Per Capita Income Growth, Social Expenditures and Living Standards: Evidence from Rural India

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Using pooled time series data across 15 major states of India, the relationships between measures of living standards and per capita income and government expenditures in social sectors are estimated. Female literacy, infant mortality, total fertility rates and level of poverty are taken as measures of living standards. Public expenditures on education, and improvement of medical facilities are found to be more effective in improving living standards than growth in income alone. In particular, the state of Kerala is not an outlier in its achievement of impressively higher living standards, relative to other states, after controlling for government expenditures in the social sectors. These conclusions do not change after controlling for fixed effects and with application of robust estimation procedures. (*JEL 0* 15, H51, H52)

A higher aggregate economic prosperity measured by per capita gross national income does not always lead to a higher standard of living. It also depends on how the gains from growth in income are shared by the people, and how the resources are allocated to the social sectors such as health and education that directly affect the quality of life. Development economists have debated for many years about whether developing countries should follow a growth-oriented or equity-oriented strategy in order to improve their standard of living at a highest possible rate. The growth-oriented strategy is associated with decentralized macro economic policies which generate high rates of growth of per capita income; this approach relies on market forces to allocate resources among the sectors of an economy, including the health, education and family planning sectors. One of the underlying assumptions in this approach is that the poor benefit equally as the rich from growth in per capita income. With higher incomes, the poor demand more health care, family planning and education. As the demand for these services rise, private enterprises emerge to supply them. Thus, the whole economy shows improvement in living standards in response to growth in per capita income.

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The advantages of the growth-oriented approach are productive efficiency and reduced government intervention.

Economic growth is necessary to finance any sustained human development strategy. If the distribution of income is unequal and if social expenditures are low or unevenly distributed, human development may not improve even when GNP grows fast (as for instance in Pakistan, Nigeria and Brazil). Externalities and indivisibilities in the production and distribution of these social sector services are often encountered and hence intervention is needed on efficiency grounds. For instance, private returns from investment in individual health and education may be lower than social returns; as a result, private investment may be lower than the socially optimal level. Moreover, the crucial premise of this strategy namely that the poor benefit equally from growth is empirically refutable particularly for lesser developed countries (Ahluwalia (1976); Adelman and Morris (1973)).

The equity-oriented strategy which is also known in the literature as the "basic needs", or the "human resource development" approach relies heavily on government intervention in the production and distribution of services in health, family planning and education, through subsidies, to targeted groups. While the growth oriented strategy is directly aimed at productivity growth, the human resource development approach also has an impact on productivity growth and income distribution. In recent studies of growth models (Lucas, 1988), human capital is treated as the engine of growth and it has been argued that because the private returns to investment in one's human capital fall short of the social returns, without government subsidies to human capital formation, the growth of the economy would be lower than socially optimal rate. In another recent growth model (Raut, 1990) it is shown that even when schools and colleges are open to all, uneducated parents faced with higher costs to give their children a certain level of education than educated parents, may not have the incentive to educate their children. This low level of investment in poor children over time lowers the aggregate growth rate in the economy. Thus, the only way for children of the poor to have upward social mobility is when they receive government subsidies for their education.

A number of empirical studies' on the relationship between nutrition and human activity have shown that malnutrition and persistent infectious diseases during childhood and adolescence have adverse effects on physical growth, learning, cognitive functions and social interactions. Ultimately these lead to lower competitive wages for the affected group as compared to the rest of the labor force. Using pooled macroeconomic time series data for developing countries, Wheeler (1980) found that human resource development contributes to higher labor productivity, reduced fertility, and improved growth in per capita income (see also Bussink, Grawe et al. (1980) for similar findings). Although it has been argued by some economists that the rate of growth in per capita income is rather slow for countries following the human resource development strategy, this strategy imparts greater equality in income distribution without necessarily sacrificing growth.

Using the cross country macro data, it is not possible to empirically evaluate the relative merits of these two strategies for two reasons. First, no country follows either

an exclusively ***growth-oriented*** strategy or exclusively ***equity-oriented*** strategy; most countries follow a mixed strategy with varying emphasis on these two goals, and it is not possible to quantify the weights given to these strategies. The success of either strategy will depend on a country's socio-economic structure and income distribution mechanism. The general empirical approach to assessing these strategies has been to regress some measure of a country's standard of living on its per capita income, and then to compare the residuals: If a country with relatively large expenditures on social services has large positive regression residuals then it is argued that the equity-oriented strategy has been effective in raising living standards, see Isenman (1980), Sen (1981), Bhalla (1988), and Bhalla and Glewwe (1986). For instance, Isenman and Sen found that Sri Lanka, whose government is known to have substantial expenditures on human resource development, is also an outlier with respect to improvements in living standards. A similar approach has been followed in the Human Development Report, 1990, where a composite index of living standards, known as the human development index (HDI) has been constructed to argue that social expenditures patterns of the countries with high values of HDI when compared with those with low values of HDI are positively correlated with achievements in human development.

