

**Impact of Growth Centres on
Unemployment and Firm Location:
Evidence from India**

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Abstract

To promote industrialisation of the backward areas in the country, growth centres providing infrastructure to enable the states to attract industries, were set up by the Government of India in 1988. In this study, I assess the performance of growth centres, taking into account the impact of growth centres on firm location. I do not find growth centres to have a statistically significant effect on unemployment rate. However, I find that wherever growth centres exist, they positively affect the number of firms locating there. Combining quantitative with qualitative methods, I conclude with implications for firm location and criteria for growth centre designation.

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Key Words: Industrial development, Incentives, Infrastructure, Unemployment, Firm location

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Introduction

The debate on convergence has occupied a lot of attention in the development literature. Convergence implies that in a steady state, poorer regions/countries can be expected to grow more rapidly than their richer counterparts. This occurs mainly because of the free flow of capital to the poorer regions (because of capital shortage, the rate of return to capital in such regions will be higher). Convergence also occurs because poorer countries/regions need not reinvent the wheel and can imitate the technological changes adopted by the richer regions.

The debate on convergence in Indian states is divided on the issue. But the majority view has been that the disparities between the poorer and richer states and regions have widened enormously (see Rao, Shand and Kalirajan, 1999; Ahluwalia, 2000; Srivastava, 2001; Singh and Srinivasan, 2002; Cashin and Sahay, 1996; Rao and Sen 1997; Nagaraj, Varoudakis, and Veganzones (1998)). This somewhat curious phenomenon is understandable because while the reforms have positively influenced economic growth and the richer states, the poorer states have grown quite slowly. As we know, the extent of trickle down of growth is dependent on the employment elasticity of agricultural output, which has remained stagnant in India. Further, non-agricultural employment has not grown rapidly enough to absorb the labour force. The infrastructure has remained a bottleneck and has hampered the trickle down of growth and employment opportunity.

Thus, despite planning, regional disparities did not show reduction over the years. Therefore, the Government of India introduced the “growth centres” program in June 1988 to give impetus to industrialisation process in backward regions. According to this programme, 71 growth centres were set up throughout the country that were allotted to the various states on the basis of a combined criteria of area, population, and extent of industrial backwardness. These growth centres provide basic industrial infrastructure like power, water, telecom,

and banking to enable the states to attract industries. Central government funds for the programme were expected to be leveraged by the states for purposes of financing.

II. Research Objectives

The objectives of the research are as follows:

- To empirically examine the effect of growth centres on unemployment rate.
- To empirically study the effect of growth centres where they have been established, on firm location.
- To qualitatively examine the relative impact of tax incentives and infrastructure on firm location decisions, based on my visits to firms located in several growth centres throughout the country.

In addition to the secondary data I obtained from DIPP regarding the functioning and effectiveness of growth centres, secondary data from all Indian states (containing growth centres) are obtained to answer the above questions to evaluate their effectiveness.

In order to answer the first question, I estimate the unemployment rate. To answer the second question, I estimate the impact of growth centres as depending on the existence of infrastructure.

II.1. Importance of Growth Centres

The growth centres programme assumes special importance in light of a recent decision to stop the war of tax incentives among Indian states. Various states in India, until recently, had been offering tax incentives to investors in order to persuade them to locate in their states, make investments and create employment. Such competition is not unique to India, but has characterised local economic development policy in the United States as well (see Sridhar, 1996, for instance).

There are several instances of such competition among the Indian states in the post-liberalization (1991) period. Karnataka's Chief Minister had been attempting to woo the house of Tatas to explore business opportunities in the state. Madhya Pradesh organised a 3-day event called as Destination Madhya Pradesh to market the state to investors, which ended in a promise from various investors (including foreign) of around (US) \$1 billion investments in steel, automobile,

software, and pharmaceutical sectors in the state. In terms of actual tax incentives also, there had been several instances of generous abatements during the past decade in India.

A conference of state chief ministers and the Union Finance Minister decided in November 1999 to stop this tax war among the Indian states.¹ The decision was taken because the offer of tax incentives, apart from affecting the general fiscal health of the states, also affects the states' ability to provide infrastructure services, given the fact that sales tax revenue accounts for nearly one-fourth of own source revenue for majority Indian states. The growth centre approach is a test of the alternative to the tax war among the states. It is also a test of the attempt to increase rural industrialization in the country to enable convergence among Indian states.

However, there is a lot of scepticism regarding growth centres and their effectiveness in attracting firms. Views have varied from a perception of the programme having been a colossal failure in attracting firms to one that strongly believes in their effectiveness because of the infrastructure incentives available to firms that locate there. This study presents empirical evidence of the effectiveness of growth centres, based on secondary data from the Department of Industrial Policy and Promotion (DIPP), Ministry of Industry, Government of India, and secondary, district-level data available from the census of India. Finally, I also collect and report primary data from my field visits to firms and growth centres located in various parts of the country.

I perform three exercises in this study: first, econometric estimation of the unemployment rate, followed by an estimation of number of firms locating in growth centres where they exist, and finally, the qualitative results from my visits to firms located in various growth centres throughout the country.

III. Review of Literature

There is a vast body of theoretical, empirical, and policy literature that deals with firm location decisions. A majority of the literature studies the relative impact of tax incentives and public services on firm location decisions. The literature argues that if public services were not held constant, tax incentives are not important in firm location decisions. The first study on sales tax incentives in the Indian context is by Tulasidhar and Rao (1986), which shows both employment and output loss due to

tax incentives, albeit in a partial equilibrium framework. This study examines sales tax incentives in Madhya Pradesh and places the revenue loss at as much as 7 to 10 percent of the sales tax revenue. Their analysis of a large number of medium and large-scale industries indicated that the sales tax incentive, whichever way it is designed, is not the most appropriate instrument to raise the level of investment or spread this to backward areas.

Rajaraman *et al* (1999), based on data from Madhya Pradesh, finds that fiscal incentives have a statistically insignificant impact on large and medium investment in Madhya Pradesh. Conversely, the study finds that abundant power was an important factor attracting investment into the state during the eighties, highlighting the importance of infrastructure in firm location decisions.

Second, the literature goes on to explain that even if tax incentives were to be effective in firm location decisions, they merely provide incentives for firms to relocate from one area to another, but do not result in any new increases in employment (see Netzer 1991; Rubin and Zorn 1985).

We have to make several observations about the relative importance of tax incentives and public (primarily infrastructure) services based on the literature. First, when the level of public (infrastructure) services is held constant, benefits to firms of tax incentives are quite significant. Although there are several factors that are more important than taxes to business location decisions, tax incentives enable corporate planning for reinvestment.

Bartik (1991), based on his comprehensive survey of the econometric literature, summarizing studies using data from the United States, found that the tax elasticity of business activity is in the range of -1.0 to -3.0 for intrastate business location decisions. This means that, holding public services constant, if a local government in a state were to *reduce* its taxes by 1 percent, in the long run, it could expect to see an *increase* in its business activity (investment and employment) anywhere in the range between 10 to 30 percent. This was found to be higher than for interstate location decisions (which Bartik found was in the range from -0.1 to -0.6), which is reasonable to expect, because traditional factors (such as transport costs, raw material availability, size of, and proximity to the market) that affect firm location are likely to be different across states and hence more important in their decisions. Further, across locations (such as within a state) where traditional factors are constant, tax incentives are likely to play an important role in influencing firm location.²

Second, it is not necessary that incentives to industry will always be harmful to development of infrastructure in the state. A good example is the Karnataka government's proposal to replace financial with infrastructure incentives to the auto industry. Karnataka promised training institutions, schools, colleges, office complexes, housing, a globally well-knit telecom network, roads, dedicated power and water supply necessary for the development of automobile manufacturing units as well as vendors and dealers in the state. If other states also follow this example, competition will only work to enhance the infrastructure competitiveness of the states.

