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Erratum

The correct name of the co-author of this article is Kant Patel. Professor Patel's institutional affiliation is Southwest Missouri State University (not the University of Houston). Professor Patel's co-author, Roger Durand is affiliated with the Department of Health and Human Resources Administration, Washington, D. C.

A Comparative Analysis of Public Health Expenditures in the States of India and the United States: A Two-Nation Test of Some Alternative Models

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ABSTRACT

This paper seeks to account for inter-state variations in public health expenditures in an economically "have" nation, the United States, and in a "have-not" nation, India. Three theoretical models, derived from studies of social welfare expenditures in the American state, are formalized and tested in both societies. Though not a major objective of this paper, a relatively unknown method of model testing with important advantages for comparative research is described. The principal findings of this paper are as follows. One of the models tested here, that associated with the work of Dye and Dawson and Robinson, is found to explain variations in the budgetary proportions the American states devoted to public health. None of the models, however, is able to account for inter-state differences in per capita spending for health in the United States. Finally, none of the theoretical models is able to explain variations among the Indian states either in per capita spending or in the budgetary share devoted to public health. Possible reason for the limitations of the models are discussed.

In recent years the determinants of policies and expenditures of sub-national governments have become subjects of considerable scholarly research. While such research has largely focused on the American states (see Dye, 1966; Sharkansky, 1968; Hofferbert and Sharkansky, 1971; Brady and Murray, 1975; Gray, 1976), several important cross-cultural, cross-national investigations have also been conducted. For example, Hogan (1972) examined the relative influence of socioeconomic and political variables on the expenditures of Mexican states and Canadian provinces. Similarly, Glassberg (1973) reported on the linkage between voting behavior and policy outputs in New York and London.

Authors' Note: The authors are grateful to David Brady and Kim Quaile Hill for their admonitions regarding an earlier draft.

The results of these studies have yielded important insights into the causes of variation in subnational, government expenditures and, especially, into the relative influence of socioeconomic and political variables in accounting for variation. A number of significant gaps remain, however, both in knowledge and in theory development. First, most studies have involved multivariate statistical analysis to the important end of data reduction. Few, however, have sought to estimate coefficients in a theoretical model and to test hypotheses about such a model in different cultural settings. Accordingly, there are almost no cross-cultural theories of why relatively autonomous, subnational governments spend as they do. Second, only a limited number of comparative investigations have involved nation-states which stand at the extremes of affluence and poverty. Yet, Peters (1972) has persuasively demonstrated that at the societal level the influence of political as opposed to socioeconomic indicators on social expenditures is likely to depend upon the level of economic development. Specifically, his evidence indicates that political variables are more important in accounting for the social expenditures of transitional societies while economic variables are more important for societies that have attained the modern stage of development. A further exploration of differences between wealthy and impoverished nations, then, seems essential to an understanding of subnational expenditures. Finally, several major policy areas remain relatively neglected topics of study, even in the American context. For example, despite recent popular interest in national health insurance and health care delivery systems in the United States, states' spending on public health has not received the same attention accorded welfare and education.

The present paper seeks to increase our knowledge and theory by formulating and testing alternative models of states' public health expenditures in India and the United States. In addition, though not a major objective of this study, a relatively unknown method of model testing with several advantages for comparative research will be described. Three theoretical models will initially be derived from existing studies of the social welfare expenditures of the American states. Following an examination of public health policies, these alternative models will then be tested cross-comparatively for their ability to account for inter-state variations in health spending in both India and the United States.

The Indian and American states have been selected here for investigation for several important reasons. Both India and the United States are federal systems whose states enjoy considerable autonomy in making expenditure decisions. Also, both countries are politically and socioeconomically

diverse with substantial subnational variations in such important factors as interparty competition and economic development. And both have competitive political parties, operating in free elections,¹ which encourage popular participation. On the other hand, they stand at the extremes of affluence and poverty and thus afford a comparison of subnational, government expenditures in a "have" and a "have-not" nation.