In contrast, Bhalla (1988), and Bhalla and Glewwe (1986) have raised the issue that ***"Sri Lanka's high living standards, both in 1948 and 1960, should caution one against casually linking social expenditures (post-1948 or post-1960) with the "exceptional" status of Sri Lanka in the late 1970s. The judgment requires an examination of whether Sri Lanka's post-1948 performance was exceptional and whether social expenditures played an important role in that performance."*** This initial condition problem is related to the concept of fixed effects in the econometrics literature; it is well known that failure to control for fixed effects leads to invalid statistical inference and questionable policy conclusions. After controlling for fixed effects, Bhalla and Glewwe found that for most measures of living standards, Sri Lanka ceased to be an outlier.

In this paper, we rectify some of the limitations of outlier analyses. ***First,*** whether an observation is an outlier or not is to be judged with reference to the true regression line. Detection of an outlier with respect to a line fitted by ordinary least squares will be misleading since the fitted line is pulled towards the outlier, thus decreasing the chances of its detection, while throwing other non-outliers into the status of outlier on the other side of the fitted line. The fixed effect estimation procedure that have been used by Bhalla and Glewwe still would not detect an outlier since their parameter estimates are based on ordinary least squares regression on the first difference of the variables. However, certain regression techniques developed in the statistics literature address this problem by fitting a line while reducing the influence of observations far away from most other observations. This estimation procedure is known as the robust regression method which we follow in this paper. The ***second*** problem is that differences in countries' political systems and cultural norms affect their achievements of living standards from a given strategy. Furthermore, command over resources needed for an average standard of living is generally represented by per capita GNP. However, the presence of nontradable goods and services and distortions from exchange rate

anomalies, tariffs and taxes make per capita income a bad indicator of command over resources even after correction for purchasing power. Therefore, international comparisons of living standards may have biased the inferences drawn in the above studies. The third, and most important problem, is that instead of looking for outliers and then examining if this outlier country spends more on social sectors, we statistically estimate the relationship between measures of living standards and per capita income, and public expenditures on different social sectors such as health, nutrition, family planning, and education together; we also control for other exogenous variables that affect living standards. Our analysis can evaluate the relative effectiveness of growth in income and public expenditures on human resource developments strategies to improve living standards.

India, with its state level data on government spending on various social programs and data on various measures of social well-being provides a good sample to carry out the above exercise.

Section 1 sets out the model and discusses the econometric issues. Section 2 describes the data. Section 3 reports empirical findings. Section 4 draws implications for policy.

I. MODEL SPECIFICATION AND ECONOMETRIC ANALYSIS

A. Measurement of Living Standards and Human Resource Development:

The 1990 Human Development Report defines human development as *"a process of* enlarging ***people's*** *choices. .. three essential ones (of which) are* for ***people*** *to lead a long and healthy life, to acquire knowledge and to have access to* ***resources*** *needed for a decent standard of living,"* (p. 10) The living standards of a society are generally measured by its poverty level, life expectancy, infant mortality, and literacy rates. It has been often argued that higher fertility in less developed countries leads to lower standards of living. With high fertility rates women in traditional societies spend most of their time in child bearing and hence lack opportunities for acquiring knowledge or other creative activities. Thus we include fertility also as one of the measures of living standards.

One of the objectives of human development is to close the gap between male and female living standards. It is common knowledge that although women are pivotal in the development process, in almost all societies, women earn lower wages than men, and in most less developed societies investment in women's education, health and nutrition is disproportionately low. The social returns from women's education is much higher than returns from men since education of women reduces fertility and infant mortality as will be shown. Thus female literacy rather than general literacy is taken as a measure of living standards.

The 1990 Human Development report defines an aggregate index of human resource development (***HDI***) of a country by combining literacy rate, life expectancy, and purchasing power parity (***PPP***) adjusted per capita income as follows: Let X_{ij} denote the value of the ith variable in country j, where the variables are literacy rate, life expectancy and log of *PPP* adjusted per capita income. Define:

$$I_{ij} = \frac{\max_j X_{ij} - X_{ij}}{\mathrm{Max}_j X_{ij} - \min_j X_{ij}}, \text{ and } HDI_j = \sum_{i=1}^{3} (1 - I_{ij}) \quad (1)$$

Kumar (1991) has used this index to construct the ***HDI*** for 17 states of India. We could follow a similar strategy. However, there are several problems associated with such a measure. First of all, ***HDI*** is a relative measure in the sense that it depends on which countries are included in the sample and on the magnitude of their disparities in those three basic variables. There is very little theoretical basis for weighting all measures of living standards equally. Furthermore, since our objective is to examine the importance of social expenditures flowing to a sector relative to per capita income to improve the living standards represented by that sector, it is most appropriate to carry out our analysis for each measure of living standards separately.