Last but not the least, poorer states/regions are justified in offering (infrastructure) incentives to attract industry and employment. If distressed areas, with the provision of incentives, were to be successful in attracting firms to invest and create employment, greater social net benefits would accrue to the area. Net benefit from a job is similar to consumers' surplus.³ Net benefit from a job is the extent to which *actual wage* is higher than the *wage at which a person is willing to accept a job* (which is referred to as a person's *reservation wage*). Thus, for example, if a person is not willing to accept a job below Rs.5,000 a month (Rs.5,000 is called his/her reservation wage), and s/he were to be offered a job for Rs.6,000, Rs.1,000 represents his/her net benefit from the job every month.

If earnings were to be constant across areas,⁴ net benefits would be higher if persons are willing to accept jobs at lower wages. This is not to say that it is socially beneficial for persons to be willing to accept jobs at lower wages. But it is easy to imagine that persons in poorer, high unemployment areas and poorer states, where job opportunities are difficult to come by, unemployed persons value the importance of having a job. As Bartik (1991), argues, they are likely to search more rigorously for job openings, wait longer in line for job interviews and less likely to quit a job once they obtain one. For these reasons, they would be willing to accept a job, if it becomes available, at a wage lower than what a person would be willing to accept in relatively richer, low unemployment areas. Therefore, if an unemployed person in a high unemployment area were to be offered a job, net benefits derived from this job would be higher than that from a similar job in a low unemployment area. Sridhar (1996) finds evidence of this, based on data from the United States. However, Haurin and Sridhar (2003), using data from the United States, find no impact of higher local unemployment rates on individuals' reservation wages. Nevertheless, as they suggest, it is sensible to attack clusters of high unemployment with policies that increase the demand for workers.

Also, given the fact that in India, since the 1950s, the disparities between these and the richer, southern and western states have widened enormously, incentives used to attract employment by distressed areas can become a tool to increase the net benefits from the employment generated in these areas, and reduce the disparities between them and the richer states. Thus incentives could be justified if they are offered by poorer states, and can be restricted to cases where they serve some useful economic purpose. In fact, the Finance Minister recently said that he was willing to allow states in the north-eastern region to have a separate sales tax structure.⁵

Thus we have to think about a war on unemployment and distress in the country. From this point of view, poorer states could be justified if they aggressively offer (infrastructure or tax) incentives to attract investment. This could be justified till at least such time the wide regional disparities in the distribution of income and employment within the country narrow. Further, we have to think about stimulating, not stifling competition, in the provision of infrastructure by all the states. Such reforms are much needed. From this viewpoint, growth centres are very important in influencing firm location decisions because they encourage competition among the states in the provision of infrastructure which are quite critical to firms.

This paper is organised as follows. The next section describes the theory and model that form the basis of the work, followed by a description of the secondary data and presents results from estimations. I report two estimations: estimation of unemployment rate; estimation to assess the performance of growth centres where they exist. The final section summarises the many important policy implications of the research based on the empirical results and field visits to firms and growth centres.

IV. Theory and model

One of the objectives of the research is to examine the impact of growth centres on unemployment, to enable a better assessment of the programme.

Basic labour economic theory (see Ehrenberg and Smith, 1993) shows that the labour market outcomes—unemployment rate (or the number of people un/employed) and wages (price of labour), are

simultaneously determined, and are determined by forces of demand for, and supply of labour. The demand for labour depends on wages, technology, and capital. The supply of labour depends on wages and non-wage characteristics such as hours of work, and flexibility.

So we have

$$Q_D^L = f(\text{wages, technology, capital}) \text{-----[1]}$$

$$Q_S^L = g(\text{wages, hours of work, flexibility}) \text{-----[2]}$$

We find that the demand and supply equations [1] and [2] are both over-identified.⁶ To estimate unemployment rate (measure of $Q_D^L = Q_S^L$ in equilibrium), we may write the above equations in reduced form.⁷ The unemployment rate in reduced form, is a function of wages.⁸ Literature (see for instance, Pantuosco and Parker, 1998; Sridhar, 2000) shows the unemployment rate in reduced form as dependent on wages that are determined by various socio-demographic characteristics.

This is reasonable for us to believe as the number of those willing to work depends on the wage rate. For instance, at very high wages, those working at home or dependents may be willing to work.

I estimate unemployment rate in reduced form as dependent on socio-demographic characteristics -- characteristics such as average age, proportion of minorities (in the Indian context, scheduled castes and/or scheduled tribes), proportion male, and literacy rate -- that determine wages, using district-level data for India.

Other variables in the reduced form equation for unemployment rate include⁹ technology, capital, hours of work and flexibility (see equations [1] and [2]). Since the data are for a single country, we do not expect the level of technology, capital availability to vary significantly enough for us to include them in the estimation. Further, the nature of jobs available in the country is such that there is not much variability in hours of work¹⁰ and flexibility (for instance, most of them tend to be eight hour jobs, with not much flexibility in timings).¹¹ Hence I do not include measures of these variables in the estimation, but include only those that determine wages, in reduced form.¹²

The model estimating the unemployment rate of the i th district may be summarized as follows:

$$U_i = \text{Dummy for Growth Centre}_i + \text{Duration of Growth Centre}_i + \text{Duration of Growth Centre Squared}_i + \text{Manufacturing employment}_i + \text{Service}$$

$$\text{employment}_i + \text{Proportion SC/ST}_i + \text{Proportion male}_i + \text{Literacy rate}_i + \text{Mean age}_i + e_i \text{ -----[3]}$$

As equation [3] shows, in addition to controlling for characteristics that determine the wage (in reduced form) at the district-level (based on data for all Indian states), I control for the occupational composition of areas. This is so because different occupations, as reflected, for instance, in the proportion of employment in manufacturing as opposed to service occupations, could have different unemployment rates due to different demand and supply conditions.¹³ These measures reflect the importance of these sectors in the area's economic base, and it is necessary to control for them. I expect the proportion of manufacturing employment in the area to have some impact, and the proportion in service employment, negative impact on the unemployment rate. This is because of the increasing importance of services in the economic base of the country.

The expectation from theoretical models that have been developed in the literature (for instance see Ge, (1995) for theoretical model, Sridhar (2000) for empirical evidence from the state of Ohio in the United States) is that areas with targeted programmes (such as growth centres) see a reduction in their unemployment rate. Consistent with this literature, along with other variables that determine the unemployment rate, I include a dummy for whether or not growth centre exists in districts of states that have growth centres.¹⁴ This methodology, while allowing us to control for all other variables that affect an area's unemployment rate, enables us to look at the impact of the growth centre. This is also consistent with the original objective with which growth centres were set up to promote industrialization of backward areas in the country. Note that while in earlier literature (for instance Sridhar (2000), the program (here, the growth centre) dummy and unemployment rate, are considered simultaneously determined, here, that problem does not arise. This is because I have checked the objective criteria for growth centres specified by the Government of India (look at the final section on policy implications), and through several discussions, have confirmed that unemployment rate is not a criterion for growth centre designation.