THEORIES OF SUBNATIONAL VARIATIONS IN EXPENDITURES

At least three theoretical models of variations in welfare expenditures may be found in recent studies of spending by the American states. The first of these models has its origins in the writings of V.O. Key, Jr. and Duane Lockard. In his monumental study of *Southern Politics*, Key (1949; 307) emphasized the importance of inter-party competition—or its absence—to programmatic politics. More specifically, Key took party competition or bifactionalism as the primary indicator of the degree to which politics was "organized" or "disorganized" within a state. An organized politics, he hypothesized, was necessary to the promotion of programs which benefit the socially disadvantaged. On the other hand, in a disorganized politics, he predicted, the disadvantaged could not effectively promote their interests and thus would "lose" in the long-run.

Key's hypotheses received further elaboration by Duane Lockard. In his study of the politics of the New England states, Lockard (1959; 336-337) suggested that inter-party competition is more likely to flourish in states characterized by relatively complex, developed economics. He then showed that two-party competitive states were inclined to spend more for social welfare programs (including aid to the blind, old-age assistance, and aid to families with dependent children) than were their one-party counterparts.

Formally, these ideas and findings may be expressed by the following mathematical model:

¹As of this writing, free elections have been suspended in India. Nevertheless, the data used in this paper derive from a period in which elections in India were free and open.

$X_1 \text{ (exogenous)}$ $X_2 = b_{21}X_1 + u$ $X_3 = b_{32}X_2 + v$	<p style="text-align: center;">Model I</p> $X_1 \quad X_2 \quad X_3$
---	--

Where X_1 is economic development, X_2 is inter-party competition, X_3 is social welfare spending, and u and v are errors or disturbances.

For convenience of mathematical expression, all variables in this model are assumed to be measured from their respective means. This assumption may be expressed in the language of expectations² or expected values:

$$E(X_1) = E(X_2) = E(X_3) = E(u) = E(v) = 0$$

Finally, a test of this model requires the following specification on the "errors" or "disturbances:"

$$E(X_1u) = E(X_1v) = E(X_2v) = 0$$

That is, the disturbance in each equation has an expected covariance of zero with the variables predetermined in that and all previous equations in the model. From this specification it also follows that the disturbances themselves have an expected zero covariance (i.e. are "uncorrelated"):

$$E(u,v) = 0$$

(The importance of this specification to model testing is discussed below.)

The second theoretical model of expenditures is most closely associated with the work of Thomas Dye (1966) and that of Richard Dawson and James Robinson (1963). According to this model, economic development is a determinant of party competition and of many policy outputs in the American states. Party competition, however, tends to have almost no independent effect on outputs. Rather, most of any relationship between party competition and policy outputs is a resultant of associations between economic development and party competition, and between development and outputs. Variations in the expenditures of states are thus determined by differences in levels of economic development and not by differences in inter-party competition.

This model may be formally expressed in the following manner:

$X_1 \text{ (exogenous)}$ $X_2 = b_{21}X_1 + u$ $X_3 = b_{31}X_1 + v$	<p style="text-align: center;">Model II</p>
---	---

Where all symbols are the same as above.

²For the reader unfamiliar with the algebra of expectations, see Hays (1963), Appendix B.

This model requires the following specifications on the disturbances:

$$E(X_1, u) = E(X_1, v) = E(u, v) = 0$$

Again,

$$E(X_1) = E(X_2) = E(X_3) = E(u) = E(v) = 0$$

A third model of expenditures in the American states was recently formalized and tested by Charles Cnudde and Donald McCrone (1969). This model suggests that economic development has a direct effect on social welfare expenditures as well as an indirect effect via party competition. That is, a state's welfare spending is directly determined by that state's level of economic development. In addition spending is also indirectly determined by development through the intervening variable of inter-party competition.

Expressed formally,

$$\begin{array}{ll} X_1 \text{ (exogenous)} & \text{Model III} \\ X_2 = b_{21}X_1 + u & \\ X_3 = b_{32}X_2 + b_{31}X_1 + v & \end{array}$$

Where all symbols are the same.