To address the issue of whether social expenditures and other redistributive policies that are targeted directly to the poor have been more effective in improving living standards than growth in per capita income, we postulate the following production function for the social sector:

$$L_{it} = \alpha_i + \beta \ln y_{it} + \gamma E_{it} + \delta X_{it} + \varepsilon_{it} \quad (2)$$

where, L_{it} is a measure of living standard such as fertility, or infant mortality; y_{it} is per capita income, E_{it} is per capita government expenditure in the relevant social sector (e.g., if L relates to female literacy rate, then the relevant E is per capita government expenditures on education), and X_{it} is a vector of other variables that affect a particular measure of living standard. ε_{it} is the error term and all other greek letters are regression coefficients, with α_i representing the fixed factor. We will use robust regression techniques to estimate (2) controlling for initial conditions as explained below. Most of the studies in the literature have included only logarithm of per capita income as one of the regressors but not the other variables. The econometric problems in estimating such a relationship are discussed below.

B. Initial Condition or Fixed Effect

Bhalla **(1988),** Bhalla and Glewwe (1986) pointed out that Sri Lanka's initial condition might have been different from other countries and some of the determinants of living standards might have been omitted in the above specification. All these lead to the presence of a country specific effect, α_i. The estimation of the parameters will depend crucially on whether this country-specific effect is fixed or random. For random effect models the appropriate procedure is generalized least squares procedure. However, if α_i is correlated with the other regressors then it is known that the random effect model leads to inconsistent parameter estimates. In that case fixed effect models are more appropriate. In our case it is very likely that α_i is correlated with the regressors, so we will treat α_i as fixed effect. In that case we have,

$$\Delta L_{it} = \beta \Delta \ln y_{it} + \gamma \Delta E_{it} + \delta \Delta X_{it} + \Delta \varepsilon_{it} \quad (3)$$

where $\Delta x_t = x_t - x_{t-1}$ denotes the first difference in x. It is possible to estimate (3) if we have at least two years of data. Such regression equations are termed in this literature as *change-change* relationships; these are known in the econometrics literature as fixed effect models. Bhalla and Glewwe estimated a version of the above equation without government expenditures and other X's as regressors and found that Sri Lanka ceased to be an outlier with respect to most measures of living standards and they concluded that Sri Lanka's performance on living standards were not exceptional. In what follows, we will refer to (3) as fixed effect model instead of change-change model. Kerala's superior performance relative to other Indian states could be viewed as Sri Lanka's superior performance relative to other less developed countries in the cross country studies. We will examine if Kerala is indeed an outlier in its superior performance, and if public expenditures in social sectors have contributed to this achievement.

Estimating a fixed effect model using the ordinary least squares technique is not enough to detect an outlier. This may lead to invalid inference. What is needed is a robust statistical procedure for detection of outliers, which we describe below.

C. Robust Regression Procedures:

Suppose we have data on two variables y and x as depicted in the following diagram:

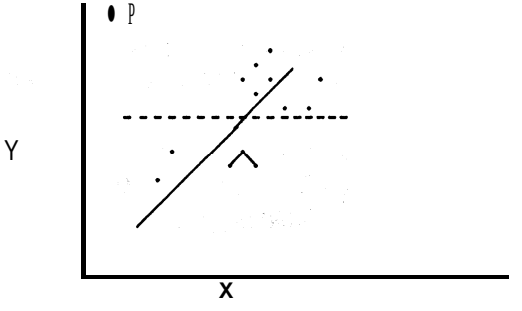

Figure I.

where the solid line is the true relationship and the dotted line is the line fitted by ordinary least squares. While the point ***P*** is obviously an outlier with respect to the true relationship, it may cease to be an outlier with respect to the least squares line; moreover, the least squares line misrepresents the true relationship between y and x. The robust regression techniques will treat such observations as gross errors and attach less weights to these observations in fitting a regression line.

There are several robust regression techniques available in the literature. The most commonly used one is known as the Huber estimate (See Hampel and others, 1986) which amounts to computing weighted least squares estimates with weights redefined iteratively by

$$w_i = \min\{1, c/|\hat{\varepsilon}_i|\} \qquad (4)$$

where $\hat{\varepsilon}_i$ is the least squares errors and c is a constant to be estimated. Note that weights are not fixed but depend on the estimate. We estimated both level-level and fixed effect relationships using ordinary least squares as well as Huber's robust regression technique. The parameter estimates are reported in section III.