In addition to the effect of growth centres on unemployment rate, I control for the time period (duration, in months, as of December 2001)¹⁵ for which it has been in existence in the area (since the day of certification). One can imagine that growth centres could reduce the unemployment rate of an area, but there could be some optimum period for which it is desirable.¹⁶ To facilitate such an understanding, the

approach would be to include a variable that indicates for how long the growth centre has been in existence in each district. Earlier research (Sridhar, 2000, with respect to tax incentive programmes) suggests that 3-5 years could be the optimum period for maximizing the effect of targeted programmes on unemployment rate, after which it is preferable that the area abates offering (tax or infrastructure) incentives. In terms of policy action, this translates into decertifying areas that have been growth centres, beyond a certain period.

In addition to the duration variable, I include in the estimation, its squared term. This is to check for any non-linearity in the impact of duration of growth centre on the unemployment rate.¹⁷ For instance, one may expect that the growth centre would initially be highly effective in reducing unemployment, but its effect could gradually taper off later, either because bureaucracies make way into the institutional structure, or simply that business / governmental interest wanes in the program.

V. Description of Variables and Data

Data on unemployment rate were not available readily. Data, however, on population, main, marginal and non-workers are available by district from the 2001 Census of India. Main workers are those who had worked for the major part of the year preceding the date of enumeration.¹⁸ Marginal workers are those who worked for sometime in the year preceding the enumeration but did not work for a major part of the year.¹⁹ If an individual had not worked at all during the last year he or she is treated as a non-worker by the census. Non-workers include (i) those attending to household duties at home; (ii) students; (iii) dependents; (iv) retired persons or renters; (v) beggars; (vi) inmates of institutions; and (vii) other non-workers. To be consistent with census' definition of non-workers, here, non-workers have been treated as those outside of the labor force.²⁰ Marginal workers have been treated as those that were willing, but have not found full-time work. The unemployment rate is thus the ratio of these marginal workers to those in the labour force (main plus marginal workers).

Other variables are calculated in a straightforward manner from the 2001 Census of India. Literacy rate is the total number of literates divided by population older than 6 for each district. The proportion male, is male population older than 6 years computed as a proportion of population older than 6 years.

Census 2001 has not yet published data on population in various age groups, SC/ST population, and employment by category. For purposes of calculating average age of population, proportion SC/ST, and proportion in manufacturing and service occupations, I use the 1991 Census of India. I assume that the proportion of employment in manufacturing and services, average age of population in the districts and proportion of SC/ST in the various districts, roughly remained constant during the decade.²¹

The average age is the weighted average of the population in every age group (the weights) and the ages.²² The proportion employed in manufacturing (manufacturing and processing in household industry, and other than household industry workers) and those in services (this includes workers in trade and commerce, those in transport, storage and communications, and in other services) are calculated as proportion of total workers.²³

Table 1 describes the relevant data for 543 districts in Indian states containing growth centres for which all data were available, and that are included in the estimation of unemployment rate.²⁴

On average, the unemployment rate is around 24 percent, although there are few districts that have greater than 40 percent unemployment rate, the maximum unemployment district, with no growth centre, in the state of Rajasthan, reinforcing the need for some kind of targeting. For purposes of interest and comparison, I report work force participation rates. Work force participation rate is the ratio of main plus marginal workers (total labour force) to total population. On average, the workforce participation rate is 41 percent, which is lower than that in advanced countries such as the United States and Australia (where it was roughly 51 percent each) and New Zealand (where this was roughly 50 percent, based on data for 2001).

It may be noted from Table 1 that districts, on average, have young population as may be seen in their average age. Since we expect youth in the mid-thirties to be actively involved in the labour force (seeking or changing jobs), the growth centre approach is important to study, for its effects on the unemployment rate and hence the work force participation of these youth.²⁵

On average, the literacy rate is 64 percent for districts in states containing growth centres, which is roughly consistent with data for the country. The minimum literacy is found in an area that does not have a growth centre. The maximum literacy area has a growth centre. Roughly,

on average, a little more than half of population of the districts is male. On average, about one-third of the population is SC or ST in the districts.

Table 1: Description of Data used in Estimation of Unemployment Rate (N=543)

Variable	Mean	Minimum	Maximum	Std. Deviation
Unemployment rate, 2001	0.24	0.05	0.49	0.09
Work participation rate, 2001	0.41	0.24	0.64	0.07
Literacy rate, 2001	0.64	0.30	0.97	0.13
Proportion male, 2001	0.52	0.46	0.58	0.02
GC_dummy, 2001	0.13	0.00	1.00	0.33
Duration of GC (months), 2001	10.97	0.00	129.00	31.07
Duration squared	1083.76	0.00	16641.00	3417.71
Avg age, 1991	34.06	31.56	36.46	0.77
Proportion SC/ST,1991	0.31	0.00	0.98	0.21
Proportion employment, manufacturing, 1991	0.08	0.00	0.37	0.06
Proportion employment, services,1991	0.19	0.06	0.72	0.10

On average, the proportion dependent on services is much greater than that dependent on manufacturing that reinforces the service

economy India has become. Thirteen percent of the districts contain growth centres. The mean for the growth centre dummy shows this.

Table 2 compares these data for districts with growth centres and those without them. Surprisingly, there is very little difference across districts with and without growth centres, except literacy rate and the proportion employed in services. On average, districts with growth centres are more literate, and contain more service employment than those without them. Finally, the proportion of SC/ST is smaller in the growth centre districts than in their non-growth centre counterparts. Data on duration of the growth centre (for districts with growth centres only) show that on average, growth centres have been in place for nearly 87 months (or a little more than 7 years).

Table 2: Comparison of Data for areas with and without Growth Centres

Variable	Non-Growth Centre Districts, N=475		Districts with Growth Centres, N=68	
	Mean	Std. Deviation	Mean	Std. Deviation
Unemployment rate, 2001	0.24	0.09	0.24	0.08
Work participation rate, 2001	0.41	0.07	0.40	0.07
Literacy rate, 2001	0.64	0.13	0.66	0.13
Proportion male, 2001	0.52	0.02	0.51	0.02
Avg. age, 1991	34.06	0.77	34.10	0.79
Proportion SC/ST, 1991	0.31	0.21	0.28	0.19
Proportion employment, manufacturing, 1991	0.08	0.07	0.08	0.05
Proportion employment, services, 1991	0.19	0.10	0.21	0.09
Duration of growth centre (in months)	NA	NA	87.59	31.58

VI. Results From Estimation of Unemployment Rate

Table 3 shows the results from OLS estimation of unemployment rate, based on districts in the country for which all data were available.²⁶ First, note the standardised coefficients. The standardised coefficient for the duration of growth centre variable is the maximum contributing factor to explaining changes in unemployment rate.

The estimation shows that the literacy rate, proportion male, proportion of employment in manufacturing and that in services, are statistically significant in explaining changes in unemployment rate.