Again,

$$E(X_1) = E(X_2) = E(X_3) = E(u) = E(v) = 0$$

The requisite specifications on the disturbances for this model are as follows:

$$E(X_1, u) = E(X_1, v) = E(X_2, v) = E(uv) = 0$$

To date, neither this nor the other two theoretical models of expenditure variation have been tested cross-nationally. The principal aim of this paper is to provide such a test with respect to public health expenditures in India and the United States. Before doing so, however, public health policies in these two nation-states will be examined.

PUBLIC HEALTH POLICY IN INDIA AND THE UNITED STATES

Health is an important public policy area in both India and the United States and in recent years has received increased attention from policy makers. In India major developments and changes in the public health field came after independence in 1947. During the earlier, colonial period, families and religious institutions were primarily responsible for the care of the infirm. But with independence, the national government and the states committed themselves to programs intended to provide minimally adequate health care to all persons (Woytinsky, 1969).

Despite considerable national legislation, however, the role of the central government of India in public health has generally been quite limited. The central government has been involved in nation-wide planning, international health, and research in addition to providing some financial assistance. But actual health services and health policy making are a state responsibility. In fact, the Constitution of India specifically charges the states with these obligations (Hilleboe, Barkhuus, and Thomas, 1972).

This constitutional autonomy of the states in the area of public health is reflected in considerable inter-state variation in health expenditures. Table 1 displays the percentage of each state's total budget devoted to public health as well as per capital health expenditures for the fiscal year 1968-69 — the most recent year for which complete and reliable data could be obtained.³ As the table indicates the State of Rajasthan devoted almost 11 percent of its operating budget to public health; in contrast, Gujarat devoted only 4.36 per cent of its budget to this area. Considering per capita expenditures, Jammu and Kashmir spent about 8.5 rupees per person compared to the only 2.47 rupees expended by Gujarat. Such figures are indicative of substantial variations in the ways the Indian states have chosen to exercise their public health responsibilities.

³Because we strongly suspect that the data reported for Uttar Pradesh was erroneous, this state has been completely omitted from our analysis. When the analysis was done with Uttar Pradesh included, no significant differences were found.

TABLE 1

Public Health Expenditures of Indian States, 1968-69

<i>State</i>	<i>Percent of Total Budget on Public Health</i>	<i>Per Capita Expenditures in Rs</i>
Andhra Pradesh	8.33	3.92
Assam	7.26	4.45
Bihar	8.80	2.50
Kujarat	4.36	2.47
Haryana	6.25	4.13
Jammu & Kashmir	7.23	8.54
Kerala	9.77	6.62
Madhya Pradesh	9.11	3.93
Madras (Tamilnadu)	7.37	4.42
Maharashtra	8.36	5.36
Mysore	6.71	4.19
Orissa	6.98	3.89
Punjab	7.19	6.02
Rajasthan	10.89	5.99
West Bengal	9.00	4.36
	Mean: 7.62	Mean: 4.53
	Standard	Standard
	Deviation: 1.59	Deviation: 1.58

Source: *Statesmen's Yearbook*, 1968-69.

Public health in the United States, by way of comparison, has witnessed a growing and increasingly diversified involvement on the part of the national government. In spite of this growing federal involvement, however, public health continues to be one of the primary responsibilities of the American states. State governments generally provide supervision over local health departments, financial assistance to localities and, through state health departments, health care in areas without local health agencies. Probably the most important state responsibility, however, is the provision of specialized state hospitals for the care of the mentally ill and for those who have contracted tuberculosis and cancer. Such hospitals are operated directly by the states and are intended to make available services that local governments could not afford (See Dye, 1973; 478-81).

As is true in India, the American states are not equally involved in the provision of health services and facilities. Differences in the extent of state activity are again suggested by the proportion of each state's budget allocated to health and by the amounts expended per capita. Table 2 represents these data for fiscal year 1968-69 — the same year considered above for India. As the table indicates, Georgia devoted the largest

budgetary share to public health: nearly 11.5 per cent of its total budget was spent in this area. In contrast, South Dakota devoted only 3.23 per cent to health. Considering per capita expenditures, New York ranked first among the states having spent over \$84 per person while South Dakota again qualified for last place by spending only about \$19.50 per person. Thus there is considerable inter-state variation in the commitment of resources to public health.

