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Economic Growth and Social Development: An Empirical Study on Selected States in India

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Abstract
The paper attempts to explore the relationship between economic growth and social development in India across states. The study uses panel regression technique to measure the impact of Economic Growth on Social Development of 16 states in India explaining the development process for the period spanning 1981 to 2009. The panel regression technique helps incorporate both the cross-section and time-series aspects of the data. In order to analyze the differences in impact of the explanatory variables on the explained variable across states, the study uses Fixed Effect Dummy Variable Model. The results reveal that most of the economic indicators have played a significant role for the reduction of death rate (Social Development Indicator) in the various states in India. The conclusion of the study is that economic growth has a desirable impact on social development, and that the impact is different for different states in India.
Keywords: Panel Regression, Fixed Effect Model, Economic Growth Indicators, Social Development Indicator.

1. Introduction

Welfare Maximization is the central goal of all government programs. Economic Growth and Social Development are the main instruments that promote this objective of the government. Economists often treat the two terms interchangeably; however, the terms are not synonymous. Economic Growth refers to a sustained increase in level of aggregate output per capita. It measures the rate at which value of goods and services increase. Economic Growth is often measured as rate of change in per capita GDP. Development on the other hand is a much broader concept. It aims at improving the overall well-being of the people of a country. Development refers to achieving a better standard of living for people, which includes a better education, sanitation and healthcare facilities, roads and rail infrastructure, agricultural technology, conservation of environment, etc.

One school of thought supports the view that economic growth helps social development. Economic growth leads to a high level of output and per capita income. High level of income leads to a rise in consumption, and investment. A rise in investment will in turn have a positive impact on infrastructural setup. This along with a rise in consumption will lead to a higher output being produced. This will further lead to an increase in income and assuming that price levels rise at a gentle pace, will lead to better living standards.

The opponents of this thought state that, economic growth is not conducive for social development. They point at instances where high level of output leads to concentration of wealth in the hands of few rich people, as against the many poor. This disparity leads to certain regions developing faster than some other regions, causing widespread migration from underdeveloped areas to developed areas; imposing unsustainable burden on resources in developed regions. This also leads to an added expenditure on part of the government on developed areas to support the addition burden imposed by the migrating population. This implies that the underdeveloped areas continue to remain poor and neglected, while the rich areas receive all the benefits. This kind of unbalanced growth process, economists suggest is not desirable.

A number of studies pertaining to economic growth and social development exist, however few gauge the impact of the former on latter. In this paper we attempt to show the impact of economic growth on social development. We try to establish a relationship between Foodgrain Production, Healthcare Services, Roads, Postal Network, Government Expenditure on Education, Sports, Arts and Culture, and consumption of petroleum products, which we have considered as economic growth indicators on death rate which is the social indicator. We have performed a panel data analysis to account for any differences in the social indicator that may occur across the Indian states.

The objectives of the present study are: (i) To examine the impact of economic growth on social development, (ii) To understand whether there are differences in the impact of economic growth on social development across the different states in India.

The remainder of the paper is organized as follows. Section 2 discusses literature relevant to the topic. Section 3 discusses the data, and enunciates the methodology used for analyzing the data. Section 4 analyzes the results obtained from the model. Section 5 summarizes and concludes the analysis.

2. Liiterature Review

Planning Commission in India was initiated in 1950. The main aim of the commission was to design programs that would promote sustained development and growth. However, the Planning Commission was not able to eliminate the inconsistent and distorted patterns in the development process. This unpredicted and haphazard growth of the Indian economy may be attributed to both endogenous and exogenous factors.

Exogenous factors include war, oil shocks, floods and droughts, and business cycles, as well as politically instable situations like black-marketing, hoarding, and lack of stability for the government. Anand (1998) and Mohammed, et. al. (1984) point out that corruption and vested interests amongst politicians and bureaucrats alike has hampered the growth process considerably. Gadgil (1977), Rudra (1985), Prasad (1973) and Kelkar et. al. (1990) cites endogenous factors for the distorted growth patterns observed in India's growth context. Some of these factors include central decision-making, a primary reason for optimal implementation failure due to inefficiency, time lags, and lack of motivation at grass root level. In addition, inappropriate policy pertaining to multi-sector models and excessive importance given to the role of public sector as a driver of economic and social development contribute toward a modest growth and development process. Further, unsuitable financial strategy, in terms of over-emphasis on investment as an engine of growth, and bias for consumer durables vis-à-vis basic and capital goods are some of the other reasons for the distortion in the growth and development story of India.