II. DATA DESCRIPTION

The analysis is based on pooled time-series cross-section data for fifteen major states in India and the years taken are 197 1 and 1978 for which the relevant data were available. The following measures of living standards are used in this study:

L_1 = poverty level measured by percentage of households below poverty
L_2 = female literacy rate
L_3 = infant mortality rate .
L_4 = total fertility rate

Public expenditures variables:

E_1 = per capita public expenditures on health in 1970–7 1 prices
E_2 = per capita public expenditures on education in 1970–7 1 prices
E_3 = per capita public expenditures on family planning in 1970–7 1 prices

Other factors affecting living standards:

Y = per capita income generated from agriculture in 1970–7 1 prices

Since we are studying the rural sector, and 95% of rural household incomes come from agriculture, we take per capita rural income generated from agriculture as a measure of income.

Z_1 = rural unemployment rate
Z_2 = percentage of households holding at least 0–1 hectare of land
Z_3 = level of available medical facilities.

We constructed Z_3 by taking weighted average of the percentage of births attended by trained medical doctors, population served by a medical practitioner, and population served by a nurse.

The table in the appendix presents the values of the above variables together with other social indicators and the data sources. A quick look at the table reveals that Kerala is quite ahead of all other states in terms of social development, while its level of per capita income is relatively lower than many other states. For instance, infant mortality rate in Kerala is 42 in 1978, but other richer states have as high as 111 in Punjab and

116 in Haryana in 1978. Similar is the story about fertility rates and life expectancy. Also notice that Kerala has one of the highest expenditures on education and health as a percentage of total government expenditures. Another interesting fact to note is that Kerala has one of the lowest figures in family planning expenditures. Thus, much of the low fertility rate in Kerala might be due to its higher levels of education and health facilities and lower rate of mortality. The magnitude of other social indicators reveals similar pattern.

III. EMPIRICAL FINDINGS

A. Total Fertility Rate Model

We postulate a simple model in which we assume that total fertility rate depends on per capita rural income, per capita public expenditures on family planning, level of medical facilities available, and female literacy rate. Table 1 below reports our regression results on the fertility model.

There is no statistical evidence that growth in income reduces fertility rate after controlling for other regressors, and the result is robust. This is not to imply that growth in income will not reduce fertility. However, if the growth in income is slow as in India, a small increase in the growth rate of income does not significantly reduce fertility as do other regressors. In fact, higher female literacy rate and medical facilities are most effective in reducing the fertility rate. The negative effect of female literacy rate on fertility rate may suggest that educated women make better use of family planning measures, or that educated women have higher cost of having children in terms of foregone earnings. The latter interpretation is partly consistent with our results since the effect of increased family planning expenditures is related to increased fertility rate.

TABLE 1. Total Fertility Rate (L_4) and Per Capita Rural Income (y), Per Capita Public Expenditures on Family Planning (E_3), Level of Available Medical Facilities (Z_3) and Female Literacy (L_2)

Model	*Constant*	*ln(y)*	E_3	Z_3	L_2
Level-Level:					
OLS	3.833	0.417	0.634	-2.47 1	-0.027
	(1.76)	(1.12)	(1.80)	(2.63)	(2.96)
Robust	3.942	0.400	0.727	- 2.769	- 0.024
	(2.03)	(1.21)	(2.39)	(3.29)	(3.05)
Fixed Effect					
OLS		0.303	0.505	-4.021	-0.041
	—	(.62)	(2.00)	(3.25)	(5.16)
Robust	—	0.303	0.505	-4.021	-0.041
		(.61)	(2.00)	(3.25)	(5.16)

Although the latter relationship maybe due to government policy to spend more on family planning in the states with higher fertility rates, it is quite likely that demand for family planning might be lacking in such states. Once again, equity oriented policies seem to stand out to be a better way to reduce fertility rates in rural India.

B. Female Literacy Rate Model

In the above model we find that female literacy is one of the important determinants of total fertility rate. In this section we investigate the determinants of female literacy rate. Denote by $L_{2(-1)}$ the lagged female literacy rate, where the lagged values of 1978 are taken to be 197 1 and for 197 1 the lagged values are taken to be 196 1 values.

We postulate that female literacy rate is linearly related to log of per capita income and hence growth in per capita income, per capita public expenditures on education, and lagged female literacy rate. In this specification, public expenditures stand for equity policy; lagged female literacy rate is included to control for the effect of parents' literacy on their children. However, we recognize that a ten year lag may not be adequate to capture the effect of parents' literacy rate. Table 2 below presents the estimates.

For all regressions, there is a significantly positive impact of public expenditures on female literacy rate. However, the effect of per capita income is not significant in the level-level specification, but the fixed effect model shows that growth in income has significantly positive effect in improving the literacy rate. Lagged female literacy rate is not significant in the fixed effect model.

