummy	-	-	3.18***
			(1.11)
State Effects	NO	YES	NO
Time Effects	YES	YES	YES
Observations	96	96	96
R^2	.79	.91	.77

Note: ***, **, * Significant at the 1%, 5% and 10% level of significance respectively. Figures in the parenthesis are robust standard errors. I have used lag of per capita income as an instrument for per capita income variable.

3 Socio-political violence and economic growth in Indian states.

3.1 Introduction

Socio-political conflict can have a lasting impact on the economic development of a country. Civil conflicts may have a direct impact on the economy through lost lives and loss of physical capital. In addition, through their indirect effect on prospective investment, labor supply, production and human and physical capital conflicts can impede economic growth. In this paper, I study the impact of socio-political violence in India at the sub-national level.

If we look at Indian socio-political history, since independence (1947) India has not had instances of seizure of political power or military coups. India continues to be a successful democracy since the time of independence. However, disturbances in terms of separatist movements,[41] ethnic violence and conflicts because of discrimination against some castes have been a part of Indian socio-political history.[42] India is a country with diversity: geographic, religious, economic and linguistic. Nevertheless, this diversity itself can become a source of socio-political instability and conflict. Guha (2007) mentions four types of 'axes' for conflict in India. First is the caste system which has *Jati*

[41] There have been a number of separatist movements in India - people in a region demanding a separate state for them. Some of the most violent have been, Kashmiri separatism: Muslims demanding a separate states of Kashmir; Khalistan: Sikh separatists in the Punjab and Haryana regions; Telangana in Andhra Pradesh; and Bodoland in Assam.

[42] Caste structure is a form of social hierarchy in Hindu religion. It was originally only an occupational stratification, but over time got translated into social stratification and discrimination attached with it.

and *Varna* intertwined in it.[43] There have been numerous instances of violence based on either *Jati* or *Varna* in Indian society. There has been a constant conflict between the higher ranked *Jatis* and *Varnas* and the ones that are marked lower in the social stratification for their rightful existence and identity.

The second axis of conflict in India mentioned by Guha (2007) is language. India has almost 200 languages and over 1600 dialects that are spoken by various groups. The Government of India recognizes 28 official languages.[44] National unity and linguistic diversity may not always be compatible and can give rise to violent conflicts.

Third, religion has been an important axis of conflict in post-independence India. A majority of the Indian population is Hindu. However, there are five other major religions that exist in India: Islam, Christianity, Sikhism, Buddhism, and Jainism. India has a large population of Muslims in the world second only to Indonesia. Inter-faith conflicts, especially Hindu-Muslim conflicts, are a commonplace in India.

Class is the fourth axis of conflict in India (Guha 2007). Even as India emerges as a leader in South Asian countries, it is riddled with extreme social disparity. Income inequality is increasing and almost thirty percent of Indians still live in poverty. Thus this disparity has led to some conflicts and violence between the 'haves' and 'have nots'. Many oppositions and protests have emanated out of this discrepancy between classes.

Given the above-mentioned background of socio-political conflict in India, it is important to study if this instability has had any effect on Indian economic growth. Such a study has important policy implications and can shed light on the link between growth

[43] *Jati* refers to the endogamous group one is born into (Guha 2007). *Varna* refers to four strata of Hindu social hierarchy.

[44] Indian currency notes have 15 different languages written on them.

and violence in India at the state level. If there is a growth deterring impact of violence, then this may help us explain why some states have persistently stayed poor and why some states have experienced continued growth. As discussed above, India is a diverse country in many socio-economic aspects. Controlling and handling the conflicts that result from such diversity can assure balanced, long term, and stable growth at the sub-national level in India.

In this paper I investigate the effect of socio-political violence in 16 Indian states. In addition, I also study a sub-sample of seven states that are affected by leftist violence in India to analyze the impact of violence on growth in these states. The leftist (Maoist/ Naxalite) movement in India is led by revolutionaries who follow a Maoist/Communist ideology and who plan to establish a Maoist regime and destroy the legitimacy of the Indian government.[45] The Maoist insurgency and leftist violence have bred instability in as many as 228 out of 604 districts in India. The violence related to this movement is one of the most important internal security threats that India faces today.

The paper is organized as follows: In section 3.2, I discuss the theoretical link between violence and economic growth and review some empirical studies of the effect of sociopolitical violence on economic development. I explain the data and methodology in section 3.3. Section 3.4 gives background information on the leftist extremism problem in selected states in India. I discuss the results in section 3.5. Section 3.6 concludes.

[45] The term 'Naxalite' comes from the name of the place in West Bengal: 'Naxalbari', where this movement originated.

