

PROGRAM OF DEVELOPMENT STUDIES
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Paper No. 65

Public Expenditures and Services as
Policy Outcome Predictors: A
Two-Nation Analysis for
Health and Education

by

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Summer, 1975

The author is Assistant Professor of Public Affairs at the University of Houston at Clear Lake City. The research reported in this paper was conducted under Agency for International Development contract no. AID/csd-3302 on "Distribution of Gains, Wealth and Income from Development." Program Discussion Papers are preliminary materials circulated to stimulate discussion and critical comment. References in publications to Discussion Papers should be cleared with the authors to protect the tentative character of these papers.

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Abstract

Much research in political science has examined the determinants of levels of government expenditures--for various nations, groups of nations, or within-nation units such as cities and states. An inference often drawn from such analyses is that different levels of expenditure in particular policy areas imply related levels of service or actual outcomes. This paper examines the validity of this inference employing data on health and education policy for Turkey and West Malaysia. Multiple indicator indices are formed for service levels and policy outcome levels for the within-nation units of analysis. Then the relative potency of expenditures and services as policy outcome predictors is examined. Likewise, various regressions are examined which employ expenditures, services, and contextual variables as outcome predictors. Throughout the analysis, expenditures are found to be poor predictors, while service levels are relatively potent outcome predictors.

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1. Introduction

In recent years there has developed in the study of American state and local politics a body of literature termed "policy output" studies. This literature has now become quite voluminous,¹ and the general findings of early work in the area are well-known to most political scientists. The principal conclusion of most early studies-- that variations in political characteristics of states or cities were not as powerful predictors of policy variations as were measures of socioeconomic development--inspired a great deal of further analysis attempting to reevaluate these findings or to find some salience for "political variables."²

¹See, as examples, Richard E. Dawson and James A. Robinson, "Interparty Competition, Economic Variables and Welfare Politics in the American States," Journal of Politics, XXV (May, 1963), 265-289; Richard I. Hofferbert, "The Relation between Public Policy and Some Structural and Environmental Variables in the American States," American Political Science Review, LX (March, 1966), 73-82; and Thomas R. Dye, "Malapportionment and Public Policy in the States," Journal of Politics, XXVII (August, 1965), 586-601. For excellent critical reviews of much of this literature, see Philip B. Coulter, "Comparative Community Politics and Public Policy," Polity, III (Fall, 1970), 22-43; and Herbert Jacob and Michael Lipsky, "Outputs, Structure, and Power: An Assessment of Changes in the Study of State and Local Politics," Journal of Politics, XXX (May, 1968), 510-538.

²For some revisionist findings in this area of research see Ira Sharkansky, "Economic and Political Correlates of State Government Expenditures: General Tendencies and Deviant Cases," Midwest Journal of Political Science, XI (May, 1967), 173-192; Richard I. Hofferbert, "Socioeconomic Dimensions of the American States: 1890-1960," Midwest Journal of Political Science, XII (August, 1968), 401-418; Charles Cnudde and Donald McCrone, "Party Competition and Welfare Policies in the American States," American Political Science Review, LXIII (Sept., 1969),

This particular analytic paradigm has become popular enough to be employed virtually wholesale in a variety of comparative or non-American settings, as well. Alt¹ and Hayes² used the approach to analyze the determinants of local or state government expenditures within Britain and Brazil, respectively. Similarly, Hogan³ compared the determinants of province and state expenditures in Canada and Mexico. For nation-level data Peters⁴ has analyzed longitudinal expenditures from Britain, Sweden and France, while Antunes⁵ applied the general model to expenditures from 79 nations at three timepoints. These studies represent important contributions because they have applied the analytic framework to diverse political laboratories, often using longitudinal data, as well. However, none of these comparative analyses has offered an improvement or reformulation of the basic analytic model. Furthermore, they have often been forced to rely upon poor indicators for social and political concepts, especially when diachronic analysis was attempted.

867-879; and Allan G. Pulsipher and James L. Weatherby, Jr., "Malapportionment, Party Competition, and the Functional Distribution of Governmental Expenditures," American Political Science Review, LXII (December, 1968), 1207-1219.

¹J. Alt, "Some Social and Political Correlates of County Borough Expenditures," British Journal of Political Science, I (January, 1971), 49-62.

²Margaret Daly Hayes, Policy Outputs in the Brazilian States, 1940-1960: Political and Economic Correlates (Beverly Hills, Calif.: Sage Professional Papers, 1972).

³James Bennett Hogan, "Social Structure and Public Policy: A Longitudinal Study of Mexico and Canada," Comparative Politics, IV(July, 1972), 477-510.

⁴B. Guy Peters, "Public Policy, Socioeconomic Conditions and the Political System: A Note on Their Developmental Relationship," Polity, V (Winter, 1972), 277-284; and B. Guy Peters, "Economic and Political Effects on the Development of Social Expenditures in France, Sweden and the United Kingdom," Midwest Journal of Political Science, XVI(May, 1972), 225-238.

⁵George E. Antunes, "Socioeconomic, Political, and Violence Variables as Predictors of Governmental Expenditures in Nations" (unpublished Ph.D. dissertation, Northwestern University, 1971).