Table 3: Results from OLS Estimation (N=543)
Dependent Variable: Unemployment Rate

Variable	Coefficient	Std. Error	t	Std. Coefficients
(Constant)	0.75	0.25	2.95	
Literacy rate, 2001	-0.11***	0.03	-3.24	-0.16
Proportion male, 2001	-0.72***	0.23	-3.18	-0.14
GC_dummy, 2001	-0.05	0.10	-0.51	-0.19
Duration of GC (years), 2001	0.00	0.00	0.81	0.79
Duration squared	0.00	0.00	-1.01	-0.64
Average age, 1991	0.00	0.01	-0.08	0.00
Proportion SC/ST, 1991	0.01	0.02	0.30	0.01
Proportion employment, mfg, 1991	-0.20***	0.07	-2.91	-0.14
Proportion employment, services, 1991	-0.22***	0.05	-4.35	-0.25
Adjusted R²	0.23			
F	19.46			

***Statistically significant at the 99 percent level.

The coefficient on literacy rate is negative, as we expect. This shows that higher literacy implies that the area's workforce is more marketable and increases their employability. Specifically, for every one percentage point increase in the literacy rate of district, there is a 0.11

percentage point decrease in the unemployment rate of the area. The sign on proportion male is negative as expected, indicating that districts with higher proportion of men cause areas to have lower unemployment rate, holding education and other characteristics constant. This is somewhat reasonable to expect, since men continue to be the primary income earners in most households, the higher the proportion of men, higher would be the employment rate (or the lower would be the unemployment rate).

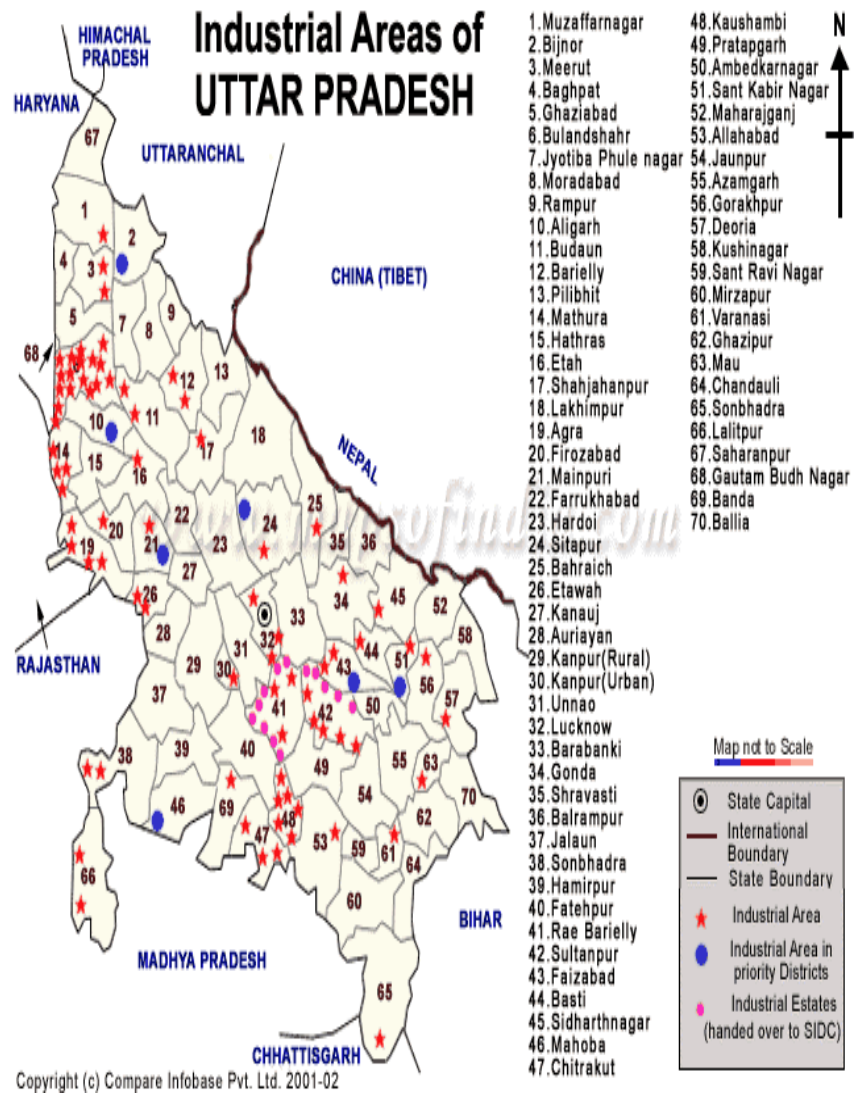
The proportion of employment, both in manufacturing and service occupations, have a significant impact on the unemployment rate, showing that as the proportion dependent on these occupations increase, unemployment is likely to decrease.

The growth centre dummy does not have a statistically significant impact in reducing the unemployment rate of districts that contain them.²⁷ The lack of significant relationship between growth centre dummy and unemployment could be a spurious result. It is possible that institutional rigidities are far too strong in these backward regions and any positive effect of the growth centres is not strong enough to counter the institutional problems. Alternatively, the impact of growth centres may not be strong enough to counter the inherent disadvantages in the regions.

Further, note that the growth centre is in place in only 13 percent of the districts. Even here, they are completely operational only in some of the 68 growth centres. For instance, in U.P., although growth centres are officially in place in 6 of the districts, they are functioning only in two of them (Gorakhpur and Jaunpur). The other proposed growth centres have been delayed because of land acquisition and litigation problems over the compensation to be paid to landowners. Overall, taking into account all districts, functioning growth centres may be said to have too small an effect on unemployment rate yet.

Next, based on my field visits, I find that many areas would have grown the way they have [for instance, Gorakhpur in U.P., (see Figure 1 for a map of the industrial areas of U.P.) Gorakhpur is an industrial area, irrespective of its growth centre status; and Hassan in Karnataka], even without the growth centre. This is because presumably these are areas with infrastructure already in place (and not necessarily the result of the growth centre) needed for firms to grow.

FIGURE 1: Industrial Areas of Uttar Pradesh



Few areas with growth centre (take the instance of Satharia (in Jaunpur district, U.P.)), however, would not have grown the way they

have, without the growth centre. Satharia is in a remote location, about 47 kilometres from the Jaunpur district headquarters, (is this 'close' to district headquarters? See criterion II for growth centre designation in section on policy implications), with road access to Satharia being quite poor (winding roads in the midst of thick vegetation), which industries find quite disadvantageous, in terms of transport costs, time and logistics. It is reasonable to believe that only because of the establishment of the growth centre and provision of infrastructure (power, telecom, paved roads) that this area has been able to attract industry.

This discussion implies that designation criteria for growth centres have to be distress-based, although they should consider potential for development. I discuss more about designation criteria in the section on policy implications.

Finally, the result I find could be the outcome of the large area that a district covers. If we were to obtain data on unemployment rate at a more disaggregated level, say block-level, and then introduce the growth centre dummy, it is possible that we may find growth centres to have some impact on the unemployment rate. For instance, Sridhar (2000), estimates the unemployment rate at the census block-group level for the state of Ohio in the United States. Even if the relevant block-level data would be available, a question that, however, remains is, whether we can expect unemployment rates to vary substantially across blocks to enable estimation. In any case, estimating unemployment rate at the block-level is a potential extension to this work.