3.2 The relationship between socio-political violence and economic growth

Socio-political violence can work as an inhibitor of economic growth and development (Alesina 1996; Barro 1991). The forms of violence may differ (for example riots, civil wars, coups) but the growth dampening effect of this violence may be significant. Civil conflict can cause destruction of humans, natural resources and physical capital (Bodea and Eldabawi 2008). Violence can affect economic growth through its effect on investment, human capital, economic planning horizons and labor supply.

Socio-political violence may lead to reduction in investment. Domestic investors may not want to invest in their home country, leading to a capital flight and reduction in monetary resources. This can affect domestic savings as well. Rodrik (1991) mentions that uncertainty of policies can work as a 'tax on investment', reducing investment and affecting economic development. As Goldsmith (1987) mentions, people will be encouraged to trade and invest only when they are confident in the future. A possibility of political unrest and sudden changes in the economic "rules of the game" will act as barriers to investment and growth. Similarly, foreign investors will not want to invest in the country. Fearing inefficient and unsecured property rights, much of the foreign direct investment will be diverted. Socio-political violence within a country across regions also has an impact on the geographic distribution of investments. More stable areas may be treated as safer and the troubled states may not be preferred by investors. This would lead to lower investment and growth in violence-affected areas, thus perhaps increasing inequality across regions, unless richer states had more violence.

In addition to this direct impact, severe and prolonged violence may also affect the security of individuals and nations and thereby shorten planning horizons. For

example, an individual may not feel secured in a country because of constant socio-political violence and mortality associated with it. This has an effect on his economic planning horizon. The fear of an uncertain future can impact individual decisions about accumulation of human capital (Bodea and Eldabawi 2008) and savings.

Socio-political violence can also cause uncertainty in decisions about production and labor supply (Alesina 1996). Violent and uncertain surroundings can lead to a direct impact on labor supply through the number of deaths and injuries suffered by the people. Also indirectly, socio-political violence can induce fear and insecurity in the minds of people and thus affect their decisions about participation in economic activities. This may give rise to uncertainty in terms of number of people available to work. People may not want to stay and work in an area affected by violence. This can lead to a movement of people from these states to more peaceful ones.

In addition, a substantial amount of a state's resources may get diverted to controlling the conflict and hence development may be affected. For example, in India in the states of Jammu and Kashmir where violence prevails because of the border conflict, huge amounts of money have to be invested in army maintenance and supplies by the Indian and Pakistani governments. Deployment of reserve police and armed forces and their up-keep has cost both the governments additional money which could have been invested in development of infrastructure and other basic amenities that are lacking in the respective areas. After discussing the theory behind the relationship between socio-political violence and economic development, in the next section I will present a review of some empirical studies that analyze economic growth and violence.

There is a wide-ranging empirical literature studying the relationship between civil conflict and economic growth. The association between economic growth and political violence can be bi-directional. Lower levels of economic growth and high poverty can lead to unrest and civil conflict. As discussed above, it is also possible that riots or political violence themselves are detrimental to economic growth. There are various empirical studies that examine one or both of the above mentioned hypotheses. Below, I will review the major findings of the literature.

Barro (1991) studies 98 countries over the 1960-1985 period. Barro finds a negative relationship between coups and assassinations and economic growth. Similar to Barro (1991), Alesina and Perrotti (1996) also find an empirical link between socio-political violence and lower growth. In a sample of 70 countries from 1960-1985, they take into account various indicators of socio-political instability like deaths from political violence and assassinations. They find that all types of political instability have a negative effect on investment and economic growth.

Bodea and Eldabawi (2008) study the impact of political violence on economic growth in a cross country study covering 68 countries over the period 1970 to 1999. They distinguish between three levels of political violence, namely, riots, coups, and civil war. Their results show that organized political violence, civil war, and riots in particular have a negative effect on the economic development of a country. Especially in the case of Sub-Saharan African (SSA) countries, civil wars were found to be especially detrimental to economic development. The risk of civil war accounted for more than 22 percent of the income gap between SSA countries and East Asian countries.

There is also an extensive literature that investigates the effect of economic growth on political instability. Miguel, Satyanath and Sergenti (2004) study 40 SSA countries over the period of 1983 to 1999 to examine the effect of GDP growth on civil conflict. Using instrumental variable estimation to control for the endogenous variables, the authors find that a negative growth shock of 5 percent points increases the likelihood of a civil conflict by fifty percent. This negative impact was no different in SSA countries that were richer, more democratic, or more ethnically diverse.