The central thrust of the policy output literature was originally the examination of "inputs" into the policy process. The goal was to elucidate those factors which impinge upon the political system to produce differing kinds and levels of outputs. Despite the inclusion of output measures in the analyses, scholarly concern was weighted heavily toward sorting out the input factors rather than examining aspects of the actual outputs. A critical failing, however, of the bulk of policy output studies--for both American and non-American analyses--has been a misrepresentation of the distinction between outputs as specific actions of governments and policy outcomes as the consequences of the actions.

Despite the fact that the research framework was derived from Easton's systems model, some of his important distinctions were ignored. Easton clearly distinguished between policy outputs--"the binding decisions, their implementing actions and...certain associated kinds of behaviors" of political authorities--and policy outcomes, the consequences of the outputs.¹ Most policy output studies have employed levels of expenditure as their only measure of policy variations. Expenditures may be one useful index of outputs, but they may be very misleading predictors to outcomes. As Sharkansky² has demonstrated, expenditures are distinct from service levels provided in various functional areas, even to the extent that their correlations across the American states are very low in some policy areas. The failure to include measures of service levels, the distribution of resources

¹David Easton, A Systems Analysis of Political Life (New York: John Wiley and Sons, 1965), 351.

²Ira Sharkansky, "Government Expenditures and Public Services in the American States," American Political Science Review, LXI (December, 1967), 1066-1077

across potential recipients, or the impact of policies in terms of problem resolution or goal achievement severely limits the utility of most of the policy output analyses.

Given the trend toward the uncritical application of the policy output paradigm in a variety of settings, it should be useful at this point to consider these conceptual shortcomings with greater care. This paper offers some conceptual elaborations of the output-outcome framework and some empirical analysis to illustrate the importance of these elaborations. The analysis here will be directed toward three questions. First, how useful is knowledge of expenditure level in predicting either levels of service or the consequences of public policy in a given issue area? Second, are service levels better predictors of policy consequences than are expenditures? Third, can one satisfactorily account for policy outcome variations with a model utilizing expenditure, service, and contextual data?

Another principal feature of this analysis is its explicitly cross-national design. While one intention of the policy output literature is certainly the validation of theoretical relationships, most of that research has been carried out in a single context--that of the American states. It is a commonplace of research design that such analysis should be carried out in a variety of settings. The present research reports the findings of comparable analyses executed within two different political systems--Turkey and West Malaysia. Such a design provides greater confidence in the validity of relationships comparable across systems.

The Model, Data, and Design

As noted above, most output studies utilize only government expenditure levels as a dependent (or output) policy phenomenon. The shortcomings of such output measures suggest at least two generally unmeasured elements which should be included in a complete policy output-outcome analysis. Shown in Figure 1 is the extended policy model which incorporates those two elements and which will be examined in the present research. First, as shown by Sharkansky's¹ empirical analysis for the American states and the critical remarks of a number of scholars,² one can clearly distinguish the official expenditures in any area of policy from

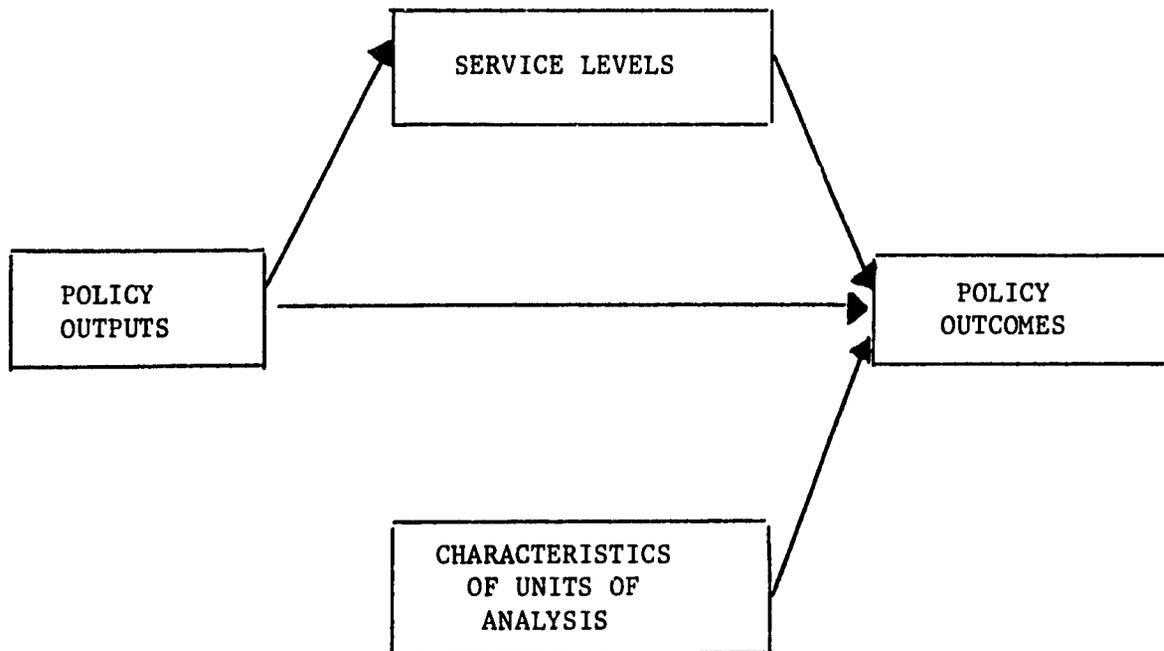


FIGURE 1: A Conceptual Model for Analyzing Policy Outcomes

¹ Ibid.