The effects of log per capita income and lagged female literacy rate are sensitive to whether level-level or fixed effect estimation procedures are used. Although the estimates might be biased because we have lagged dependent variables as regressors, they are consistent as long as there is no contemporaneous correlation between lagged dependent variable and other regressors. Here we have some evidence that both growth and equity strategies are effective for this measure of living standards.

TABLE 2. Female Literacy Rate (L_2) and Per Capital Rural Income (y) Per Capita Public Expenditure on Education (E_2), Lagged Female Literacy $L_{2(-1)}$

Model	*Constant*	*ln(y)*	E_2	$L_{2(-1)}$
Level-Level:				
OLS	–1 1.409	*2.344*	*0.784*	*0.984*
	(.44)	(.53)	(2.7 1)	(6.96)
Robust	-7.1212	1.474	0.883	0.969
	(.52)	(.56)	(4.53)	(9.15)
Fixed Effect				
OLS	—	25.793	0.700	0.278
	—	(2.83)	(2.24)	(.84)
Robust	—	25.363	.657	0.367
	—	(6.72)	(4.40)	(1.87)

C. Infant Mortality Rate Model

Apart from per capita income and per capita public expenditures on health, we also include level of medical facilities and female literacy rate. Table 3 below reports the regression results.

All regressions show that growth in income does not reduce infant mortality rate. Again the redistributive policies are more effective in reducing infant mortality rate; higher female literacy rate has positive effect on this measure of living standard. However, it may not be so much the ignorance of mothers about the health of their children (as reflected in female literacy rate) that causes infant mortality as the lack of medical facilities. Per capita expenditures on health are found to be non significant when controlled for the level of medical facilities. This may be because the level of medical facilities already captures the effect of per capita expenditures on health. We ran a regression of X_3 on E_1 and found significantly positive effects of E_1 on all regressions. Thus to improve this measure of living standard again an equity policy seems to stand out to be a better one.

TABLE 3. Infant Mortality Rate (L_3), and Per Capita Rural Income (y), Per Capita Public Expenditure on Health (E_1), Level of Available Medical Facilities (Z_3) and Female Literacy Rate (L_2)

Model	*Constant*	*ln(y)*	E_3	Z_3	L_2
Level-Level:					
OLS	74.157	19.948	-0.877	-95.241	-0.606
	(.66)	(.97)	(.20)	(2.04)	(1.61)
Robust	*35.226*	27.980	-2.380	-97.232	-0.570
	(.48)	(1.86)	(.82)	(3.08)	(2.47)
Fixed Effect:					
OLS	—	-4.669	0.822	-106.149	-0.514
		(0 22)	(.26)	(1.95)	(1.47)
Robust	—	*-13.087*	.508	*-109.178*	*-0.356*
		(0 75)	(.36)	*(2.24)*	*(1.83)*

D. Poverty Level Model

We postulate a linear relationship between poverty level and per capita rural income, rural unemployment rate, and land holdings. In this specification, for given level of per capita income, the higher rural unemployment rate or the lower percentage of households holding some positive amount of land the lower is equity in the state. Therefore, while the coefficient of log-income measures the growth effect, the coefficients of the other two variables measure the effects of equity on the poverty level. The regression estimates of this specification are given in Table 4 below.

In all regressions, we find that lower unemployment rate and lower percentage of landless households significantly reduce the level of poverty in rural India. While the level-level specification shows that growth in income reduces the poverty level

TABLE 4. Poverty Level (L_1) and Per Capita Rural Income y, Rural Unemployment Rate (Z_1), Percentage of Land Holdings (Z_2)

Model	*Constant*	*In(y)*	Z_1	L_2
Level-Level:				
OLS	283.623	-36.909	2.116	– 0.446
	(6.73)	(5.69)	(5.02)	(3.51)
Robust	284.45 1	-37.102	2.054	-0.419
	(12.90)	(10.47)	(11.17)	(7.12)
Fixed Effect				
OLS	—	-8.297	1.780	-0.705
		(.97)	(1.34)	(1.91)
Robust	—	-5.058	2.016	-0.916
		(.98)	(2.94)	(2.77)

significantly, the fixed effect estimate which is statistically more appropriate in our case shows no significant effect of income growth in reducing poverty. Note that the policies that reduce the value of Z_1 or increase the value of Z_2 holding per capita income constant are of the redistributive type. The above results show that to reduce poverty level, equity-oriented policies are more effective than growth oriented policies.

IV. CONCLUSION

Kerala whose per capita income is not as high as other states of India is often found to be an outlier in its superior achievements in living standards, similar to Sri Lanka in the cross country studies. Our analysis shows that when we include public expenditures on social sectors as determinants of living standards, Kerala is not an outlier, not even in robust regression equations after controlling for initial conditions; growth in per capita income does not have significant effect on improvements in most measures of living standards. However, social expenditures always have significant positive effects; thus Kerala's superior achievements in living standards could be attributed to its high per capita government expenditures on social sectors.