Urdal (2008) studies political violence in 28 Indian states from 1956 to 2002. The author analyzes the effect of population pressure, higher youth populations and differential growth rates between ethnic and religious groups on the occurrence of political violence. He finds that the scarcity of productive land is linked with higher levels of political violence. Higher proportions of young populations also have a significant positive impact on sub-national violence in India. Higher young populations combined with higher levels of urban inequality are found to be associated with a higher number of Hindu-Muslim riots. In addition, the high growth rate of the Hindu population relative to the Muslim population has a positive impact on Hindu-Muslim riots.

In another study of India, Krishna (2008) investigates the determinants of civil conflict in seven north-eastern states for the period 1970-2007. He finds that both relative and absolute poverty in these states are important determinants of civil conflict. Also, economic and political discrimination increase the probability of civil conflict. More populous states seem to have a higher risk of an outbreak of conflict.

Bohlken and Sergenti (2009) examine the effect of economic growth on Hindu-Muslim riots for fifteen states in India for the period 1982-1995. To deal with the

endogeneity issue of the growth variable, the authors use rainfall as an instrument. They find that the relationship between growth and riots is negative and significant. Their estimates show that a one percent increase in the growth rate of the GDP is associated with a decrease in average number of riots by five percent. The authors also show that the occurrence of riots in the past year increases the possibility of violence in the future. The incidence of violence (riots) in the adjacent states has a spillover effect on riots.

My paper contributes to the literature in two ways. First, I study the effect of riots on economic growth in states in India. In the current political violence and growth literature on India, none of the papers study the effect of riots on economic growth. The determinants of riots are widely discussed but *riots as a determinant of economic development* is not studied in the literature in an Indian context. The above-mentioned papers like Bodea and Eldabawi investigate the effect of riots in other countries. However, a study of the effect of political violence at the state level in India has not been undertaken. My paper fills this gap. Second, I take into consideration a subset of the states that are affected by leftist extremism and study the effect of riots in those states affected by Maoist violence.

After reviewing some important empirical papers in the literature on violence and growth, in the following section I discuss the data and methodology used to study the effect of socio-political violence in Indian states.

3.3 Data and methodology

My sample covers the period 1970 to 2005 and includes data from 16 Indian states: Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka,

Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamilnadu, Uttar Pradesh, and West Bengal.

To investigate the effect of socio-political violence on growth, I use as my dependent variable the average annual growth rate of the Net State Domestic Product (NSDP). I use the number of riots in a state in a given time period as an indicator of socio-political violence. There are many different indicators of political instability and violence used in the literature. For example, Bohlken and Sergenti (2009) use the number of Hindu Muslim riots in India as an indicator of violence. Besley and Persson (2009) use the incidence of internal and external wars to indicate violence. Some papers use assassinations and coups to measure socio-political violence (Barro 1991; Londregan and Poole 1990). Blanco and Grier (2009) build an index of political instability based on nine different indicators like coups, riots, assassinations and strikes.

As far as Indian data is concerned, the only variable that reflects socio-political violence and is available for a range of states over a long period is the number of riots. Therefore I choose the same for my purposes. I use the 'Crime in India' dataset compiled by Marshall and Marshall (2005). Riots are categorized as violent crimes affecting public safety, according to the Indian Penal Code by the National Crime Records Bureau of India. A riot is defined as a 'single incident involving five or more persons'. As mentioned in 'Crime in India, 2005', violent crimes such as riots affect the lives and safety of people. Riots can induce insecurity and fear in the minds of people and are also a threat to public peace. As discussed earlier in the paper, socio-political violence is expected to be negatively related to economic growth and development. In the sample, Bihar has the highest number of riots reported, followed by Uttar Pradesh and Rajasthan.

Figure 3.1 gives the average number of riots in 16 states in India. I use the average number of riots over a five-year period in a state as an indicator of socio-political violence.

While estimating the effect of riots on economic growth across states, there is an important problem of reverse causality that needs to be taken into account. As mentioned earlier, it is possible that riots affect growth; nevertheless, it may also be the case that lower economic growth causes riots. There are various papers that discuss slower economic growth as a possible determinant of socio-political violence (Gurr 1970; Olzak 1992; Bohlken and Sergenti 2009; Krishna 2008). These papers explain how poor economic development can increase the risk and events of violence in a society. This makes riots potentially endogenous in the regression.[46] To account for the feedback effect between riots and economic growth, I estimate the model using instrumental variables. I use area under forest cover as an instrumental variable for number of riots. Krishna (2008) and Economist, (2010) mention forest area as a determinant of political violence. The presence of forest cover may act as a favorable condition for the perpetrators (Krishna 2008; Economist 2010). In addition to the number of riots, I use other independent variables such as population growth, literacy rate, capital expenditure by the state government, and a coastal dummy. I discuss the control variables below. Table 3.1 gives details about the data and their sources.

i) Literacy Rate:

[46] I tested for endogeneity using the Hausman test. The results of the test did not suggest the use of IV estimation. I go ahead using the instrumental variable approach because of the strong theoretical underpinnings that suggest a reverse causality between socio-political violence and economic growth.