The signs on the duration (of growth centre) variable and its squared are interesting when combined with that for the growth centre dummy. While the negative sign on the growth centre dummy implies that areas with growth centres can expect to see a reduction in their unemployment rate, sign on the duration variable indicates that the longer the growth centres are in place, the higher would be their unemployment rate. This outcome points to the need for well-defined, predetermined sunset provisions of the program when the objectives of industrialization have been met. This is also consistent with the results in Sridhar (2000).

I looked at the correlation matrix and no correlations were alarming enough to suspect collinearity.²⁸ Further, I performed formal tests of heteroscedasticity in the data, and found that it was small enough to be ignored.²⁹

VII. Estimation for Growth Centres

In addition to examining the unemployment rate, I assess the performance of growth centres, based on where they exist in the country. Secondary data available on the various growth centres from the Department of Industrial Policy and Promotion (DIPP), the Union Ministry of Commerce, contain information on the date of their approval, approved project cost, amounts of central and state releases,³⁰ final total expenditures, land acquired, number of plots developed and allotted, the number of firms established, capital invested and employment created by them.

Table 4 describes this data (obtained from the DIPP) for the 68 growth centres in the country. The Table shows that approximately 38 percent of the total expenditure on growth centre is leveraged by funds from the Centre, the total expenditure being less than the approved project cost in all cases, as one would expect. The average size of a plot on which an industrial unit sits in the various growth centres, is roughly 3 acres, based on the land acquisition and developed plots data in Table 4. On average, the number of plots allotted to firms (52), significantly lags behind the number developed (about 198). This implies that the growth centres still need to market themselves to businesses as good places to invest.³¹ On average, the number of units (firms) established in these growth centres is even much less, being about 12. This could be due to the fact that only one-third of the growth centres have firms so far, either because they are still in the land acquisition/development stage or are in the process of being allotted to firms. If we take into account just the growth centres in which firm establishment activity has already taken place, on average, about 40 firms have been established with a capital investment of Rs.11,780 lakh on average. The average employment creation per growth centre (390) shows that mostly labour-intensive firms have located here.

Table 4: Description of Data for Growth Centres (N=68)

Variable	Average	Maximum	Minimum	Std. Deviation
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Approved project cost (rupees in lakhs)	3,444.39	11,184.60	1,500.00	1,421.18
Central Release (rupees in lakhs)	481.93	1,050.00	50.00	368.27
State release (rupees in lakhs)	914.02	7,346.91	0.00	1,440.00
Total expenditure (rupees in lakhs)	1,255.41	8,346.91	0.00	1,713.38
Land acquired (in acres)*	659.10	3,060.41	0.00	722.92
Plots/sheds developed	198.47	2,205.00	0.00	384.38
Plots/sheds allotted	51.94	362.00	0.00	91.00
Number of units established	12.43	231.00	0.00	33.35
Capital invested by units (rupees in lakhs)	11,788.75	435,300.00	0.00	54,865.79
Employment	389.87	7,191.00	0.00	1,189.74
Regional Dummy	0.49	1.00	0.00	0.50
Plots/sheds developed	198.47	2,205.00	0.00	384.38

*Only for this variable the descriptive statistics are based on 63 observations since at the time I got the data, DIPP had not received reports regarding acquired land from 5 of the states

To assess the impact of growth centres where they exist, I estimate the number of units (firms) as dependent on the presence of growth centres. Since growth centres were set up to promote the industrialisation of backward areas in the country, I use the number of firms located in the growth centre as measure of their *performance*. I estimate the number of firms located in growth centres as dependent on the number of plots developed and a dummy for the region in which the growth centre is located.

I confirmed (from growth centre officials) that the number of developed sheds/plots represents the most important quantitative indicator of the *presence* of growth centres. This is reasonable to assume because developed plots represent what growth centres promise to industry—infrastructure and public services to enable their location. The infrastructure typically includes roads, electricity, telephone lines, and water/sewerage connections. The estimation attempts to empirically validate if infrastructure (which is what a developed plot implies) is a determinant of firms' decision to locate in the area.

In addition to the presence of growth centres, I develop a regional dummy for areas where the growth centre is located. This is because, holding everything constant, casual observation suggests that, irrespective of tax incentives or public services (which growth centres provide), firms most likely locate in prosperous areas because of their presumed favourable business climate. This presumed business climate could be a composite index consisting of characteristics (such as skills, work ethic) of the labour force, local area income (indicative of demand conditions), political factors including law and order conditions, political leadership, social factors such as communal harmony, and amenities such as temperate weather conditions, schooling, and recreational facilities.

In order to make a regional dummy for every growth centre, I assume that these characteristics are most closely related to income. In the Indian context, this assumption seems to be tenable. For instance, some of the higher income states (such as Karnataka, Tamilnadu, Maharashtra, Punjab, Haryana) are also the ones that are better governed, have more skilled labour force, and have better infrastructure.

For purposes of making the regional dummy, I compute weighted rural income (the weights being number of households in every income group), based on data published by the National Council of Applied Economic Research, for all states. Whenever this weighted rural income for the state containing the growth centre, is higher than the all-India weighted rural income, the growth centre receives a value of 1, implying that it is in a relatively prosperous area. When the weighted rural income for the state is below than the national average weighted rural income, the growth centre receives a value of 0 for the regional dummy. The average value of the regional dummy in Table 4 shows that roughly half of the growth centres are located in relatively prosperous states with higher rural income (in relation to national average).

Table 5 presents the results from this OLS estimation. The value of adjusted R² indicates that this model explains more than 60 percent of the variation in the number of firms locating in growth centres. It shows that when controlled for the state in which the growth centre is located, the number of developed plots is a highly significant determinant of the decision of firms to locate in the growth centre. This implies that, among states having growth centres, those having the financial resources to develop larger number of plots with infrastructure are the ones that attract firms. These results are consistent with the results from the qualitative discussions I have had with several growth centre firms that I visited in various growth centres throughout the country.

Table 5: Estimation of Growth Centre Performance (N=68)
 Dependent Variable: Number of units established

Variable	Unstandardised Coefficients	Standard Error	t value
Intercept	-3.38	3.53	-0.96
Regional Dummy	5.13	5.14	1.00
Plots/sheds developed	0.07***	0.01	9.97
Adjusted R²	0.62		
F	56.29		

In general, the prosperous states attract greater number of firms as may be seen in the sign of the coefficient on the regional dummy, but the effect is not statistically significant.

When combined, the results from estimation of the unemployment rate and that for the growth centres show that, it is not a bad idea for states to invest in improving their infrastructure, as that helps in improving and marketing the area as a better place to do business. This is valid even if one is not sure about the effectiveness of growth centres. Growth centre is a name we may give to the targeted development of infrastructure in distressed pockets of states.

The next section describes my visits to a sample of growth centres, discussions with state government, industrial agencies implementing the programme, the firms that have located there, and summarises policy implications arising out of the work. See Sridhar (2003), for impact of these firms on local labour markets and their social contribution to the communities in which they have located.

VIII. Policy Implications

To corroborate empirical findings of the work, I visited 4 growth centres through the country -- one in the south (Hassan, Karnataka), one in the north – Bawal, Haryana, and both the growth centres in U.P. that are functioning and where firms have located. The location of these growth centres is geographically dispersed enough to give a fair picture of their functioning and evaluation.