We find that for most measures of living standards, a higher rate of public expenditures on social sectors is a more effective means of improving living standards of the rural poor in India than growth in per capita income alone. Reduction of the rural unemployment rate and provision of productive assets (i.e., land holdings for the poor) to the rural households are the most effective means of reducing poverty level. Higher public expenditures on education are more effective in raising literacy rate, while increased medical facilities and female literacy rate are more effective in reducing infant mortality and total fertility rates in India.

APPENDIX: THE BASIC DATA SET

The Components of XI[a]

States	% of villages Electrified		Road Length ka. per 100 sq. ka.		Population per Cinema House		No. of Permanent P.O. per lakh Popl		XI	
	1971	1978	1971	1978	1971	1978	1971	1978	1971	1978
1. Andhra Pradesh	***29.68***	***53.73***	***263.00***	359.00	37.00	31.00	26.00	29.00	0.53	0.62
2. Assam	***2.80***	***9.79***	***386.00***	528.00	89.00	96.00	9.00	13.00	0.27	0.33
3. Bihar	***11.46***	***26.94***	***670.00***	917.00	235.00	193.00	12.00	14.00	0.20	0.31
4. Gujart	***21.38***	***44.44***	***221.00***	303.00	71.00	65.00	17.00	23.00	0.39	0.51
5. Haryana	***80.86***	100.00	***306.00***	420.00	119.00	110.00	15.00	19.00	0.44	0.53
6. Karnataka	***31.04***	56.5 1	516.00	707.00	42.00	38.00	17.00	25.00	0.45	0.60
7. Kerala	***94.32***	96.53	3114.00	4260.00	33.00	27.00	15.00	17.00	0.74	0.84
8. Madhya Pradesh	***9.74***	***23.07***	190.00	260.00	120.00	178.00	6.00	14.00	0.21	0.27
9. Maharashtra	***34.09***	60.04	***316.00***	432.00	64.00	59.00	12.00	16.00	0.37	0.48
10. Orissa	***3.61***	31.13	367.00	502.00	246.00	196.00	15.00	25.00	0.19	0.40
11. Punjab	***50.70***	99.49	590.00	807.00	120.00	102.00	17.00	22.00	0.42	0.60
12. Rajasthan	***8.78***	30.02	146.00	200.00	161.00	139.00	13.00	25.00	0.24	0.43
13. Tamil Nadu	***70.96***	98.65	714.00	977.00	34.00	31.00	20.00	24.00	0.58	0.69
14. Uttar Pradesh	***18.41***	31.12	381.00	521.00	183.00	156.00	12.00	15.00	0.24	0.33
15. West Bengal	***7.79***	30.65	606.00	828.00	78.00	75.00	10.00	13.00	0.31	0.40
Average	***31.71***	52.81	585.73	80 1.40	108.80	99.73	14.40	19.60	0.37	**0.49**
s.d.	***29.46***	31.52	72 1.55	987.05	70.24	60.33	4.82	5.37	0.16	0.16

States	per capita rural income generated from agriculture X2 (at 70/71 prices)'		Rate of rural unemployment X3[a]		Participation rate of children X4[d]		Participation rate of female children X5[d]		In 77/78 % of total Revenue spent on Health Education F.Plan. X1p[e]	X2pe	X3pe
	1971	1978	(3) 1971	1978	1971	1978	1971	1978	1978	1978	I978
1. Andhra Pradesh	394.87	325.22	12.09	10.77	10.64	11.09	7.75	10.50	6.17	20.00	2.83
2. Assam	337.85	291.20	1.79	1.55	3.53	2.21	0.72	1.52	4.83	28.81	2.88
3. Bihar	246.65	214.06	10.59	8.17	4.64	1.93	2.05	0.98	5.71	27.08	2.63
4. Gujart	549.48	39 1.68	5.84	6.14	5.61	2.53	3.40	1.73	6.66	26.47	3.44
5. Haryana	693.45	653.21	3.78	6.83	3.32	1.64	0.73	0.79	5.23	18.84	4.51
6. Kamataka	461.76	379.8 1	9.89	9.32	7.55	5.89	4.31	4.52	6.59	22.18	2.36
7. Kerala	355.15	3 14.49	26.25	26.94	1.30	0.92	1.18	0.86	8.55	34.93	1.46
8. Madhya Pradesh	309.73	299.95	3.45	2.74	6.99	7.39	4.74	6.28	6.04	2.13	3.85
9. Maharashtra	304.31	360.93	9.69	7.37	6.06	3.60	4.91	3.69	4.43	19.57	3.70
10. Orissa	355.24	335.53	10.69	8.19	5.55	5.34	1.54	4.25	5.62	21.07	3.20
11. Punjab	841.88	743.08	4.45	4.88	4.87	2.02	0.12	0.31	5.22	22.72	4.15
12. Rajasthan	476.86	374.68	3.87	3.07	5.91	8.50	3.13	8.38	6.90	21.87	4.73
13. Tamil Nadu	325.75	289.02	13.79	16.60	5.59	7.11	3.57	6.05	8.10	22.94	1.96
14. Uttar Pradesh	322.44	266.98	3.64	3.97	3.87	1.23	1.61	0.59	5.15	22.32	3.49
15. West Bengal	385.68	327.72	11.27	9.75	3.03	2.00	0.69	0.94	9.15	21.47	2.56
Mean	424.07	371.17	8.74	8.42	5.23	4.23	2.70	3.43	6.29	22.16	3.18
s.d.	161.51	141.60	6.19	6.37	2.21	3.13	2.11	3.18	1.39	6.95	0.93