The Planning Commission of India has made attempts to promote balanced regional growth. The purpose of planned economic development program has been to achieve a rapid and sustainable rate of growth in the fundamental sectors of the economy with objective being eradication of poverty, reducing unemployment, and achieving self-sufficiency, and inducing efficient utilization of resources. Nayyar (2008) and Sinha et. al. (2002) studied the problem of convergence among the different states in India. These studies observe that the states in India are not converging to identical levels of per capita income but to different steady states. Ramaswamy (2007) examine some facets of regional employment growth. The study corroborates the widening interstate gap in income. Datt, et. al. (2002) and Tewari (2008) assert that some states have progressed at a rapid pace, while others have lagged behind. Thus, such unbalanced growth patterns depicted in the Indian growth process suggests that the efforts of the Planning Commission have not paid dividends.

Agricultural and industrial development has been identified as key sectors on which the success of an economy depends. Development of agriculture and industries is accompanied by infrastructural development, creating accessibility to remote areas. Consequently, more people move to these areas helping the growth of the economy promoting both private as well as public expenditure, and furthering the development process. Shalini, et. al. (2009) and Escobal (2001) advocate that infrastructure development, with emphasis on development of roads, helps development by increasing efficiency and reducing poverty.

Another area of contention is government expenditure as an engine of growth. Economists are divided on the impact of government expenditure on growth and development of the economy. Ram (1986) finds that government expenditure is actually an engine of growth. Landau (1983) on the other hand suggests that government expenditure negatively impacts the rate of economic growth. In the Indian context Rakshit (2004) supported by Bhaduri and Nayyar (1996), and Bhaduri (2005) observe that government expenditure crowds-in rather than crowding-out private expenditure, thus leading to economic growth and development.

Most of the literature discussed the impacts of some particular components of economic growth on social development. Some others have commented on the role of government in economic growth and social development. However, no study to our knowledge has been conducted on the objectives stated above in the Indian context for the stated time frame. The present paper will attempt to bridge this gap.

3. Methodology

The paper uses the least square dummy variable fixed effect panel regression model to examine the distributional bias of selected explanatory variables among the Indian States and the corresponding impact on death rate per thousand population of the states in India for the period 1981 to 2009. We consider 6 explanatory variables, viz. State-wise Production of Foodgrains in '000 tonnes (SPFOODG), Health Services: Number of Hospitals (HSHNO), State-wise Surface Road in Kilometers (SWSR), State-wise Postal Network and Traffic: Number of Post Offices (SWPN), Total Consumption on Petroleum Products in '000 tonnes (TCPP), and State Government Revenue Expenditure on Education, Sports, Arts, and Culture in crores of rupees (SGREXP). Death Rate per '000 population (DRPKP) in the selected 16 states in India serves as the dependent variable. The 16 major states

selected are, Andhra Pradesh (AP), Assam, Bihar, Gujarat, Haryana, Himachal Pradesh (HP), Karnataka, Kerala, Madhya Pradesh (MP), Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu (TN), Uttar Pradesh (UP), and West Bengal (WB).

Sources of data include Centre for Monitoring Indian Economy, and Reserve Bank of India Reports. By using software package SPSS, and EViews, we have checked the data for multicollinearity, stationarity and structural break, and corresponding usual econometric tests have been performed. In order to examine the differences in impact of economic growth on social development across the states, we consider a dummy variable for each of the 16 states.

3.1. Panel Dataset Structure

Panel dataset generally includes sequential blocks or cross-sections of data, and each cross-section component has a time-series associated with it. The data includes information on variables, viz. states, year, and the corresponding variables like, Death Rate (DRPKP), State-wise Production of Foodgrains (SPFOODG), Health Services, State-wise Surface Road (SWSR), State-wise Postal Network and Traffic (SWPN), Total Consumption on Petroleum Products (TCPP), and State Government Revenue Expenditure on Education, Sports, Arts, and Culture (SGREXP). Table 1 shows an excerpt of the dataset.