The literacy rate is an indicator of human capital and a possible determinant of economic development. Literacy can increase the efficiency of economic and political institutions and helps bring about scientific advances (Schultz 1991). Theoretically, I would expect to see a positive relationship between literacy and economic growth. However, in the literature we find mixed evidence of the effect of education or literacy on economic growth. Some papers like Barro (1991) and Aghion, Boustan, Hoxby and Vandenbussche (2009), find that education has a positive effect on economic growth whereas Pritchett (2004) fails to find a strong positive effect of education on economic development.

ii) Population Growth:

There is no consensus in the literature on the effect on population growth on economic development. There are three schools of thought, namely the pessimists, the optimists, and the revisionists (Birdsall 1991). The pessimists, like Malthus (1806), Solow (1956), Coale and Hoover (1958), argue that faster population growth and the corresponding increase in labor supply relative to capital formation would lower per capita consumption levels. On the other hand, optimists look at population as a 'net contributor' to economic growth (Birdsall 1991). Increased population can bring about scale economies and encourage technological innovations. (Boserup 1965, 1981; Kuznets 1966). Revisionists do not agree with any generalization about the consequences of population growth and focus on micro-level case studies which may vary by time, place, and circumstances (Birdsall 1991).

iii) Investment:

One would expect that higher investment would promote economic growth (Mankiw 2000). Getting a long and reliable time series data on investment across states is not possible for India. Hence one has to look for proxies for public investment levels. Some papers in the literature use various proxies like developmental expenditures by state (Ahluwalia 2000) and capital expenditures by state (Adabar 2000; Nayyar 2008). Nayyar (2008) finds that at the national level there is a strong correlation between state-wise capital expenditure and gross capital formation in the public sector for the period 1975-2003. Following Nayyar (2008) and Adabar (2000), I use capital expenditure by the states in India as a measure of public investment expenditure at the state level. I expect state capital expenditure to have a positive impact on the growth of NSDP.

iv) Coastal Dummy:

I create a dummy variable which equals 1 if the state is a coastal state and 0 otherwise. There is a link between economic growth and access to the sea (Sachs 2001). The states that are coastal can have easy access to the ocean and therefore may benefit more easily from ocean trade as compared to the landlocked states. Thus we would expect to see a positive relationship between economic growth and coastal dummy.

v) Initial Income:

Countries with a lower initial income grow faster owing to diminishing returns to scale (Solow 1956). A rich country will grow slower as diminishing marginal returns to capital set in as it accumulates more and more capital. On the other hand, a poor country, where capital is scarce, will have a higher return to capital and grow faster. For this variable, for each five year period I use income from the previous year as the initial

income. For example for five year period 1970-74 I use income in 1969 as the initial income and so on.

vi) Naxalite Dummy:

I also want to test if there is any effect of socio-political violence in the states that are affected by Maoist insurgency and violence. For this, I include an interaction term in the regression. Some states like Bihar that face a problem of leftist violence also have a high number of riots. First, I create a Naxal state dummy variable equal to 1 if the state is affected by Naxalite insurgency and 0 otherwise. In India there are seven states that are troubled by leftist extremism /Naxalite violence: Andhra Pradesh, Bihar, Madhya Pradesh, Maharashtra, Uttar Pradesh, Orissa and West Bengal.[47] The severely affected districts in these states are sometimes referred to as the 'red corridor' or 'the compact revolutionary zone' (CRZ). I interact this Naxal state dummy variable with the riots variable in the regression to determine if the effect of riots on growth is different in these states.

Table 3.2 gives the summary statistics of the data. I explain the problem of leftist violence in India in the next section.

3.4 Violence and economic growth in the states affected by leftist extremist violence in India

The origin of Naxal/Maoist movement can be traced back to a peasant uprising in West Bengal in 1967 in a village by the name of Naxalbari. This movement, led by

[47] The most severely affected districts are in Bihar, Madhya Pradesh and West Bengal. In 2001, two new states were carved out of Bihar and Madhya Pradesh: Jharkhand and Chattisgarh. For data consistency purposes I have included Chhattisgarh in Madhya Pradesh and Jharkhand in Bihar for my sample period.

revolutionaries who followed Maoist/Communist ideology, was launched under the name of the Communist Party of India (CPI). However, in April of 1969, a split occurred in the party and the radical platform was adopted by a group calling themselves the Communist Party of India (Marxist-Leninist). The CPI continued to put forth their demands through constitutional means but this new faction CPI (ML) adopted violent ways. Their objective of the movement is the seizure of power through an agrarian revolution (CII, 2010). After the revolution, they plan to establish a 'Maoist State' or a communist regime.