In this section, I summarise the qualitative findings from my visits to these growth centres. I elaborate on firm-level and growth-centre implications.

Table 6 gives an overview of some aspects of the growth centres I visited and summarises primary data I collected regarding number of plots developed and allotted, average size of plot in the growth centre and compensation the government had to pay to acquire the land for growth centre uses.³² The cost of land in U.P. is higher because of its fertile nature. Land acquisition in U.P. appeared to be more prone to litigation, compared with the other states where compensation for land was negotiated between the government and landowners.

Table 6: Overview of Growth Centres Visited

Growth Centre, State	Number of plots developed (allotted)	Average size of plot	Average compensation per acre
Bawal, Haryana	561 (208)	Ranges from 0.06 of an acre to 10 acres	Rs.2-4 lakh per acre
Hassan, Karnataka	213 (65)*	7.8 acres	Rs.3.5 lakh per acre
Shajanwa, U.P.	290 (265)	Ranges from 0.06 of an acre to 3 acres	Rs.3.5 lakh per acre
Satharia, U.P.	462 (337)	Ranges from 0.1 of an acre to 7 acres, average plot size being 0.07 of an acre	Rs.2-6 lakh per acre

*In Hassan growth centre, 1,662 acres have been developed out of which 514 acres (31 percent of developed area) have been allotted so far. Based on the average size of 7.8 acres per plot, I surmise that 213 plots are developed out of which 65 plots have been allotted.

First, I summarise the attractiveness of growth centre infrastructure to firms, whether/not tax incentives were effective in their location decisions, the importance of traditional factors (such as availability of raw material, transport costs, proximity to markets and

availability of skilled labour force). Sridhar (2003) finds that these firms have favourable impacts on the local labour markets where they have located. That study also finds that few of these firms export and some of them contribute socially to the communities in which they have located.

I have studied here at the firm-level whether or not other locations were considered by the firms and whether they really represent local entrepreneurship that could have occurred anyway. This is quite critical for us to understand if we have to qualitatively evaluate the impact of tax incentives. Nevertheless, note that in the Indian context, studies (Rajaraman *et al* 1999) have shown that infrastructure are more important than fiscal incentives in medium and large industry investment decisions.

Table 7 summarises the effectiveness of growth centre infrastructure and of tax incentives in firm location decisions, based on firm responses where I visited. In all, I visited 18 firms in the four growth centres. Everywhere, I made a conscious effort to study firms that located after the growth centre came into existence and those that located before, to isolate factors that influenced their location.

Table 7: All Firms in Growth Centres Visited, and their Location Decisions

G.C.	Firm number	Effectiveness of growth centre infrastructure	Effectiveness of tax incentives	Importance of traditional factors	Other locations considered
Hassan, Karnataka	1	Yes	No	Yes (proximity to raw materials)	Yes
Hassan, Karnataka	2	Yes	Yes	Yes (proximity to raw materials and skilled labour)	Local entrepreneurship
Hassan, Karnataka	3	No	Yes	Yes (proximity to raw materials)	Yes
Bawal, Haryana	4	No (pre-GC firm)	Yes	Not important	No
Bawal, Haryana	5	No (pre-GC firm)	Yes	Yes (proximity to raw materials and access to highway)	Local entrepreneurship
Bawal, Haryana	6	Yes	Yes	Yes (proximity to market)	Yes
Bawal, Haryana	7	Yes	Yes	Yes (proximity to raw materials and skilled labour)	Yes
Bawal, Haryana	8	Yes	Not clear	Yes (cheap land, proximity to raw materials and skilled labour)	No
Bawal, Haryana	9	Yes	No (Not effective without market)	Yes (proximity to market)	Yes

Table 7: All Firms in Growth Centres Visited, and their Location Decisions (Contd.)

G.C.	Firm number	Effectiveness of growth centre infrastructure	Effectiveness of tax incentives	Importance of traditional factors	Other locations considered
Shajanwa, U.P.	10	Yes	Not clear	Yes (proximity to raw materials & market)	Yes, local entrepreneurship
Shajanwa, U.P.	11	Yes	No	No	Local entrepreneurship (even without GC)
Shajanwa, U.P.	12	Yes	Yes	No	Local entrepreneurship (even without GC)
Shajanwa, U.P.	13	Yes	Yes	Yes (cheap land from GIDA)	Local entrepreneurship (even without GC)
Shajanwa, U.P.	14	No (pre-GC mill)	No	No	Local entrepreneurship (even without GC)

Table 7: All Firms in Growth Centres Visited, and their Location Decisions (Contd.)

G.C.	Firm number	Effectiveness of growth centre infrastructure	Effectiveness of tax incentives	Importance of traditional factors	Other locations considered
Satharia, U.P.	15	No (pre-GC)	Yes	Yes (distribution network)	No
Satharia, U.P.	16	Yes	No	Yes (agglomeration economies)	Yes, Local entrepreneurship (wouldn't have located without GC)
Satharia, U.P.	17	No (pre-GC)	Yes	Yes (proximity to good quality aluminium)	Yes
Satharia, U.P.	18	Yes (mainly power)	Yes	No	No, local entrepreneurship (wouldn't have located without GC)

Firm-Level Implications: Pre-Growth Centre Firms. We may note from Table 7 that 5 (27 percent) of these 18 firms are pre-growth centre, that quite obviously, located without the growth centre. As we expect, growth centre infrastructure did not appear important to these pre-growth centre firms. Firms, however, that were grandfathered into the growth centre (e.g., few firms in Satharia, U.P.) once it came into being, were receiving the benefits of growth centre infrastructure (e.g., uninterrupted power for their manufacturing processes which were not available to them earlier).

Of the 5 pre-growth centre firms, majority (4) of them, however, expressed the view that tax incentives were effective in their location decision.³³ We also may observe from the table that of the 5 pre-growth centre firms, 2 were multinational firms whose decisions were not determined by the growth centre, and two others represent local

entrepreneurship that would have located there anyway. The other firm located because of proximity to raw material and availability of tax incentives at the time. These responses are consistent with what we would expect of non-growth centre firms.

Growth Centre Firms: It is instructive to note from table 7 that while *tax incentives* were effective for nearly all pre-GC firms (except one), for only half of the growth centre firms, *tax incentives* were effective. These growth centre firms located where they did because of traditional factors such as agglomeration economies and proximity to raw material sites and markets. Further, more than one-third (35 percent) of growth centre firms represent local entrepreneurship and would have located there even without the growth centre.

Does this mean that we should discontinue growth centres, and these areas would experience industrial development anyway? Although several of these firms represent local entrepreneurship, they find the growth centre infrastructure and/or tax incentives that were being offered at the time of their location,³⁴ to be effective in influencing their entrepreneurship. With the growth centre, and the guarantee of infrastructure provision, their entrepreneurship decision occurred sooner rather than later.

It is important to observe from table 7 that growth centre *infrastructure* is effective for all the 14 firms that located in the growth centre after it came into being, and played an important role in their decision to locate there. Given that most of these are manufacturing firms, availability of uninterrupted power is quite critical to their production processes.

The firms' responses show that the states and their industrial development authorities have to aggressively promote their backward areas by providing infrastructure including road/highway access, power supply, telecom and Internet infrastructure, which would not be available to firms otherwise. The costs of infrastructure in the major cities of the country make it difficult for Indian companies to win the price war. There are several implications for industry and policy that are faced with the transition that occurs as a city grows.