The dataset under consideration has two dimensions. There is a cross-sectional component of the observations, which is State (i), and a temporal orientation (t), given by Year. Even though time is nested within the cross-sections example, according to Lois Sayrs (1989), under some circumstances the cross-sections may also be nested within the time series. If there are no missing values, the dataset is called a balanced panel. On the other hand, in case of missing observations the dataset is referred to as unbalanced panel. In our analysis, we have used smoothing methods to account for missing observations. This has helped us construct a panel that is balanced.

3.2. Panel Regression Equation

In our analysis, in order to identify whether the Ordinary Least Square Estimates without group dummy variables are appropriate or Fixed/Random Effect Estimates are appropriate, we use Lagrange Multiplier Test. Significant LM values suggest Fixed/Random Effect Estimates. The Hausman Test gives whether a Fixed Effect or Random Effect Model is to be used. Significant Hausman Test values favor Fixed Effect Model, which introduce dummy variables to account for any discrimination in the mortality rate among the states.

In our analysis, we used Fixed Effect Panel Model with Constant Slope, but Differing Intercepts according to cross-section units (i), i.e. states. The formulation of the model assumes that differences across states can be measured by differences in the constant terms. In the model, each α_i is treated as an unknown parameter, which needs to be estimated. Let Y_i and X_i be the dependent and independent variables respectively, i is a T x 1 column vector of ones, and e_i is the error term, then the Fixed Effect Panel regression model is given as

$$\mathbf{Y_i = X_i \beta + i \alpha_{i+} e_i}$$

Collecting these terms gives

$$\mathbf{Y = \{X\ d_1\ d_2\ d_3\ \ldots..\ d_n\}\ \{\frac{\alpha}{\beta}\} + e}$$

Where, d_i is the dummy variable indicating the i^{th} unit.

Let nT x n matrix be D = $\{d_1\ d_2\ d_3\ \ldots..\ d_n\}$, α_i be the coefficient of dummy variable (intercept) and β (slope vector) be the coefficient of the explanatory variable.

Then, assembling all nT rows gives

$$\mathbf{Y = X^*\beta + D^*\alpha + e}$$

This model is called the Least Square Dummy Variable (LSDV) Model.

3.3. Panel Regression Equation for States

In our analysis we are using data on 16 states. Thus, to avoid the problem of dummy variable trap, i.e. a situation of perfect collinearity, we have used only 15 dummy variables for estimation. There is no dummy variable for the state AP. In other words, α_1 represents the intercept of AP and α_2, α_3… and α_{16}, the differential intercept coefficients, which indicate how much the intercepts of Assam, Bihar, …., and West Bengal differ from the intercept of AP. The names of the dummy variables are the corresponding state names or D_2, D_3,…., D_{16}. Therefore, the final Fixed Effect Panel Regression Equation is as follows.

DRKP = β_1 SPFOODG + β_2 HSHNO + β_3 SWSR + β_4 SWPN + β_5 TCPP + β_6 SGREXP + α_1 + α_2 Assam + α_3Bihar + α_4 Gujarat + α_5 Haryana + α_6 HP + α_7 Karnataka + α_8 Kerala + α_9 MP + α_{10} Maharashtra + α_{11} Orissa + α_{12} Punjab + α_{13} Rajasthan + α_{14} TN + α_{15} UP + α_{16} WB + e_{it}

By using state dummies as D's in the equation above yields

DRKP = β_1 SPFOODG + β_2 HSHNO + β_3 SWSR + β_4 SWPN + β_5 TCPP + β_6 SGREXP + α_1 + α_2 D_2 + α_3 D_3 + α_4 D_4 + α_5 D_5 + α_6 D_6 + α_7 D_7 + α_8 D_8 + α_9 D_9 + α_{10} D_{10} + α_{11} D_{11} + α_{12} D_{12} + α_{13} D_{13} + α_{14} D_{14} + α_{15} D_{15} + $\alpha_{16}D_{16}$ + e_{it}.....(1)

Where, D_2, D_3,…., D_{16} are 15 dummy variables against 15 states, e_{it} is the error term.