Since its founding, however, this movement has become more and more violent. In 2009, 228 out of the total 604 districts in India were affected by leftist violence. In 2006, Prime Minister Manmohan Singh called Maoist extremism the most serious internal threat to national security. In the last decade (2001-2010) the total number of deaths from leftist violence was close to 6,000 (Ministry of Home Affairs, India).

The Naxalites's strategy is to destroy the state's legitimacy (CII 2010). They try to gain acceptance among people and finally aim to capture political power through violent means. Their main activities to accomplish these goals include attacks on police force, destruction of the state's property, extensive use of landmines and other weapons, disruption of railroads, and disruption of employment generation projects of the State. To carry out such activities that finally impede development of these areas, the leftist groups mobilize local people and instigate the people against the state. The Naxals have also established what they call 'Jan Adalats', which is their own judicial system used to dispense quick justice. These deal with a wide range of disputes ranging from family matters to land disputes. The left-extremists have terrorized people through such Jan-Adalats, and their so-called judgment. Violation of Jan Adalat verdicts have also led to

mass killings of innocent people. Some areas are sealed by the Naxalites to make sure that government help does not reach the afflicted people.

Figure 3.2 presents the number of violent Naxalite incidences and the related number of deaths. As can be seen, Jharkhand (Bihar) and Chattisgarh (Madhya Pradesh) are the worst affected areas. It also appears that the states that are the most affected are also the ones with the lowest levels of socio-economic development. For instance, in terms of net state domestic product, states such as Bihar and Orissa have shown slow growth since 1970. Also, in these states the foreign direct investment as a percentage of NSDP is negligible and the development of the service sector has been limited. Demographic variables like fertility rates and infant mortality rates also indicate low levels of development. [48]

3.5 Results

Table 3.3 provides the results of regressing state income growth on the above mentioned variables using OLS estimation. Table 3.4 gives the results when I use instrumental variables to account for possible endogeneity. In each of these two tables, there are six columns, each with a different specification. In column 1 and 2, I have included time effects in addition to the other independent variables. In column 3 and 4, I have taken into account time as well as state fixed effects, which helps to control for unobserved heterogeneity across the states in the sample. In column 5 and 6, I include a

[48] Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates (www.worldbank.org). Infant Mortality rate refers to the probability (expressed as a rate per 1,000 live births) of a child born in a specified year dying before reaching the age of one if subject to current age-specific mortality rates (www.worldbank.org).

dummy variable indicating whether the state in question is coastal or not. I do not use the state fixed effects in this specification because the coastal dummy variable is time-invariant and the use of state dummies and the coastal dummy causes a collinearity problem.

The coefficient on initial income in both column 1 and 5 in Table 3.3 is statistically significant at the 10 percent level. Thus there does not seem to be evidence of conditional convergence. The states that started out richer than others grew faster than poorer states. However, the introduction of state effects makes the coefficient on initial income insignificantly different from 0. Population growth has a negative and significant impact on economic growth in all of the specifications. The coefficient on population growth is negative and statistically significant at the one percent level in column 1 and 2 in Table 3.3. This significance level falls to five percent in columns 3, 4, 5, and 6 but the negative coefficient still remains significant. This finding corroborates other similar results in the literature about negative effect of population growth. Particularly, Nayyar (2008) and Adabar (2004) find a growth-retarding effect of population growth in case of India.

Column 1, 2, 5, and 6 of Table 3.3 show that riots have no statistically significant effect on the growth of NSDP. However when I take state fixed effects into account in column 3 and 4, riots have a positive and significant effect on growth rate of NSDP. This is unexpected given the extensive literature about the growth-deterrent effects of socio-political violence. Initial income has a positive and significant effect on NSDP growth. Next, in column 4, the interaction term of riots and Naxalite states has a negative effect. This means that in case of states that affected by Naxalite/Maoist violence, riots have a

negative effect on the growth of NSDP. The coefficient on the interaction term is statistically significant at the five percent level. However, as seen from columns 2 and 6, the negative effect of the interaction variable goes away in other specifications of the model.

Table 3.4 presents the results for estimation using instrumental variables (IV). As mentioned earlier in the paper, the OLS estimates may be biased because of endogeneity of the riots variable.