² See, as examples, Herbert Jacob and Michael Lipsky, op. cit., 515-516; and Philip B. Coulter, op. cit., 29-32.

the levels of actual service provided to the public in that policy area. Thus, the first additional policy element which should be examined is service levels. One might view services as the physical or material resources provided by official monies for policy implementation. Services might also be indexed by measures of the interaction between policy implementing agents and their relevant client populations.¹

The second additional policy element is discussed most extensively in the program evaluation literature. This element is generally termed policy impact or outcome and is identical to Easton's concept of policy outcomes noted previously. As Easton suggests, outcomes are the consequences of particular policy outputs. Like political outputs, outcomes may be categorized in a number of ways.² The important point to note is that, whatever typology of outputs one chooses, he may associate hypothetical impact consequences with each discrete output type. The research reported here concentrates upon expenditure and valued goods allocations as outputs; therefore, appropriate outcomes may be defined as changes in environmental, socioeconomic, or population parameters associated with particular policy outputs.³

¹For a study of client attitudes toward a service bureaucracy, see Herbert Jacob, "Contact with Government Agencies: A Preliminary Analysis of the Distribution of Government Services," Midwest Journal of Political Science, XVI (February, 1972), 123-46.

²For some representative typologies of outputs, see David Easton, op. cit., 352-362; Gabriel A. Almond and G. Bingham Powell, Jr., Comparative Politics: A Developmental Approach (Boston: Little, Brown and Co., 1966), 190-212; Theodore Lowi, "American Business, Public Policy, Case Studies and Political Theory," World Politics, XVI (July, 1964), 677-715.

³One can make conceptual distinctions among primary, secondary, intended, and unintended policy impacts. For such an elaboration, see Thomas J. Cook and Frank P. Scioli, Jr., "A Research Strategy for Analyzing the Impacts of Public Policy," Administrative Science Quarterly, XVII, (September, 1972), 328-339. The research reported here will concentrate upon primary and intended consequences.

Along with the two policy elements explicated above, this analysis will also include levels of government expenditure. Utilization of this output indicator will provide the study with a direct empirical linkage to previous policy output analyses. Examination of the interrelationships among these three policy elements will indicate the utility of those studies which examine expenditure alone.

Finally, one additional conceptual element must be incorporated into the design. This last concept is contextual characteristics of the units of analysis. In Przeworski and Teune's terminology, "context factors constitute aggregates of individual characteristics."¹ Operationally, measures on such specific traits as industrialization, urbanization, education levels, or income levels (all measured with individual-level data) are implied to index this concept. These variables are also those generally utilized in policy output studies to index the concept "socioeconomic inputs"; however, the rationale is very different in the present case. The intended theoretical importance of "socio-economic inputs" in most output studies is, frankly, vague. Generally, the implication is that different levels of development or wealth so-measured may independently determine the levels of authoritative expenditure levels regardless of political characteristics. Yet, different levels of development may also result in different levels or character of explicit demands for policy outputs. Since actual demands remain unmeasured in such studies, the system development-demand-output linkage is untested.

The usage of contextual variables in the present research follows a different logic. It is possible that different scores on contextual variables imply different potentialities for the utilization of allocated expenditures;

¹Adam Przeworski and Henry Teune, The Logic of Comparative Social Inquiry (New York: Wiley-Interscience, 1970), 56.

that is, the translation of expenditures into service levels or impact levels may be more "efficient" or "productive" in certain kinds of units (perhaps in more urbanized, industrialized ones, or perhaps in ones at lower levels of service or impact with faster growth rates).¹ Contextual measures can thus be considered as potentially important intervening variables in the presumed output-service-impact sequence.

The data employed in this study are for central government expenditures and services in health and education for Turkey and West Malaysia. While the administrative systems of these two nations are nominally different (Turkey having a strong unitary administrative system and Malaysia a federal one), the central governments of both nations monopolize the public provision of services in such areas as education and health.² The data employed here will be aggregated for the major administrative sub-units in each country--the eleven states of Malaysia and the sixty-seven provinces of Turkey. An ecological analysis at these levels is especially appropriate since these governments recognize such units as important budgetary units.

For both countries we have developed appropriate per capita measures for total public expenditures in the two policy areas: total education expenditures/total students and total health expenditures/total population.

¹Thomas J. Cook and Frank P. Scioli, Jr., op. cit., 331-332.

²In education we will be dealing only with the primary and secondary levels. In health a variety of service measures are employed for both physical and personnel facilities. In both countries the bulk of physical capacity is provided by the public sector. Also, both governments employ significant portions of all health personnel. For example, in Malaysia about one-third of all doctors are employed in the public service, whereas in Turkey one-third of all doctors are fully employed and one-third partially employed in the public service. Likewise, both governments are actively stimulating the production of new doctors and other health professionals. On these and related points see (for Turkey) Nusret H. Fisek, "Health Planning in Turkey as an Example for Planning in Developing Countries," Annales de Societes belges de Medecine tropicale, XLVIII(1968), 381-392; and (for Malaysia) the Fourth Report on the World Health Situation, 1965-68 (Geneva: World Health Organization, 1971), 375-377.

Similarly, we have generated a variety of indicators of the level of service provided within the individual units of analysis. These indicators generally measure the physical character and the extensiveness of public services, as indexed by appropriate ratios of teachers, schools, classes and students in education and doctors, nurses, hospitals and health units in public health. The data were gathered from a variety of sources within both nations--principally from published and unpublished materials of the relevant government ministries and the central governmental statistical offices.¹ The data are generally for 1970 with a few exceptions where data from a preceding or following year are employed for completeness.