The β's in Equation (1) gauge the impact of the respective explanatory variable on the dependent variable, ceteris paribus. The term, β_1 SPFOODG, β_1 indicated the regression coefficient of the explanatory variable SPFOODG, which explains the impact of State Foodgrain Production on the Death Rath within the state.

4. Empirical Investigation

The dependent variable in our analysis is State-wise Death Rate per thousand population(DRPKP) in India; the explanatory variables are State-wise Production of Foodgrains (SPFOODG), Health Services (HSHNO), State-wise Surface Road (SWSR), State-wise Postal Network and Traffic (SWPN), Total Consumption on Petroleum Products (TCPP), and State Government Revenue Expenditure on Education, Sports, Arts, and Culture (SGREXP).

The general panel regression model is given below.

DRPKP = C(1)*SPFOODG + C(2)*HSHNO + C(3)*SWSR + C(4)*SWPN + C(5)*TCPP + C(6)*SGREXP + C(7)*D2 + C(8)*D3 + C(9)*D4 + C(10)*D5 + C(11)*D6 + C(12)*D7 + C(13)*D8 + C(14)*D9 + C(15)*D10 + C(16)*D11 + C(17)*D12 + C(18)*D13 + C(19)*D14 + C(20)*D15 + C(21)*D16 + C(22)

The parameters were estimated using EVIEWS. The estimated results are as follows (Detail in Table II).

DRPKP = 0.0001096998743*SPFOODG + 6.487077904e-005*HSHNO + 1.320166661e-005*SWSR - 0.002033208472*SWPN - 0.0008854758181*TCPP - 9.030676384e-005*SGREXP - 24.96676112*D2 - 8.650302911*D3 - 11.96536088*D4 - 31.46422601*D5 - 34.22870817*D6 - 18.15805175*D7 - 26.87165997*D8 - 14.80188516*D9 - 8.20084333*D10 - 19.80234913*D11 - 30.099336*D12 - 11.63108478*D13 - 6.562473647*D14 + 9.951313117*D15 - 16.55698107*D16 + 50.55489943 .(2)

The results obtained show that except for HSHNO, and SGREXP, all the estimated coefficients of equation (2) are individually significant, as their p-values of the estimated t-coefficients are small. The estimated coefficients of explanatory variables SPFOODG, SWPN, and TCPP are individually highly significant, and their t-statistics are very high, and p-values are very small. The estimated coefficient for SWSR is significant at 10% level. It is found that the coefficient for HSHNO and SGREXP are not significant to explain the dependent variable Death Rate and the coefficient of HSHNO is very close to zero.

The coefficients of dummy variables give the intercept values and they are statistically different for different states and the coefficient values are 50.56 for A.P., 75.53 (50.56 + 24.97) for Assam, 59.21 (50.56 + 8.65) for Bihar, 62.53 (50.56 + 11.97) for Gujarat, 82.02 (50.56 + 31.46) for Haryana, 84.79 (50.56 + 34.23) for H.P., 68.72 (50.56 + 18.16) for Karnataka, 77.43 (50.56 + 26.87) for Kerala, 65.36 (50.56 + 14.80) for M.P., 58.76 (50.56 + 8.20) for Maharashtra, 70.36 (50.56 + 19.80) for Orissa, 80.66 (50.56 + 30.10) for Punjab, 62.19 (50.56 + 11.63) for Rajasthan, 57.12 (50.56 + 6.56) for T.N., 40.61 (50.56 – 9.95) for U.P. and 67.12 (50.56 + 16.56) for W.B. It is found from the estimated coefficients that the impact of the selected economic indicators on mortality rate is higher in case of Himachal Pradesh, followed by Haryana and Punjab. The states of Uttar Pradesh, Tamil Nadu and Maharashtra have shown the least impact of the explanatory variables. Thus, we may infer the estimated results support that the impact asymmetry amongst states exists.

We can see from Table 2 that value of R^2 is 0.75. This implies that the explanatory variables explain about 75% variation in the dependent variable. The Durbin-Watson statistic of 1.31 indicates that there is no autocorrelation in the data.