TABLE 2

Public Health Expenditures of American States, 1968-69

<i>State</i>	<i>Percent of Total Budget on Public Health</i>	<i>Per Capita Expenditure in \$</i>
Alabama	8.11	36.07
Alaska	3.41	41.65
Arizona	4.65	26.81
Arkansas	6.44	28.54
California	6.39	49.94
Colorado	7.29	44.16
Connecticut	6.61	38.48
Delaware	5.58	39.40
Florida	9.18	44.53
Georgia	11.49	54.62
Hawaii	5.73	45.74
Idaho	6.68	33.16
Illinois	6.66	37.14
Indiana	7.74	37.64
Iowa	5.87	34.94
Kansas	7.09	35.94
Kentucky	5.72	28.66
Louisiana	7.60	40.18
Maine	4.97	23.87
Maryland	7.98	49.07
Massachusetts	7.72	49.16
Michigan	7.74	47.58
Mississippi	7.21	31.42
Missouri	8.16	39.78
Montana	4.51	26.28
Nevada	8.85	68.03
New Hampshire	5.91	28.68
New Jersey	6.19	32.75
New Mexico	5.35	32.57
New York	10.30	84.13
North Carolina	7.40	28.86
North Dakota	3.40	21.26
Ohio	6.13	29.08

Table 2 continued on page 48

TABLE 2

Public Health Expenditures of American States, 1968-69

<i>State</i>	<i>Percent of Total Budget on Public Health</i>	<i>Per Capita Expenditure in \$</i>
Oklahoma	5.80	29.73
Oregon	4.93	30.85
Pennsylvania	5.39	27.58
Rhode Island	6.04	36.02
South Carolina	9.54	36.28
South Dakota	3.23	19.41
Tennessee	8.96	38.80
Texas	6.49	28.69
Utah	4.70	27.59
Vermont	3.79	24.18
Virginia	6.89	31.41
Washington	5.61	36.49
West Virginia	5.88	27.33
Wisconsin	6.05	39.41
Wyoming	7.11	67.58
	Mean: 6.55	Mean: 37.32
	Standard	Standard
	Deviation: 1.75	Deviation: 12.41

Source: *Government Finances*, 1968-69.

MODEL TESTING

Having considered public health policy and inter-state variations in health expenditures in both India and the United States, the three alternative models of spending will now be tested in both nation-states. The two measures just discussed, the proportion of each state's budget devoted to public health and a state's per capita health expenditures, constitute the dependent variables for purposes of model testing. Data on these two measures for India were obtained from the *Statesmen's Yearbook* for fiscal year 1968-69. As already noted, this was the most recent year for which complete and reliable data could be obtained. To insure comparability, data on these same two measures were also gathered for the same fiscal year from *Government Finances in 1968-69*.

It proved considerably more difficult to obtain comparable measures of states' economic development and inter-party competition for both countries. *Conceptually similar*, though by no means identical, scales of economic development were constructed from the results of a series of factor analyses. The final factor solution for each country is presented in Table

3. The measures included in the analyses for India were obtained from the 1971 *Census of India*; those for the United States from the *U.S. Census of Housing and Population, 1970*. The development scale for each country was constructed by additively combining the variable listed in Table 3 after weighting each variable by its respective factor score coefficient.⁴

TABLE 3

*Economic Development Factors for the States of India
and the United States^a*

<i>India</i>		<i>United States</i>	
Electricity consumption per capita	.899	Median School years completed	.980
Per capita income	.747	Percent black in the population	-.725
Gross industrial output	.671	Median family income	.588
Number of motor vehicles/10,000 persons	.610	Percent engaged in manufacturing	-.428
Percent literate in the population	.499	Percent living in urban areas	.336
Eigenvalue	2.95396	Eigenvalue	2.52114

^aEntries denote factor loadings of variables derived from principal factors solution. Factors were rotated to varimax criteria.