Concept Operationalization

While it is possible to index such concepts as "educational service levels" or "health outcomes" with single variables, the level of generality as well as the substantive content of such concepts virtually demands a multiple-indicator approach to measurement. Substantively, one might expect such concepts to have a number of dimensions or components, which may not be (themselves) highly associated.² The multiple-indicator approach to measurement, which arises from psychological construct validation procedures,³ recognizes the abstractness and possible multidimensionality of such concepts.

¹For more details on the specific variables, their source and operational definitions, see Kim Quaile Hill, "Distributional and Impact Analysis of Public Policy: A Two Nation Study for Health and Education Policy" (unpublished Ph.D. dissertation, Rice University, 1974).

²On the likely need for a multiple indicator approach to measurement in social research, see Amitai Etzioni and Edward W. Lehman, "Some Dangers in 'Valid' Social Measurement," The Annals of the American Academy of Political and Social Science, CCCLXXIII (September, 1967), 3.

³See, as an example, J.C. Nunnally, Psychometric Theory (New York: McGraw-Hill, 1967).

Consequently, this study will develop such indicators for the service and outcome policy concepts under study. The multiple-indicator approach has additional benefits in that it helps one eliminate variable with low validity, and it increases the reliability of the final index relative to that of the original variables from which it was generated.¹

The approach to index construction utilized here will be a factor-analytic one. Other procedures such as arbitrary scoring² or combined standard score methods³ have been utilized elsewhere, but they can result in arbitrary or misleading weighting of component variables.⁴ The factor-analytic approach solves this difficulty by weighting component variables based on their intercorrelations.

Recognizing the possibilities of multidimensionality, this research seeks to examine the empirical relationships among supposed measures of the same concept for both nations under study. In the data gathering process attempts were made to accumulate as many indicators as possible for services, outcomes, and contextualities. The Appendix reports the complete set of variables for these concepts in both countries. Brief descriptions

¹Donald T. Campbell and Donald W. Fiske, "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix," Psychological Bulletin, LVI (March, 1959), 81-105.

²See the index construction techniques of William Flanigan and Edwin Fogelman, "Patterns of Political Development and Democratization: A Quantitative Analysis," in John V. Gillespie and Betty A. Nesvold (eds.), Macroquantitative Analysis (Beverly Hills, Calif.: Sage Publications, 1971), 441-474.

³See the techniques of Phillips Cutright, "National Political Development: Measurement and Analysis," American Sociological Review, XXVIII (April, 1963), 253-264; Deane E. Neubauer, "Some Conditions of Democracy," American Political Science Review, LXI (December, 1967), 1002-1009; and E.A. Duff and J.F. McCamant, "Measuring Social and Political Requirements for System Stability in Latin America," American Political Science Review, LXII (December, 1968), 1125-1143.

⁴Jesse F. Marquette, "Standard Scores as Indices: The Pitfalls of Doing Things the Easy Way," Midwest Journal of Political Science, XVI (May, 1972), 278-286.

of these variable sets should indicate the rationale for the choice of individual variables.

Education services are indexed by pupil-teacher ratios, average class sizes, and pupils per school (a measure of scale for individual schools). In both countries these variables were generated for both elementary and secondary school levels. For Turkey some additional indicators of average teacher salaries, and the percentages of villages without schools were also available.

Education outcomes are measured in both countries by enrollment or "scholarization" rates for elementary and secondary school age children. In Turkey, outcome measures were also available for graduation rates and rates of continuation into secondary education.

Health services are operationalized by measures of the availability of both personnel and physical facilities. For health personnel the numbers of doctors, dentists, nurses, midwives, and similar personnel per capita are employed. Such facilities as hospitals, hospital bed, capacity, dispensaries, infirmaries, pharmacies, and various kinds of rural health units are also individually measured.

For health outcomes various mortality measures are employed. In Malaysia, such indicators are available disaggregated by ethnic groups (Malay, Chinese, and Indian) and by age group (infant, neonatal, toddler, maternal and total). Unfortunately, the only available death rate data for the Turkish provinces turned out to be unreliable, since it included only urban area deaths. Thus, no health outcome index could be employed for Turkey.

Contextual characteristics are indexed by the percentage employed in various occupational sectors (manufacturing, agriculture, construction,

services, and so on). Also, measures of population density, urbanism, and education levels are employed. In Malaysia, the ethnic characteristics of the state populations are utilized, as well.

In order to examine the dimensionality of each concept, to reduce the variable sets, and to minimize data reliability problems, the research proceeded with the factor analysis of the sets of variables linked to each concept. Principal components factor analytic solutions and orthogonal rotations using Kaiser's varimax criterion were employed to aid in interpretation of the factor structures.¹

At least one satisfactory multiple-indicator was found for each of the measured policy concepts. Table 1 reports the structures of these new indicators and the unique variables for each concept. A few comments about the individual results are appropriate. For Malaysian education services a single index, which will be referred to as the "Education Service Index" resulted, incorporating all save one of the original service variables. For education outcomes all three of the variables available in Malaysia loaded highly on a single index measuring variations in enrollment levels (hence, it will be referred to as a "Level of Enrollment Index"). For health services, three distinct indices resulted in the Malaysian analysis. health centers, subcenters, midwife clinics, etc.) and will be denoted a "Rural Health Service Index." The second index with