In the case of population growth, similar to OLS results, I find a negative relationship between population growth and economic growth. However, the negative effect is statistically significant only in columns 1, 2, and 5. Initial income has a negative impact on economic growth in IV estimation in column 4. The coefficient on initial income in column 4 of Table 3.4 is negative and statistically significant at 1 percent level. The states that were poorer have indeed grown faster. This is in contrast to the positive effect found in case of OLS.

Column 1, 2, 5, and 6 of Table 3.4 show that riots have no statistically significant effect on the growth of NSDP. This is similar to the results obtained while using OLS. One important difference is that now riots are insignificant even in case of column 3 and 4. As mentioned earlier, OLS showed that riots have a positive effect on economic growth: which seemed counterintuitive. However, now after using IV and correcting for the endogeneity bias, the positive effect is eliminated. The interaction variable between Naxalite dummy and riots has a negative effect on economic growth. The coefficient on the interaction term in column 2 and 6 is negative and statistically significant at the five percent level. Thus, the IV results demonstrate the growth inhibiting effect of riots in the

states mired by leftist extremism. This result is similar to the negative relationship between socio-political violence and economic growth found in earlier papers like Alesina and Perotti (1996), Barro (1991) and Bodea and Eldabawi (2008).

To summarize the most important results, I find a negative effect of riots on economic growth in the states affected by Naxalite violence but not in other states. Also, there is an adverse impact of population on growth of NSDP.

3.6 Conclusion

India in the past decade has emerged as one of the fastest growing countries in South Asia. In terms of India's stability and long term growth it is important to study the effect of socio-political violence. I study the effect of riots on economic growth in 16 Indian states and find that in India at large riots do not have a significant effect on NSDP growth. In spite of the various socio-political disturbances in terms of caste, language and ethnic issues, India has continued to develop economically. The episodes of socio-political problems and related violence do not seem to have put a drag on India's fast pace of economic growth. However, I find that in case of seven states that are affected with Maoist/Naxalite violence, riots have a significant growth-inhibiting effect. Population growth has a significant negative impact on the growth of NSDP.

Exploring the effect of riots on location of foreign direct investments could be an interesting topic for future research. In addition to this, exploring the link between continued socio-political violence and the displacement of affected people and related migration may also be of interest for further study. Riots and other forms of socio-political violence cannot be ignored because they fail to have a direct measurable impact on economic development of a state or country. These disturbances in themselves pose a

threat to the security of the entire society and can threaten the foundations of democratic institutions and therefore should be taken seriously.

3.7 References

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Table 3.1 Explanation of the variables and their sources

Variable	Description
Growth rate of per capita net state domestic product	The average growth rate of Per Capita Net State Domestic Product over 5 year intervals. The data is in 2000-01 prices. Sources: 'Domestic product of states of India, 1960-61 to 2000-01', Economic and Political Weekly Research Foundation and Central Statistical Organization.
Population Growth	The growth rate of population over 5 year intervals. Sources: Economic Survey (2007-08), www.indiabudget.nic.in and Census of India, Office of Registrar General.
Literacy	Literacy rates for 1971 are for the population aged 5 and above and for 1981, 1991, 2001, they are for the population aged 7 and above. Sources: Economic Survey(2007-08), www.indiabudget.nic.in and Census of India, Office of Registrar General
Seaside dummy	Equal to one if the state has sea access, zero otherwise Source: Author's calculation
Riots	Source: 'Crime in India' compiled by Monty G. Marshall and Donna R. Marshall, Center for systemic peace, 2008
State government capital expenditure	Source: Budget documents of the state governments, rbi.com

Table 3.2 Summary statistics

Variable Name	No. of Obs	Mean	Std.Dev	Min	Max
Average annual growth rate of per capita NSDP	112	2.03	2.55	-5.54	8.58
Initial Per capita NSDP	112	9.15	0.43	8.43	10.08
Log of Literacy rate	112	3.86	0.33	3.11	4.50
Log of State Capital expenditure	112	7.72	0.56	5.80	9.12
Population Growth	112	1.91	0.50	0.06	3.05
Log of Riots	112	7.88	1.68	1.33	9.91
Coastal Dummy	112	0.5	0.5	0	1