Comparable, cross-national measures of inter-party competition were difficult to obtain largely owing to the existence of a multi-party system in India. The measure finally selected for India is one involving the difference between the number of seats held by the party with the largest representation in a state's lower legislative house and the number held by the party with second largest representation in that same house. The smaller the difference between the shares of seats, the more competitive the parties are considered to be; the larger the difference, the less competitive.⁵ Allocations of legislative seats which resulted from elections held in 1967 were used.

This measure of competition was utilized for two important reasons. First, since this research is concerned with state policies, it was deemed important to employ a measure based upon party apportionment in state legislatures. Second, India's political system is modeled after the British system wherein the lower house is the more powerful, both traditionally and constitutionally, of the two state houses.

⁴On this conventional scaling procedure see Kerlinger (1973), chapter 29.

⁵On measures of party competition see Gopal and Hahn (1966), Rae (1967), and Milder (1974). A second measure of party competition for India was also employed: the percentage of seats held by the largest party in a state's lower house. Nearly identical results were obtained using this measure.

The measure chosen for the United States is one previously employed by Thomas Dye (1966; 54-59) in his study of state policy outputs. It is simply the percentage of seats held by the majority party in a state's lower house.⁶ This indicant was calculated from the apportionment of seats in the session immediately following the 1968 state elections.

Most studies of the determinants of expenditure variations either have employed correlational techniques or have made use of standardized regression coefficients. Unfortunately, neither methodology is satisfactory for comparative research. As Otis Dudley Duncan has demonstrated (1975; Chapter 4) it could happen that the structural parameters or coefficients of a model are identical of two or more populations under study. Yet, if only the variance in the exogeneous variable(s) of the model differ(s) from population to population, differences, would in general be observed between the populations in all the correlations and in all the standardized regression coefficients. That is, estimates of population correlations and standardized coefficients will (in general) suggest that the populations differ in only one: the variance of the exogeneous variable(s). It is, therefore, possible to draw erroneous inferences about the comparative nature of theory through the use of these strength of association measures.

Such erroneous inferences can be avoided by not expressing the variables in standard form (i.e. dividing out the variances) when calculating ordinary-least-squares estimates of the coefficients in the model. In this way differences between the objects of explanatory interest, the structural coefficients of the model, and the variances and covariances that describe the joint distribution of the variables in a population will not be obscured. This is the procedure followed here. (For an extended discussion and elaboration see Duncan, 1975).

The concern of the paper, however, is not merely in testing a single model in two populations but in choosing among three models in both India and the United States. To demonstrate the method of model testing and selection employed here, the proportion of each state's budget spent on public health will be used as the dependent variable. Observe that one dif-

⁶The Pearson's correlation between the percentage of seats held by the Democratic Party in state senates and state lower houses was .969. This high correlation indicates that almost nothing could have been gained by including the partisan distribution of seats in upper state houses.

Because the legislatures of Nebraska and Minnesota are nonpartisan, these two states are omitted from the remainder of this analysis.

ference between Model III and Models I and II is that Model III contains the following prediction not contained in the others:

$$X_3 = b_{32}X_2 + b_{31}X_1 + v \quad (\text{Eq. A})$$

Where symbols are as noted above.

If this prediction is sustained by the data, then Model III receives some support and the other prediction equation in the model may then be tested. If it is not sustained by the evidence, however, Model III may be rejected and Models I and II considered.

To determine if the prediction (Eq. A) is supported by the data is to estimate the structural coefficients in the equation. This estimation was accomplished using a method described by Duncan (1975). The method involves calculating the coefficients from estimates of population variances and covariances which can be computed from available data. As will be seen, the principal advantage of this approach is that it shows directly how a model generates the observable covariances. To illustrate, Eq. A was first multiplied by one of the variables predetermined in the equation (either X_1 or X_2). Taking X_1 ,

$$X_1X_3 = b_{32}X_1X_2 + b_{31}X_1X_1 + X_1v$$

Taking expectations or expected values,

$$E(X_1X_3) = b_{32}E(X_1X_2) + b_{31}(X_1X_1) + E(X_1v)$$

Then, making use of the fact that the expected value of (X_1X_1) is equal to the variance of X_1 ; the expected value of $(X_1v) = 0$ by assumption (see Model III above); and that the expected value of $(X_iX_j) = \text{covariance of } X_iX_j \text{ where } i \neq j \text{ yields,}$