¹The principal component solutions were derived from the variable intercorrelation matrices altered by the use of highest column correlations in the diagonal. This figure represents a conservative estimate of common variance for each variable. Because the commonality estimates in these factor analyses were highest column correlations, the correlation matrices to be factored were not symmetric. Consequently, the amount of explained variance attributable to the first few principal components is artificially inflated. These figures overstate somewhat the importance of these factors for explaining the variance of the component variables. Yet, this bias was of little concern in the present research because all the variable sets

TABLE 1: Factor Structures of the Multiple-Indicator Indices and Unique Variables for the Policy Concepts

MALAYSIA	
<p><u>Education Service</u></p> <p>Education Service Index: Prim. pup-tchr. .841 Prim. class size .865 Secun. class size .803 Prim. sch size .905 Secun. sch size .806</p> <p>Unique Variable: Secun. pup-tcr. ratio</p> <p><u>Health Service</u></p> <p>Rural Health Service Index: Dispen./cap. .948 Hlt. cent./cap. .722 Subcent./cap. .922 Ast. nur./cap. .612 Midwives/cap. .729 MM clin. cap. .948</p> <p>Hospital Service Index: Hosp./cap. .718 Hosp. beds/ cap. .866 Ast. nur./cap. .708</p> <p>Health Personnel Index: Doctors/cap. .944 Dentists/cap. .944</p> <p><u>Level of Development Index</u> Pct. no sch. -.706 Pct. prim. grad. .885 Pct. low. sec. grad. .967 Pct. upp. sec. grad. .943 Pct. 6th form grad. .827 Pct. in agric. -.743 Pct. in util. .940 Pct. in commerce .804 Pct. in transp. .795 Pct. Malay -.918 Pct. Chinese .875 Pct. Indian .669</p>	<p><u>Education Outcomes</u></p> <p>Level of Enrollment Index: Prim. enroll. .971 Secun. enroll. .700 Fem. prim. enroll. .958</p> <p><u>Health Outcomes</u></p> <p>Malay Deaths Index: Toddler dth. rate .942 Infant dth. rate .963 Crude dth. rate .967 Mal. tod. rate .904 Mal. infant rate .934 Mal. crude rate .946</p> <p>Chinese Deaths Index: Chin. infant rate .928 Chin. neonat. rate .810 Chin. tod. rate .557 Chin. crude rate .781</p> <p>Neonatal Deaths Index: Neonat. dth. rate .904 Mal. neonat. rate .935 Ind. neonat. rate .506</p> <p>Indian Deaths Index: Ind. infant rate .818 Ind. tod. rate .818</p> <p>Unique Variables: Ind. crude rate Matern. dth. rate</p>
TURKEY	
<p><u>Education Service</u></p> <p>City and Secondary Service Index: City prim. class size .866 City prim. pup-tchr. .733 City prim. sch. size .912 Orta sch. size .791 Lise sch. size .685</p> <p>Unique Variables: Vill. w/o sch. Vill. prim. class size Vill. prim. pup-tchr. Vill. prim. sch. size Orta. pup-tchr. Lise pup-tchr. Teacher salary</p> <p><u>Health Service</u></p> <p>Health Service Index: Hosp. beds/ cap. .773 Phar'cies/cap. .882 Specialist/cap. .962 Doctors/cap. .902 Dentists/cap. .907 Nurses/cap. .882 Hlt. off./cap. .761 Phar'cists/cap. .946</p> <p>Unique Variables: Hlt. cent./cap. Hosp./cap. Infirm./cap. Midwives/cap.</p>	<p><u>Education Outcomes</u></p> <p>Level of Enrollment Index: City prim. enroll. .781 Orta enroll. .935 Low. sec. enroll. .958 Lise enroll. .902 Up. sec. enrcll. .891 Orta fem. enroll. .923 Lise fem. enroll. .856</p> <p>Graduation Rate Index: Prim. grad. rate .852 City prim. grad. rate .739 Vill. prim. grad. rate .902</p> <p>Unique Variables: Orta continuation Lise continuation Vill. prim. enroll.</p> <p><u>Level of Development Index</u> Pct. in manu. .906 Pct. in const. .884 Pct. in services .873 Pct. urban .815 Pct. lise grad. .728 Pop. density .787</p>

hospitals, hospital beds, and nurses as the constituent variables suggests levels of "Hospital Service." The third multiple indicator, formed with the variables for doctors and dentists, will be termed a "Health Personnel Index." For health outcomes four distinct indices resulted from the analysis. Three of these are separate indicators for Malay, Chinese, and Indian deaths, each one incorporating ethnic group-specific variables. The fourth multiple indicator is a "Neonatal Death Index" incorporating three death rate variables for that age group.

The distinctiveness of the health service and outcome indices is notable, based on their substantive content. Of the three service indicators the hospital and personnel indices are better measures of service levels than is the rural service index. This rural service index is certain to be correlated with rural populations, implying that certain levels of health service are provided there. Such services are important, but they are certainly inferior to those measured by the other two indices. For health outcomes, the four indices in Malaysia reflect the divergence of death rates for the different ethnic communities. Since these indicators are distinct, later analyses may reveal that they are associated differently with levels of service and expenditure.

Some interesting results are also evident for the Turkish policy concepts. For education services a single index for "City and Secondary Service" was derived. This index incorporated variables from the city primary and both secondary levels. A number of the original service variables did not cluster in this analysis and will be utilized as separate resulted in clearly single- or bi- factored solutions.