The first is for industry to relocate to smaller and medium towns, as the growth centres programme rightly emphasises. If state and local governments invest in improving the physical infrastructure in small and medium towns, it is possible that they can compete as alternative locations, cutting down on operational costs (e.g., rental/leasing costs)

for firms that would find such costs to be much higher in metro and urban areas.

In smaller and medium-sized towns, where the growth centres are located, firms will also be able to get adequately trained labour force at relatively low cost. This is because the cost-of-living adjusted wage is itself lower in smaller and medium towns, holding quality constant. Industries can exploit this advantage.

The other reason for industry to locate to semi-urban and rural areas (the emphasis of the growth centre programme) is that it would change their economic base. Urban theory shows that rural-urban migration occurs in search of employment. Data compiled by the National Institute of Urban Affairs (NIUA) show that more than half of men that migrated from rural to the urban areas of India in 1991 did so for the sake of employment. Relocation of industry to rural and semi-urban areas would help the rural poor and surplus labour find alternative employment in their own areas. This acts as a check on urban migration that causes critical shortages in urban housing and prevents the creation of slums. Besides, relocation of industry would also help to coordinate the government's poverty alleviation programmes in a better manner. So far, it has been found that recipients of various employment training programmes have not been able to find suitable employment in rural areas.

Finally, the development of smaller and medium towns might imply that they are self-contained communities, but eventually automotive ties have to develop between urban areas and their satellite towns. This implies that development of roads and highways that has been neglected for a long time in India, gets the attention it needs.

Growth Centre-level Implications: Criteria for Designation of Growth Centres. Currently criteria for selection of growth centres are as follows (these criteria are described in circular No.14/23/88-DBA I issued by the Ministry of Industry, Government of India, dated December 8, 1988):

- I. Growth centres shall not be located:
 - Within 50 kilometres of the boundary of 7 cities in the country with a population above 25 lakhs;
 - Within 30 kilometres of the 2 cities with a population between 15-25 lakhs; and
 - Within 15 kilometres from the boundary of the 12 cities in the country with a population between 7.5-15 lakhs.

II. The growth centres should be located close to district/sub-divisional/block/taluk head quarters or developing urban centres.

III. Growth centres shall have access to basic facilities -- proximity to railheads, national or state highways, water supply, power, telecommunications, and educational and health facilities. If such facilities are not readily available, it should be ensured that they are developed with priority and commitment.

Based on my field visits to the growth centres and discussions with agencies involved in implementation of the programme, in reality, growth centres are designated by the centre based on a variety of criteria none of which are clear to neither the states, nor the industrial authorities implementing the programme. While official criteria for the establishment of growth centres relate to lack of urbanisation and/or presence of infrastructure, it is quite possible for many undeserving areas to get growth centre status. This is because if an area is located at a distance from an urban area as specified by the policy, it can either have the infrastructure or not have it, but in both cases it could get designated as growth centres (for e.g., note criterion III above), according to existing criteria. There can be several problems with existing criteria:

The first problem would be that undeserving areas or those that could attract industries without growth centres would be given sops at the cost of the state and central exchequer.

Second, lack of clear criteria make the designation process arbitrary, as it has happened in the case of many states in India.

Additional criteria that should be taken into account for designation of growth centres, to industrialise backward areas and to alleviate unemployment are:

1. High unemployment: This can be measured by the degree of unemployment in the state relative to the national average unemployment. For instance, states having 125% of the nation's average unemployment, during the most recent 12 months, could be decided as high unemployment areas; I have elaborated on the theoretical arguments as to why we may expect high unemployment areas to be more deserving than others to attract industry and create employment.

For purposes of designation, first, states with high unemployment rates in relation to the national average can be identified. The selected states can be asked to identify their worst unemployment

areas and backward industrial areas. This can encourage states to undertake mapping of the spatial distribution of unemployment and industries, and are feasible to be used as criteria for designation of growth centres.

2. Industrial backwardness: The prevalence of closed industrial facilities (probably minimum of 5% of existing units) can be said to indicate the extent of industrial backwardness of the area.

Enterprise zones in the United States are similar to the growth centres of India that are a topic of hot debate in the literature and policy circles because of the alleged 'pirating' of firms in one zone by neighbouring zones. Because of the proliferation of enterprise zones in some states in the United States, firms save millions of dollars by just moving across state borders.

However, firm relocation is less likely to be a problem in India where firms are not footloose. I have confirmed this based on discussions with firms that have located in various growth centres and also by informal discussions I have had with employees in the Department of Company Affairs. This is because when a firm locates in an area and has access to markets and various distribution networks, it is less likely to move out just because tax incentives are not available any more. In fact, the uniform stoppage of tax incentives by all states throughout the country is likely to check the relocation, even if it exists. However, this is not so in the United States where most of the areas have equal access to good transportation facilities and other infrastructure.

IX. Concluding Remarks

Thus, over a period of time, growth centres are likely to enjoy all the benefits of development by catching up with the other areas. When this is attained and the area's distress criteria indicate that it is no longer a high unemployment or industrially backward area, its growth centre status can be revoked. Thus the time limit for which the areas would be designated as growth centres is important to be specified. In the absence of a time limit, areas and industries could respectively lobby for continuation of the status and incentives forever, not different from small scale industries in the country that have been protected for over three decades now.

The implications of this work for geographically targeted programs that aim at convergence are for a time-bound programme which will sunset at the expiry of the period and is performance-based during the period that it is existent. It is performance-based both for the state/local government administering the programme and the firms that make the commitments.

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NOTES

¹ This is noteworthy in view of the fact that even states in the United States of America have not taken this bold step of stopping the incentive war, although even there, a number of economists and those in the policy circles continue to be worried about the effect of tax incentives on the fiscal health of states and their ability to provide public services.

² These elasticities are for the U.S. and, in general, depend upon the degree to which alternative locations considered are good substitutes. So they could differ from country to country depending upon the degree to which different alternative locations are similar or not from the viewpoint of prospective businesses.

³ Consumers' surplus is the savings a consumer realises in the market when the *actual* price of a good s/he purchases is lower than what s/he is actually *willing to pay*.

⁴ This is reasonable to assume for the following reasons:

- Wages (adjusted for occupation) across areas are usually cost-of-living adjusted.
- Although rural-urban wage differentials exist, in the long run, they are equalised because of migration, as in Todaro's model.

⁵ However, now, given that the implementation of value added tax is impending in all the states, this may not be possible.

⁶ By the order condition, there are two variables (hours of work, measure of flexibility in the job) that are excluded from the demand equation (included in the model), whereas there are two endogenous variables (wages and the quantity of labour demanded). Since the number of excluded exogenous variables in the demand equation is greater than the number of endogenous variables less one, it is over-identified. There are two exogenous variables excluded in the supply equation (included in the model – technology and capital) as well, and the number of endogenous variables is two. So by the order condition again, the supply equation is over-identified.

⁷ I have checked, through substitution of terms, the final reduced form equation for unemployment rate. Note that there is no need to estimate wages from viewpoint of the research objectives in this paper. Also note that when I derive the reduced form equations, I assume linearity. This is

based on assumption in the past literature on the subject (Pantuosco and Parker 1998; Sridhar 2000).