Figure 3.1Average number of riots in selected states in India during 1970-2005

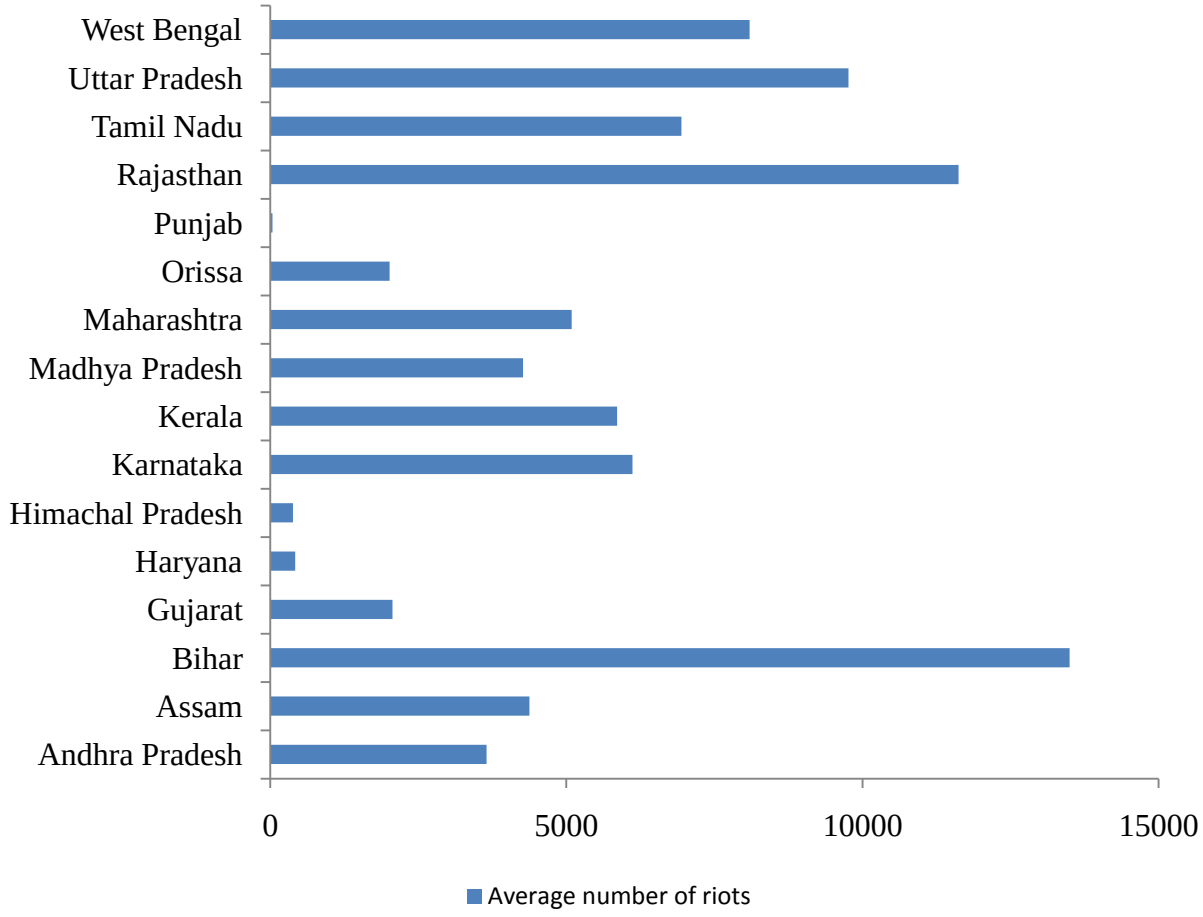

Figure 3.2 Number of Leftist violence incidents and related deaths in selected states (2004-2008)