$$\sigma_{13} = b_{32}\sigma_{12} + b_{31}\sigma_{11} \quad (\text{Eq. B})$$

Where σ_{13} and σ_{23} are covariances and σ_{11} is the variance in X_1 . (It is important to note that the variables are not in standard form. If they were, σ_{11} would equal unity and Eq. B could be further reduced.) The covariance between the dependent variables (X_3) and X_1 has thus been expressed as a function of the structural coefficients in Eq. A (the b's), the covariance between X_1 and X_2 , and the variance in X_1 .

Next, Eq. A was multiplied by the other predetermined variable in the equation, X_2 , and expectations taken,

$$\sigma_{23} = b_{32}\sigma_{22} + b_{31}\sigma_{21}$$

Where σ_{23} and σ_{21} are covariances and σ_{22} is the variance in X_2 . Again, an expression was obtained which relates covariances, the structural coefficients of the model, and a variance term.

Then the structural coefficients in Eq. A could be calculated. Observe that the procedures just employed resulted in two new equations (B and C) in two unknowns (b_{31} and b_{32}) and in five terms (variances and covariances) which, because they could be computed directly from the data, are "known" terms. Thus the unknown terms, the structural coefficients, could easily be solved uniquely.

Tables 4 and 5 present the variances and covariances for the variables in the models for India and the United States, respectively. Substituting into equations B and C with the proportion of total state spending on public health as the dependent variable:

India	$(-.4402) = b_{32}(-.3488) + b_{31}(.8575)$
	$(2.2804) = b_{32}(336.678) + b_{31}(-.3488)$
United States	$(-.6835) = b_{32}(7.1346) + b_{31}(.988)$
	$(-4.9096) = b_{32}(213.551) + b_{31}(7.1346)$

Solving both sets of equations simultaneously produced the following values:

India	$b_{32} = .00624$	$b_{31} = -.51081$
United States	$b_{32} = -.0015$	$b_{31} = -.68355$

Substituting these values into Eq. A for both India and the United States,

India	$X_3 = .00624X_2 - .51081X_1$
	S.E. .02382 .47196
	F .069 1.171
	$R^2 = .09$
United States	$X_3 = -.0015X_2 - .68555X_1$
	S.E. .01881 .27518
	F .000 6.170
	$R^2 = .15$

As an aid to model acceptance or rejection, standard errors and F-ratios have also been calculated and included along with the equations.

TABLE 4
Variances and Covariances Computed for India^a
N = 15

	<i>Economic Development</i>	<i>Party Competition</i>	<i>Health Percent of Budget</i>	<i>Per Capita Health Spending</i>
Economic Development	.8575			
Party Competition	-.3488	336.678		
Health Percent of Budget	-.4402	2.2804	2.5304	
Per Capita Health Spending	.1345	-12.6584	.7952	2.4844

^aDiagonal entries denote variances; off-diagonal entries denote covariances.

TABLE 5
Variances and Covariances Computed for the United States^a
N = 48

	<i>Economic Development</i>	<i>Party Competition</i>	<i>Health Percent of Budget</i>	<i>Per Capita Health Spending</i>
Economic Development	.9982			
Party Competition	7.1346	213.551		
Health Percent of Budget	-.6835	-4.9096	3.0576	
Per Capita Health Spending	1.8289	29.6688	14.2869	154.1298

^aDiagonal entries denote variances; off-diagonal entries denote covariances.

An examination of these structural coefficients (b's) and associated statistics indicate that Eq. A is not supported by the data for either India or the United States. For India the standard error of each coefficient is quite large and the corresponding F-ratio quite small. Thus the coefficients do not approach statistical significance at the .10 level—the level of type I error used throughout this paper. For the United States, the b_{31} coefficient (-.68355) is considerably larger than its associated standard error and the corresponding F-ratio indicates that this coefficient is statistically signifi-

cant from zero. Since all coefficients in an equation must differ from zero at statistically significant levels in order for the equation to be supported by the data, Eq. A cannot be accepted for either country. Furthermore, as a consequence of failing to accept Eq. A for both countries with respect to percentage of the budget devoted to public health, Model III in which this prediction is found must be rejected.