States	*The components of X6 the medical facilities available in different states*						*X6*		*A measure of old-age insecurity; no. of holdings as % of households, x7*	
	% of births attended by trained med. Doc.[b]		*Popln. served by a medical practitioner*[a]		*Population served by a nurse*[a]					
	(1)1971	*(2)1978*	*1971*	*1978*	*1971*	*1978*	*1971*	*1978*	*1971*	*1978*
1. Andhra Pradesh	12.10	16.80	4343.00	3010.00	6204.00	5242.00	0.51	0.60	34.7 1	36.87
2. Assam	7.80	10.60	3730.00	2872.00	7460.00	8370.00	0.49	0.53	49.49	N.A
3. Bihar	12.10	13.40	5626.00	4787.00	14065.00	12196.00	0.37	0.43	55.38	76.34
4. Gujart	10.50	10.70	3806.00	2735.00	8880.00	9787.00	0.49	0.52	17.43	17.91
5. Haryana	9.60	21.30	N.A.	N.A.	N.A.	11060.00	N.A	N.A	19.79	22.47
6. Kamataka	19.40	22.10	3656.00	2351.00	14625.00	16075.00	0.47	0.52	27.46	30.09
7. Kerala	51.80	55.80	4262.00	2908.00	5328.00	3266.00	0.75	0.85	79.91	92.98
8. Madhya Pradesh	8.70	6.30	8314.00	5819.00	10393.00	9102.00	0.29	0.39	26.20	28.69
9. Maharashtra	11.60	15.30	2287.00	1812.00	2516.00	2113.00	0.63	0.67	19.71	21.85
10. Orissa	14.20	12.10	5480.00	4000.00	10960.00	11780.00	0.42	0.45	38.76	40.78
I 1. Punjab	20.20	29.30	1127.00	939.00	1503.00	1226.00	0.73	0.80	30.41	35.11
12. Rajasthan	13.70	4.40	8570.00	4935.00	8570.00	7198.00	0.33	0.43	25.50	32.15
13. Tamil Nadu	29.80	39.70	2285.00	1857.00	2938.00	2437.00	0.73	0.81	51.17	60.25
14. Uttar Pradesh	5.53	5.40	7350.00	5204.00	29400.00	19330.00	0.08	0.28	76.90	80.24
15. West Bengal	18.20	22.00	1769.00	1693.00	8844.00	8012.00	0.61	0.64	42.84	54.36
Mean	16.35	19.01	447 1.79	3208.7 1	9406.14	8479.60	0.49	0.57	39.71	45.01
s.d	11.54	13.91	2352.7 1	1501.85	6993.51	5196.69	0.19	0.17	19.68	23.95