The cutoff point for factor extraction was generally set at an eigenvalue of 1.0; however, lower eigenvalue cutoff points were sometimes examined.

indicators below. For education outcomes two indicators resulted in Turkey. One of these is a "Level of Enrollment Index" with variables from all the school levels. The second is a "Graduation Rate Index" composed of primary level graduation variables. For health services a single, strong index was generated. This indicator, termed simply a "Health Service Index," incorporates both institutional and personnel variables. Most of the health service variables which did not associate with this index are relatively poor indicators since they tap predominately rural health services.

In both nations a strong single dimension was extracted from the contextual measures, failing to include only two or three variables in each country. Given these results, a single "Level of Development Index" was generated for use in the following analysis for each of the two nations.

Given the data and measurement techniques discussed above, the analysis will proceed by examining the relationships among the conceptual elements of Figure 1. Output (expenditure) and service indicators are the principal independent variables predicting to outcomes as the criterion variables. The analysis will also consider the relationships among expenditures and the various service measures. Finally, contextual measures will be introduced as possible intervening influences in the relationships with outcomes.

The Relationships between Expenditures and Services

One might make the initial assumption that higher levels of expenditures lead to higher levels of service in a given unit of analysis. In order to test this assumption Tables 2 and 3 report regressions of service indicators

TABLE 2: Regressions of Malaysian Level of Service Indicators on Per-Capita Expenditures (N=11)

Service Variable	Intercept	Per-Capita Expend. ^d	r	r ²	r̄ ²
Educ. Service Index	4.64	-0.028 ^a (0.033) ^b (-0.273) ^c	-.27 (p = .417)	.08	.03
Secun. pup-tchr.	50.24	-0.153 (0.036) (-0.815)	-.82 (p = .003)	.66	.63
Rural Hlt. Service Index	- 1.82	0.127 (0.085) (0.444)	.44 (p = .172)	.20	.11
Hospital Service Index	- 3.74	0.261 (0.053) (0.852)	.85 (p = .001)	.73	.70
Hlt. Personnel Index	- 1.76	0.123 (0.087) (0.424)	.42 (p = .194)	.18	.09

^a regression coefficient

^b standard error of coefficient

^c standardized coefficient

^d expenditure variable for the appropriate issue area

TABLE 3: Regressions of Turkish Level of Service Indicators on Per-Capita Expenditures (N=67)

Service Variable	Intercept	Per-Capita Expend. ^d	r	r ²
City and Secon. Educ. Serv. Index	2.28	-5.306 ^a (1.275) ^b (-0.461) ^c	-.46 (p =	.21 .001)
Vill. w/o Sch.	29.31	232.428 (181.560) (0.157)	.16 (p =	.03 .206)
Vill. Prim. Sch. Size	125.39	-74.002 (39.386) (-0.227)	-.23 (p =	.05 .065)
Vill. Prim. Pup-tchr.	49.06	-22.916 (5.408) (-0.465)	-.47 (p =	.22 .001)
Vill. Prim. Class Size	62.25	-36.184 (9.492) (-0.427)	-.43 (p =	.18 .001)
Orta Pup-tchr.	96.64	-40.470 (37.288) (-0.133)	-.13 (p =	.02 .282)
Lise Pup-tchr.	28.85	-17.895 (13.037) (-0.168)	-.17 (p =	.03 .175)
Teacher Salary	16,403.45	-1108.799 (3621.788) (-0.038)	-.04 (p over	.00 .500)
Hlt. Serv. Index	0.46	-26.639 (18.631) (-0.175)	-.18 (p =	.03 .158)
Hlt. Cent./cap.	0.10	0.341 (1.376) (0.031)	.03 (p over	.00 .500)
Hosp./cap.	0.07	1.920 (0.796) (0.287)	.29 (p =	.08 .019)
Infirm./cap.	0.04	-1.391 (0.502) (-0.325)	-.33 (p =	.11 .008)
Midwives/cap.	22.44	505.232 (162.682) (0.359)	.36 (p =	.13 .003)

^aregression coefficient

^bstandard error of coefficient

^cstandardized coefficient

^dexpenditure variable for the appropriate issue area

on expenditure level measures for Malaysia and Turkey, respectively. The dependent variables in these regressions include the multiple indicator indices and the unique service indicators for both policy areas. The results suggest important regularities.

In none of the Turkish regressions do expenditure levels serve as useful predictors. The predictive power of all these regressions is poor--none of them explains more than 20 percent of the variation in the service variables. Likewise, most of the standardized regression coefficients are small (meaning that an increase in expenditures leads to a relatively small increase in services). Furthermore, for the primary service indicators (the multiple indicator indices) in both policy areas, the standardized coefficients are negative--implying that higher expenditures per capita are associated with lower service levels per capita as measured by these indicators.

For the Malaysian regressions the results are similar. For three out of the four multiple indicator service variables, the models have very low r^2 --explaining 10 percent or less of the variation in services. However, for secondary school pupil-teacher ratios and for the Hospital Service Index, expenditures explain 63 and 70 percent of the variation with similarly large positive regression coefficients. Even though expenditures are poor predictors in most of the cases, there are some dimensions of service for which they are good predictor variables in the Malaysian case.