Using identical reasoning and procedures, the ability of Model III to account for variations in states' per capita health expenditures was then tested. Values for structural coefficients were again calculated from the variances and covariances presented in Tables 4 and 5. Standard errors and F-ratios were also calculated. The results were as follows,

India	$X_3 = -.03745X_2 + .14164X_1$
	S.E. .0220 .43997
	F 2.845 .104
	$F^2 = .20$
United States	$X_3 = .10210X_2 + 1.10229X_1$
	S.E. .14276 2.08797
	F .512 .279
	$R^2 = .03$

These results are generally the same as those obtained above for proportion of the budget devoted to public health. That is, the equation cannot be accepted for either country since the structural coefficients have high corresponding standard errors and fail to differ significantly from zero as indicated by the F-ratios. Accordingly, Model III may also be rejected as an explanation for variations in per capita health expenditures in India and the United States.⁷

Having rejected Model III, Models I and II were then tested. Structural coefficients were calculated for the equations in these models according to the procedures outlined above. Standard errors and F-ratios for the coefficients were also computed. The results are presented in Tables 6 and 7.

⁷Scatterplots of residuals were examined for evidence of curvilinearity and heteroscedasticity. No evidence of either nonlinearity or heteroscedasticity was detected in any of the relationships for India. For the United States, however, some evidence of curvilinearity was found in the relationship between economic development and party competition. Also, heteroscedasticity was found in the scatterplot of residuals obtained after fitting Eq. A. After appropriately transforming variables, the equations for the United States were recomputed. Although the structural coefficients for the equations were slightly altered, in no case were the basic findings changed. Because the basic results remained the same, and because the conceptual meaning of transformed variables is often difficult to determine, the recomputed coefficients are not presented here.

Both Models I and II predict that inter-party competition will be a linear function of economic development. Consequently, the test of this prediction is presented at the top of each table. Tests of the remaining equations are presented separately for the two models and for both dependent variables.

As Table 6 indicates, neither Model I nor Model II may be accepted for India. Contrary to the prediction of both models, economic development was not found to influence inter-party competition at statistically significant levels. Furthermore, with a single exception (to be discussed), the other predictions of the models are also not supported at significant levels. Thus none of the three theoretical models developed in American state analyses explains variations in public health expenditures in India.

TABLE 6
Tests of Models I and II for India

Models I and II

$$X_2 = -.40674X_1 + u$$

S.E. 5.49433
F. .005
R² = .0004

Percent of Budget Denoted
to Health

Per Capita Spending in
Health

Model I

$$X_3 = .00677X_2 + v$$

S.E. .02397
F. .080
R² = .006

$$X_3 = -.03760X_2 + v$$

S.E. .02142
F. 3.081
R² = .19

Model II

$$X_3 = -.51335X_1 + u$$

S.E. .45465
F. 1.275
R² = .09

$$X_3 = .156688X_1 + u$$

S.E. .47005
F. .111
R² = .008

TABLE 7

Tests of Models I and II for the United States

Models I and II	
	$X_2 = 7.14681X + u$
	S.E. 1.88149
	F. 14.428
	$R^2 = .24$
Percent of Budget Devoted to Health	Per Capita Spending on Health
Model I	
$X_3 = .02299X + v$	$X_3 = .13893X + v$
S.E. .01731	S.E. .12357
F. 1.763	F. 1.264
$R^2 = .04$	$R^2 = .03$
Model II	
$X_3 = -.68465X + u$	$X_3 = 1.83201X + u$
S.E. .23747	S.E. 1.81203
F. 8.312	F. 1.022
$R^2 = .15$	$R^2 = .02$

It is noteworthy, however, that the relationship between per capita health expenditures and party competition does approach significance at the .10 level. While the magnitude of this relationship is not large, it appears that inter-party competition has some influence on the number of rupees per person an Indian state will spend on public health. The greater the party competition in a state, it seems, the less that state is inclined to spend—a tendency contrary to that predicted by American state studies.