⁸ Note that unemployment is fundamentally a disequilibrium phenomenon. At this point, it is not clear if a model is estimated in reduced form only when market clearing occurs (as when demand for and supply of labour meet). It is possible that special techniques are used in the labour literature, for estimating a disequilibrium model such as the one with unemployment. I am thankful to Indira Rajaraman for pointing to this. That is a potential extension to this work.

⁹ I have checked this through substitution.

¹⁰ It is only very recently that the concept of part-time work is slowly gaining acceptance in India, as revealed by opinion polls.

¹¹ Telecommuting is even more rarely practised. For some preliminary evidence on telecommuting and flexible work patterns in India, see Mitter (2000), Irani *et al* (2000).

¹² Note that two-stage least squares (2SLS) is always the recommended procedure for estimating over-identified equations. If we were to use indirect least squares to estimate such equations, remember that we will not get unique values of structural coefficients based on reduced form equations.

Note that all we need to estimate is the unemployment rate. So I confine myself to the first step of 2SLS here (which is basically OLS in both the steps) in which I estimate the unemployment rate in reduced form, without continuing with the second stage (in which the wage would have been estimated as a function of the predicted value of the unemployment rate).

¹³ We may note here that while the proportion of employment in manufacturing and services determine the unemployment rate of an area, there is no reverse causation from unemployment rate to the proportion in manufacturing and service occupations. We would expect the manufacturing and service base to be determined by exogenous factors such as natural resources available, skills of the population, and the extent of integration into international markets.

¹⁴ I have excluded from the estimation, districts in states that do not have even a single growth centre because these states could be systematically different from the rest of the sample. See endnote 22.

¹⁵ The growth centre dummy is defined according to its status in 2001. To be consistent, I have defined the duration variable as of December 2001. Also, note that whether or not a growth centre is completely operational on the day it is certified or designated is not relevant, it is only the idea of marketing the area as a good place to do business, if not the actual incentives, that could make a difference to prospective firms. This idea supports the construction of the duration of growth centre variable since the day of its certification.

¹⁶ Incidentally, when I visited the Shajanwa growth centre, this issue was also raised by Gorakhpur Industrial Development Authority (GIDA) officials (that administers the growth centre) in their observations about its effectiveness.

¹⁷ Remember that the effect of growth centre, its duration and its squared, on the unemployment rate, over a period of 12 months (or one year), for instance, can be computed from their coefficients as follows: Coefficient on growth centre dummy + (Coefficient on duration of growth centre * 12) + Coefficient on duration squared * 12²). If we wanted to know the effect of the growth centre over a period of 2 years, we substitute 24 (months) instead of 12 as above, and so forth. See Sridhar (2000).

¹⁸ These workers are those who were engaged in any economically productive activity for 183 days or six months or more during the year.

¹⁹ These workers include those who worked for less than 183 days or six months during the year.

²⁰ This becomes tricky. If we agree that willingness to work itself depends on the wage rate, we have to accept that at very high wages, even working at home or dependents may be willing to work! So if wages were to be high, taking into account only main workers at any given point in time could be an under-estimation of those in the labor force. I am thankful to M.Govinda Rao for pointing to this.

²¹ During the decade, several new districts were created, mostly carved out of existing districts. There were also three new states (Jharkhand carved out of Bihar, Chattisgarh carved out of Madhya Pradesh, and Uttaranchal out of Uttar Pradesh) created during the decade. For new districts and those in these new states, I have assumed that the data for the parent district (from which it was carved) holds good. Given the fact

that these districts and those in the state have been carved only relatively recently, the assumption is certainly reasonable to make.

²² I have calculated weighted average age after excluding persons below 15 and above 65, since we are concerned about the effect on the unemployment rate, of average age of only those eligible to be in the workforce.

²³ Data on workers in manufacturing and services in the 1991 Census of India were broken down by rural and urban and male and female, so I aggregated these categories for obtaining total employment in the respective category.

²⁴ In all, these 543 districts are in 27 (out of 35) Indian states/union territories that contain growth centres. I did not include in the estimation, states/union territories that do not contain growth centres, (these being Chandigarh, Uttaranchal, Delhi, Sikkim, Daman & Diu, Dadra & Nagar Haveli, Lakshadweep, Andaman & Nicobar Islands), districts in these states could systematically be different from their counterparts in states containing growth centres. The objective is to compare only districts that are equally likely to contain a growth centre, which would not be met if (districts in) states with not a single growth centre were to be included.

Only one state (Jammu and Kashmir) with growth centres has been left out of the estimation because of lack of 1991 data for districts in the state. The 1991 census was not held in Jammu and Kashmir due to the perturbed law and order situation in the state at the time. The census of 2001 was not held in Kutch district, Gujarat, because of the earthquake. These and few other districts in various states have been left out of the estimation, due to lack of complete data for all variables. The final estimation is based on a sample of 543 districts for which all data were available.

²⁵ It is to be noted that the maximum of the average age in the districts is 36 years. This does not mean that there are no persons in any of the districts that are above this age, but only that this is the maximum of the weighted average age that has been calculated for all the districts, based on information regarding number of people in each of the age groups (the weights) in the districts.

²⁶ OLS is applied to the reduced form equation, this provides consistent estimates of the parameters.

²⁷ Although my interest is to explain only variables that are statistically significant, I probe into the statistically insignificant growth centre variable to explain it, as that is one of the primary objectives of the study.

²⁸ The correlation matrix is available upon request.

²⁹ I used White's general test of heteroscedasticity to check for possibility of non-constant variance of error term with all independent variables. I had to reject the null hypothesis of homoscedasticity. To detect specifically which exogenous variables were associated with the problem, I did a graphical plot of residuals against each of the variables. I found proportion of SC/ST population, proportion of manufacturing employment and those in services, to be causing increasing error variance, as in the assumption $E(u_i^2) = \sigma^2 X_i$. I transformed all variables using

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$\sqrt{\text{Pr oportionSCST} * \text{Pr oportionManufacturing} * \text{Pr oportionServices}}$

as the weight, and performed GLS estimation of the transformed variables in the original model. I examined the ratio of the OLS variance to GLS variance, to examine how big of a problem heteroscedasticity is. The largest OLS error variance (of the proportion male variable) was only 2 times that of the GLS variance, leading me to conclude that the problem was small enough to be ignored.

³⁰ Currently, the programme is financed by funds from the centre leveraged by funding at the state-level. There was a proposal to transfer the programme entirely to the states last year, but it is now not clear whether the programme is being scrapped (to downsize the government), or being transferred to the states, or will be continued in its present form.

³¹ The Bawal (Rewari) growth centre in Haryana recently advertised itself in the Economic Times, a leading business newspaper, that it is the best global destination for businesses to invest!

³² In some cases, there are discrepancies between the secondary data (I obtained from the Department of Industrial Policy and Promotion, Government of India) and the primary data pertaining to the number of plots developed and allotted to firms. On other aspects reported in Table 6, such as size of plot and cost of land (compensation per acre), secondary data are not published by DIPP, Government of India, hence

what is reported based on primary data collected, is the only information available.

³³ In the pre-growth centre (pre-93) period, tax incentives were being offered by various states.

³⁴ As discussed at the beginning, a decision has been taken by all Indian states not to offer tax incentives any more. So firms' responses regarding tax incentives are not relevant any more.