Examination of the scatterplots for these regressions reveals no curvilinear relationships or unusually clustered plots for either country. The visual analysis thus upholds the interpretations suggested above. Of all the service indices for both countries, only two were well predicted

by expenditure level. The rest of the service indices were virtually unassociated with level of expenditure. Evidently, expenditure measures are not good summary indicators of the overall policy process within these policy areas. Service levels represent a different aspect of that process, and their lack of association with expenditures suggests the policy process may not be as direct as one might imagine. The absence of a functional relationship between expenditures and services in our analysis is an important finding, the import of which we will discuss at a later point.

Predicting Outcome Levels with Expenditures and Services

The principal concern of this portion of the analysis is with policy outcomes. In this section we will examine predictors of outcome levels. While expenditures were found to be poorly associated with service levels, they may prove useful in predicting to outcomes. Alternatively, levels of service alone may be better explanatory variables for outcome assessment.

Table 4 reports regressions of outcome indicators on levels of expenditure for both Turkey and Malaysia. The results of the regressions are singularly consistent--the fit of the linear models is so poor that virtually no variance is explained in the bulk of the regressions. In only one case--predicting the Malay Death Rate Index--does the explained variance rise appreciably above 10 percent. The signs of most of the regression coefficients indicate that higher expenditure levels would mean higher (i.e., better) outcomes; yet, the fit of the models is so poor and the size of the standard errors so large as to make the regression

TABLE 4: Regressions of Outcome Indicators
on Per-Capita Expenditures

Dependent Variable	Intercept	Per-Capita Expend. ^d	r	r	r ²
MALAYSIA					
Level of Educ. Enroll. Index	-1.13	0.0068 ^a { 0.034 ^b 0.066 ^c }	.07	.00	.00
			(p over .500)		
Malay Deaths Index	2.07	-0.145 { 0.081 -0.514 }	-.51	.26	.18
			(p = .106)		
Neonatal Deaths Index	0.69	-0.048 { 0.097 -0.163 }	-.16	.03	.00
			(p over .500)		
Chin. Deaths Index	0.32	-0.023 { 0.098 -0.076 }	-.08	.01	.00
			(p over .500)		
Ind. Deaths Index	-1.07	0.075 { 0.102 0.238 }	.24	.06	.00
			(p = .482)		
TURKEY					
Level of Enroll. Educ. Index	0.38	-0.873 { 1.372 -0.079 }	-.08	.01	
			(p over .500)		
Graduation Rate Index	-0.57	1.330 { 1.433 0.114 }	.11	.01	
			(p = .357)		

^a regression coefficient

^b standard error of coefficient

^c standardized coefficient

^d expenditure variable for the appropriate issue area

poor and the size of the standard errors so large as to make the regression coefficients meaningless.

Once again visual inspection of the scatterplots offers no support for conclusions other than those drawn from the regression results. As in the case of predicting service levels, one must conclude that level of expenditure is a very poor index for predicting policy consequences. In cross-sectional analysis these expenditure measures offer virtually no information on final policy outcomes.

Given the impotence of expenditures as outcome predictors, we can now turn to the use of service levels as explanatory variables. One might argue that levels of physical service provided to different areas within nations should be better predictors of outcomes than are levels of expenditure. Table 5 presents the results of regressions of outcome measures on individual service indicators for both countries. The independent variables in these regressions will only be the multiple indicator variables for each policy area. Two reasons justify the decision to employ only these service measures as predictors. First, these indices are of more certain validity and reliability given the procedures followed to generate them. Second, a concern for parsimony in the analyses also supported the decision not to utilize the unique service variables at this time. The general points of theoretical interest to this section can be made without their use. Furthermore, the predictive capacity of these unique variables will be explored anyway in a later section of this paper.

In Malaysia (where the number of equations is large, due to the multidimensionality of health services and outcomes) there are several examples of good predictive capacity. In education, the service index explains

TABLE 5: Regressions of Outcome Indicators
on Level of Service Indicators

Dependent Variable	Intercept	Service Predictor	r	r ²	r̄ ²	
MALAYSIA						
Education Enrollment Index	0.0	0.691 ^a { 0.242 ^b 0.690 ^c	Education Service Index (p = .019)	.69	.48	.42
Malay Death Rate Index	0.0	0.244 { 0.319 0.242	Rural Health Service Index (p = .469)	.24	.06	.00
Malay Death Rate Index	0.0	-0.428 { 0.272 (-0.465)	Hospital Service Index (p = .150)	-.47	.22	.13
Malay Death Rate Index	0.0	-0.729 { 0.215 (-0.748)	Health Personnel Index (p = .009)	-.75	.56	.49
Neonatal Death Rate Index	0.0	-0.230 { 0.335 (-0.224)	Rural Health Service Index (p over .500)	-.22	.05	.00
Neonatal Death Rate Index	0.0	0.033 { 0.320 0.033	Hospital Service Index (p over .500)	.03	.00	.00
Neonatal Death Rate Index	0.0	-0.190 { 0.333 (-0.187)	Health Personnel Index (p over .500)	-.19	.04	.00
Chinese Death Rate Index	0.0	-0.222 { 0.337 (-0.215)	Rural Health Service Index (p over .500)	-.22	.05	.00
Chinese Death Rate Index	0.0	0.050 { 0.321 0.052	Hospital Service Index (p over .500)	.05	.00	.00
Chinese Death Rate Index	0.0	-0.001 { 0.340 (-0.001)	Health Personnel Index (p over .500)	-.00	.00	.00
Indian Death Rate Index	0.0	0.270 { 0.355 0.245	Rural Health Service Index (p = .468)	.25	.06	.00
Indian Death Rate Index	0.0	0.327 { 0.324 0.319	Hospital Service Index (p = .340)	.32	.10	.02
Indian Death Rate Index	0.0	0.034 { 0.361 0.031	Health Personnel Index (p over .500)	.03	.00	.00
TURKEY						
Education Enrollment Index	0.0	0.587 { 0.095 0.608	Education Service Index (p = .001)	.61	.37	
Education Graduation Index	0.0	0.101 { 0.125 0.100	Education Service Index (p = .420)	.10	.01	