Table 7 summarizes the findings for the United States. As is indicated, Model II—that associated with the work of Dye, Dawson, and Robinson—does explain inter-state variations in the proportion of the budget devoted to public health. Economic development is seen to bear a positive relationship to party competition at statistically significant levels. Also as predicted, development and the percent of the budget spent on health are related. This latter relationship is negative in direction suggesting, as previous research has shown that poorer states tend to devote a larger proportion of available resources to social welfare than their more affluent counterparts (see Dye, 1966, 134-135). Hofferbert and Sharkansky, 1971, 473). Finally, party competition and percent of the budget are not associated at significant levels. Model II may, therefore, be accepted as an explanation of the proportion of each state's budget allocated to public

health. This is a result well in keeping with the dominant findings of American state policy research.

However, none of the three models can account for per capita spending on health by the American states. As Table 7 demonstrates, per capita spending is related neither to party competition nor to economic development at statistically significant levels. Consequently, all three models may be rejected as explanations for inter-state variations in per capita health expenditures.

DISCUSSION AND CONCLUSIONS

To recapitulate, this paper has sought to account for inter-state variations in public health expenditures in an economically "have" nation, the United States, and in a "have-not" nation, India. Three theoretical models, derived from studies of social welfare expenditures in the American states, have been formalized and tested in both societies. One of the models tested here ("Model II") has been found to explain variations in the budgetary proportion the American states devoted to public health. None of the models, however, was able to account for inter-state differences in per capita spending for health in the United States. Furthermore, none of the theoretical models could explain differences between the Indian states either in per capita spending or in the budgetary share devoted to public health.

These findings may be attributed to differences between India and the United States in stage of economic development. As noted earlier in this paper, Peters has demonstrated at the nation-state level that political variables are more important for societies like the United States that have reached the modern ("have") stage of economic development. In the same way, the relative importance of political as opposed to economic variables in accounting for *subnational*, government expenditures may depend upon a *nation-state's* stage of economic development. Thus among the American states, economic development but not inter-party competition was seen to bear a significant relationship to the budgetary proportion states devoted to public health. Moreover, among the Indian states the relationship between party competition and per capita health spending was seen to approach significance but not that between economic development and spending.

Yet, this extension of Peters' stages of economic development argument fails to explain why states' development was not found related to per capita health spending in the United States. Nor does it account for the failure of party competition to influence the budgetary proportion the Indian states devoted to public health. Consequently, the findings of this

research are probably not a product of societal "have—have-not" differences. Rather, they may well be attributable to some fundamental limitations of the three theoretical models considered here.

Possibly one such limitation has to do with the variable of party competition. V.O. Key's theory of social welfare politics, which was the genesis of most later studies, did not stress inter-party competition so much as the extent to which politics was "organized" or "disorganized" within a state. As Morehouse (1973) has recently suggested, it may be that party competition is a rather imperfect measure of political organization. This seems particularly likely in India where, unlike the United States, states dominated by a single party (the Congress Party) may sustain either the most or the least fractionalized politics. Accordingly, future studies might do well to incorporate more direct measures of political organization, such as the strength of party leadership, into expenditure models.

A second possible limitation of the models considered here lies in the process by which program innovations and, hence, new expenditures are adopted. Walker (1969) found important regional differences in the propensities of the American states to adopt program innovations. These differences were sufficiently strong to suggest regional patterns of communication, competition, and emulation among states. Such regional patterns may also characterize India: certainly the southern part of that country stands apart from the rest owing to its greater industrialization and stronger British tradition. If this is so, regionally-based communications and innovative "cues" may be sufficiently strong to largely override inter-state differences in wealth and party competition in determining per capita expenditures and budgetary proportions. Thus it may be necessary to construct models which either incorporate measures of innovation or which aggregate key variables according to political region.

Whatever the case, the findings of this paper dictate that American and comparative scholars alike search beyond the theories considered here if general explanations are to be found for why relatively autonomous, sub-national governments spend as they do.

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