5. Summary and Conclusions

The study conducted for investigating the impact of Economic Growth on Social Development of 16 states in India yields that the Economic Growth reduces the mortality rate for the period spanning from 1981 to 2009. We have used panel regression technique to incorporate both the cross-sectional, and time dimensional aspects of the data. The paper reveals that most of the economic indicators have played a significant role for the reduction of

death rate in the various states in India. Productions of Foodgrains, Postal Network, and Consumption of Petroleum Products, have a desirable impact on death rate. These are also statistically significant. On the other hand, Health Services and Roads seem to have a positive relationship with death rate. However, this impact is negligible and is statistically insignificant too. Government Revenue Expenditure on Education, Sports, Arts, and Culture too has a desirable impact, but the coefficient is not statistically significant.

The coefficient values of the dummy variables indicate that there the impact of economic growth indicators on the reduction of death rate is different among the states of India. It has also been found that maximum impact of economic growth on social development indicator has been in the states of Himachal Pradesh, Haryana, and Punjab, while minimum impact has been noticed in Uttar Pradesh, Tamil Nadu, and Maharashtra.

From our analysis, we may thus conclude that economic growth generally has a positive impact on social development. We further observe that this impact differs from one state to the other.

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Table I: Panel Data Structure

States	Year	DRPKP	SPFOODG	HSHNO	SWSR	SWPN	TCPP	SGREXP
AP	1981	18.70	9991.60	608	57455	16150	1759	434
AP	1982	18.30	11413.10	608	65457	16167	1756	454
	.	.	.	.	.	.	.	.
AP	2009	17.40	19846.33	4630	143319	16129	7676	10520
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
MP	1981	18.60	12411.90	268	55525	9876	1102	290
MP	1982	18	12834.20	269	55525	10120	1199	297
	.	.	.	.	.	.	.	.
MP	2009	7.80	12070.50	435	104256	12031	4530	5078
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
WB	1981	19.10	8281	402	25322	7931	2178	456
WB	1982	1830	5649.70	403	25393	7862	2282	467
	.	.	.	.	.	.	.	.
WB	2009	11.64	16523.91	413	57606	9057	5238	8551

Table II: Estimated Results

Dependent Variable: DRPKP				
Method: Least Squares				
Included observations: 464				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
SPFOODG	0.000110	4.70E-05	2.336399	0.0199
HSHNO	6.49E-05	0.000204	0.317220	0.7512
SWSR	1.32E-05	7.75E-06	1.702977	0.0893
SWPN	-0.002033	0.000233	-8.737003	0.0000
TCPP	-0.000885	0.000152	-5.810931	0.0000
SGREXP	-9.03E-05	9.27E-05	-0.973827	0.3307
D2	-24.96676	2.826634	-8.832684	0.0000
D3	-8.650303	1.268261	-6.820603	0.0000
D4	-11.96536	1.840378	-6.501579	0.0000
D5	-31.46423	3.186605	-9.873904	0.0000
D6	-34.22871	3.057330	-11.19562	0.0000
D7	-18.15805	1.714961	-10.58802	0.0000
D8	-26.87166	2.589414	-10.37751	0.0000
D9	-14.80189	1.452911	-10.18774	0.0000
D10	-8.200843	1.364914	-6.008323	0.0000
D11	-19.80235	1.953261	-10.13810	0.0000
D12	-30.09934	3.034296	-9.919710	0.0000
D13	-11.63108	1.590701	-7.311922	0.0000
D14	-6.562474	1.358092	-4.832128	0.0000
D15	9.951313	1.127287	8.827666	0.0000
D16	-16.55698	1.924184	-8.604675	0.0000
C	50.55490	3.604114	14.02700	0.0000
R-squared	0.747169	Mean dependent var		14.77414
Adjusted R-squared	0.735157	S.D. dependent var		3.882400
S.E. of regression	1.997997	Akaike info criterion		4.268421
Sum squared resid	1764.461	Schwarz criterion		4.464708
Log likelihood	-968.2736	F-statistic		62.20013
Durbin-Watson stat	1.307587	Prob(F-statistic)		0.000000