States	Components of X7(the old-age insecurity): number of holdings 0–1 hectare ('00)[c] 1971	number of holdings 0–1 hectare ('00)[c] 1978	number of rural households ('000)[f] 1971	number of rural households ('000)[f] 1981	an index of tax-effort X8[g] 1978	% of female agricultural laborer to total workers X9 1971	% of female agricultural laborer to total workers X9 1981	per capita expenditure on health (in Rs.) (4) Y1 (h) 1971	per capita expenditure on health (in Rs.) (4) Y1 (e) 1978	per capita expenditure on education (in Rs.) (4) Y2 (a) 1971	per capita expenditure on education (in Rs.) (4) Y2 (e) 1978
1. Andhra Pradesh	24916.00	28680.00	7179.00	8427.00	1.02	60.59	59.07	6.02	6.62	5.00	16.80
2. Assam	11204.00	13437.00	2264.00	N.A	0.78	4.83	N.A	5.11	5.56	9.00	22.54
3. Bihar	48743.00	72154.00	8802.00	10148.00	0.49	63.89	63.33	2.92	3.00	5.00	11.42
4. Gujart	5786.00	6557.00	3319.00	4039.00	1.06	45.93	48.08	7.67	7.69	9.00	23.43
5. Haryana	2501 .00	3079.00	1264.00	1486.00	1.07	21.92	22.00	7.50	9.90	N.A	20.78
6. Kamataka	10812.00	12742.00	3937.00	4556.00	0.84	45.41	49.72	5.53	6.72	9.00	19.50
7. Kerala	23980.00	30692.00	3001 .00	363 1 .00	1.14	48.35	43.55	7.18	8.80	15.00	34.24
8. Madhya Pradesh	16833.00	19781.00	6425.00	7398.00	0.91	46.99	40.61	4.87	5.97	7.00	1.45
9. Maharashtra	12419.00	15054.00	6300.00	7534.00	1.07	48.40	45.61	7.78	8.25	10.00	21.34
10. Orissa	14756.00	16660.00	3807.00	4385 .00	0.70	48.07	54.24	4.99	5.83	5.00	16.39
11. Punjab	5176.00	6374.00	1702.00	1936.00	1.27	10.08	25.29	7.38	10.91	14.00	28.19
12. Rajasthan	9400.00	13196.00	3687.00	4568.00	0.88	17.60	15.67	8.31	9.02	8.00	18.23
13. Tamil Nadu	31253.00	39512.00	6108.00	7042.00	1.10	46.70	53.43	6.69	7.94	10.00	20.01
14. Uttar Pradesh	104529.00	117734.00	13592.00	15841.00	0.92	35.76	35.23	3.23	4.33	5.00	13.01
15. West Bengal	25285 .00	3502 1 .00	5902.00	7033.00	0.73	38.21	39.43	6.12	8.68	8.00	16.70
Average	23172.87	28711.53	5152.60	6287.43	0.93	38.85	42.52	6.09	7.28	8.50	18.94
s.d.	25511.94	30189.92	3183.19	3703.84	0.20	17.57	14.04	1.64	2.13	3.16	7.45

Infant Mortality Rate[d]		*Total Fertility Rate*[f]	
Y6		*Y7*	
1972	*1978*	*1972*	*1978*
128.00	120.00	4.80	4.10
140.00	120.00	5.30	4.00
113.00	98.00	5.10	4.20
139.00	127.00	6.00	4.60
98.00	116.00	7.00	4.60
102.00	81.00	4.50	3.70
66.00	42.00	4.20	2.80
165.00	141.00	6.20	5.30
114.00	84.00	4.80	3.90
136.00	137.00	4.70	4.30
129.00	111.00	5.70	4.10
132.00	139.00	6.40	5.50
133.00	120.00	4.40	3.50
213.00	172.00	6.90	5.90
95.00	79.00	4.40	3.50
126.87	112.47	5.36	4.27
33.67	31.80	0.94	0.82

Sources: (a) "Regional Dimensions of India's Economic Development," proceedings of Seminar held at Nainital, India, on April 22–24, 1982, Planning Commission, Government of India, and State Planning Institute, Government of U.P.

(b) Pravin Visaria, "On Population," a background paper prepared for Economic Report on India, 1984.

(c) Reports of Centre for Monitoring Indian Economy, November, 1979 and October, 1981, Udyog Bhawan, Worli, Bombay.

(d) Survey on Infant and Child Mortality, 1979, Office of the Registrar General, India, Ministry of Home Affairs, New Delhi.

(e) Combined Finance and Revenue Accounts of the Union and State Governments in india for the year 1977–78.

(f) Census of India, 1971 and 1981, Office of the Registrar General, India, Ministry of Home Affairs.

(g) Chelliah, R.J., and N. Sinha (1982), "State Finances in India, Vol. 3, The Measurement of Tax Effort of State Governments, 1973–1976," SWP# 523, The World Bank.

(h) Pocket book of Health Statistics, 1975, Central Bureau of Health, Intelligence, Directorate General of Health Services, Ministry f Health and Family Planning, Government of India, New Delhi.

(i) Combined Finance and Revenue Accounts of the Union and State Governments in India for the year 1971–72; for Andra Pradesh, Haryana, Tanil Nadu and West Bengal, the data relate to 1973/74.

(j) Levels, Trends and Differentials in Fertility,1979, Vital Statistics Division, Office of the Registrar General, India, Ministry of Home Affairs, New Delhi.

(1) for 1970–72

(2) for 1976–78

(3) for 1972–73

(4) at 1970–71 prices

(5) Projected using $Y = a+bx$, where x = percentage of literate girls in the age group 5–14 years, the estimates for a and b are made on 1978 date.

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NOTE

1. However, the conclusion is not free from controversy. See Srinivasan (1983) for a discussion of the controversy and a survey of empirical findings on the issue.

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