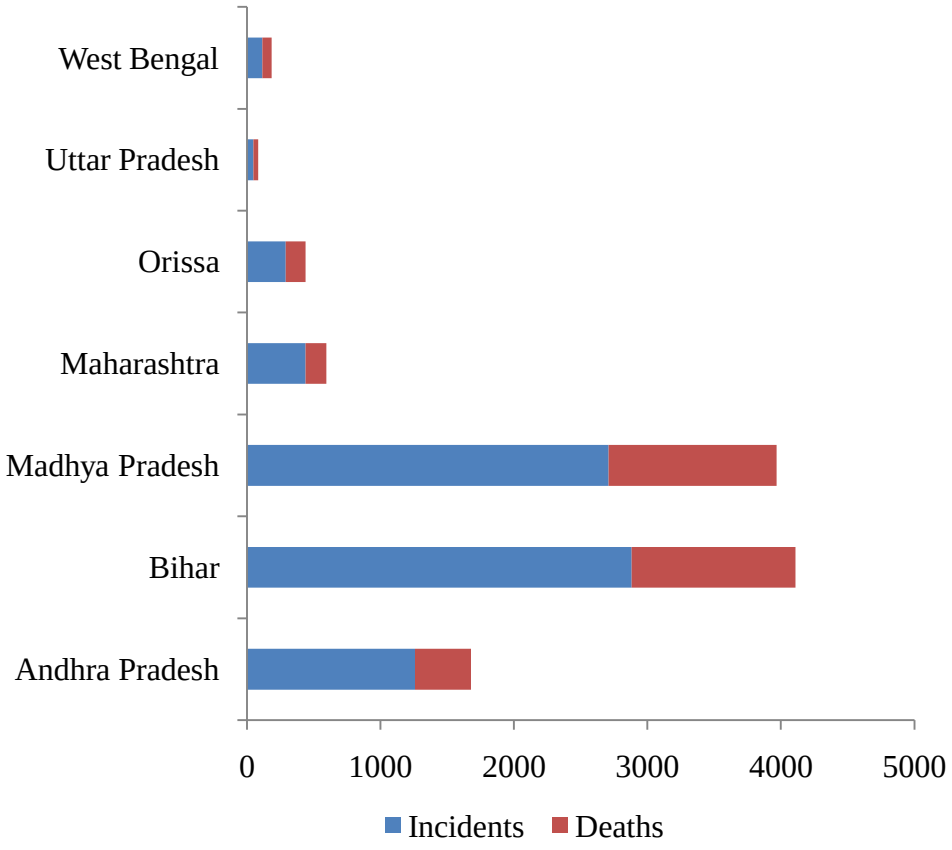

Table 3.3 Estimating the effect of riots on economic growth in Indian states using OLS

Average Annual Growth Rate	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Population Growth	-1.44***	-1.45***	-1.74**	-1.52**	-1.39**	-1.33**
	(0.48)	(0.48)	(0.83)	(0.8)	(0.58)	(0.58)
Log of Literacy Rate	0.22	0.06	-1.30	-1.61	0.17	-0.08
	(0.85)	(0.87)	(2.03)	(1.93)	(0.87)	(0.88)
Log of State Capital Expenditure	0.26	0.50	1.1	0.58	0.25	0.49
	(0.34)	(0.40)	(1.10)	(1.07)	(0.33)	(0.39)
Initial Income	1.37*	1.09	-2.06	-1.46	1.33	0.96
	(0.78)	(0.81)	(2.09)	(2.06)	(0.81)	(0.86)
Log of Riots	0.09	0.08	0.52*	0.91*	0.08	0.06
	(0.11)	(0.11)	(0.29)	(0.37)	(0.13)	(0.13)
Naxalite dummy*Log of riots	-	-0.06	-	-2.30***	-	-0.06
		(0.04)		(0.80)		(0.05)
Coastal Dummy	-	-	-	-	0.09	0.24
					(0.48)	(0.50)
State Effects	NO	NO	YES	YES	NO	NO
Time Effects	YES	YES	YES	YES	YES	YES
Observations	112	112	112	112	112	112
R^2	0.58	0.59	0.62	0.65	0.58	0.59

Note: ***, **, * Significant at the 1%, 5% and 10% level of significance respectively. Figures in the parenthesis are robust standard errors.

Table 3.4 Estimating the effect of riots on economic growth in Indian states using IV

Average Annual Growth Rate	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Population Growth	-1.41***	-1.21***	-1.31	-0.69	-1.48**	-0.82
	(0.48)	(0.48)	(0.94)	(0.94)	(0.59)	(0.61)
Log of Literacy Rate	0.12	1.00	-2.49	-0.35	-0.13	0.83
	(1.35)	(1.53)	(2.96)	(3.20)	(1.30)	(1.44)
Log of State Capital Expenditure	0.005	0.70	1.05	1.02	-0.02	0.84
	(0.79)	(0.84)	(0.99)	(1.26)	(0.94)	(0.93)
Initial Income	1.98	0.59	-3.21	-6.81	2.17	-0.27
	(1.84)	(1.84)	(2.24)	(2.56)	(2.73)	(2.49)
Log of Riots	0.26	0.10	1.66	2.87	0.31	-0.11
	(0.48)	(0.46)	(1.64)	(1.82)	(0.74)	(0.63)
Naxalite dummy*Log of riots	-	-0.11**	-	0.77	-	-0.13**
		(0.05)		(2.14)		(0.06
Coastal Dummy	-	-	-	-	-0.13	0.78
					(0.84)	(0.82)
State Effects	NO	NO	YES	YES	NO	NO
Time Effects	YES	YES	YES	YES	YES	YES
Observations	112	96	112	96	112	96
R^2	0.58	0.47	0.59	0.41	0.57	0.49
First Stage Results: Dependent variable log of riots						
Log of Forest Area *F*-stat	9.23		5.02		4.23	

Note: ***, **, * Significant at the 1%, 5% and 10% level of significance respectively. Figures in the parenthesis are robust standard errors. I have used area of forest cover in a state as an instrument for riots. I have used lag of riots in states affected by Naxalite violence as instrument for riots in states affected by Naxalite violence.