^a regression coefficient

^b standard error of coefficient

^c standardized coefficient

almost 50 percent of the variation in enrollment levels with a large positive regression coefficient. In health, the Malay Death Index is well accounted for by both the hospital service and the personnel service indices. Both of these predictors have sizable regression coefficients (-0.465 for hospital services and -0.748 for personnel services) with the proper sign. The other three health indices are poorly associated with any service level measure.

In Turkey education enrollment levels are well predicted by service levels as was the case in Malaysia. Almost 40 percent of the variation in enrollment levels is accounted for by the education service index. However, the graduation rate index is virtually unassociated with the service level index.

Some important general results are demonstrated by the service regressions. Unlike the analysis with levels of expenditure, there are a number of cases where service levels are powerful outcome predictors. We saw that in only one regression for either country was expenditure level even a mildly potent predictor of outcomes (for the Malay Death Index). However, at least one major outcome index for each country and each policy area (where a reliable index was available) was well predicted by a level of service index. While the primary service indices could not adequately predict all of the outcome measures, they proved to be much more valuable in this regard than did expenditure levels.

We must conclude that service measures are much more meaningful indicators of levels of government commitment in policy areas than are levels of expenditure. Services provide more information about actual policy outcomes, at least for the two issue areas under study here. If our concern

is with the actual policy implementation process and with the results of that process, a focus on services provided within the process is much more meaningful than one on levels of expenditure.

Predicting Ourcomes with a Combination
of Expenditures and Services

It has been demonstrated that expenditure level is a poor predictor of outcomes and that the principal service measures are better predictors, but not always potent ones. Given these results we know that service levels are more indicative of outcome levels, but we cannot predict all of the outcome measures well on the basis of single service indices. In order to provide more systematic information on the determinants of outcome levels, regressions were examined which employed all of the service variables (both multiple indicator ones and unique indicators) and the appropriate expenditure level measure as predictors. The intention of these analyses was to determine how well outcomes could be accounted for with all the available policy predictors.

Various formulations of such regressions were explored for each of the outcome measures. In some cases the enlarged regressions still did not predict the particular outcome successfully. In other cases the regressions were very successful (that is, the R^2 's indicating the amount of variance explained were high in these regressions), but some of the independent variables included did not contribute much to the predictive power of the overall set. In these cases impotent predictor variables were eliminated to produce reduced regressions with predictive power that remained high. However, the expenditure level variables were always retained regardless of their impact in order to demonstrate their power vis-à-vis that of service

variables. The final formulations of these equations are more parimonious than regressions which include a number of trivial predictor variables.

In Malaysia the single education outcome measure and the Malay Death Index (one of four health outcome indices) were reasonably well predicted in these regressions. The final regressions for these two variables are presented in Table 6. Educational enrollments are shown there to be principally influenced by level of Education Service. (This predictor has a large positive regression coefficient.) The educational expenditure variable makes only a small contribution to increase in the enrollment index, based on the size of the appropriate regression coefficient. The Malay Death Index is shown in Table 6 to be appropriately influenced by both the Health Personnel Index and the Hospital Service Index. The size and signs of the standardized regression coefficients for these two predictors indicate that positive changes in both these variables are associated with significant decreases in the Malay Death Index. However, the standard error of the Hospital Service Index regression coefficient is extremely large relevant to the coefficient itself. Thus, the impact of this variable is less certain than is that of the Health Personnel Index. As in the case of the education regression, the expenditure predictor makes little contribution (with a standardized coefficient near zero). Likewise, the Rural Health Service Index was a trivial predictor. The poor validity of this index as a measure level of health services was commented upon earlier. Because of its poor predictive power, it was not included in the final equation.

The other three health outcome regressions--for the Chinese Death Index, the Indian Death Index, and the Neonatal Death Index--were not presented because in none of these cases did the amount of explained variance rise

TABLE 6: Regressions of Selected Malaysian Outcome Indices on Expenditure and Service Variable (N=11)

Dependent Variable	Coefficient	Predictor	Dependent Variable	Coefficient	Predictor
Education Enrollment Index	= -1.21		Malay Death Index	= -0.86	
	0.0178 ^a	Education Expend. Per Student		0.060	Health Expend. Per Capita
	(0.045) ^b			(0.133)	
	(0.173) ^c			(0.214)	
	0.7782	Education Service Index		-0.450	Hospital Service Index
	(0.267)			(0.404)	
	(0.776)			(-0.489)	
	-0.0702	Secondary Pupil-Teacher Ratio		-0.714	Health Personnel Index
	(0.241)			(0.247)	
	(-0.129)			(-0.734)	
R = 0.74 (p = .114)	R ² = 0.55	R̄ ² = 0.36	R = 0.82 (p = .044)	R ² = 0.67	R̄ ² = 0.53

^a regression coefficient

^b standard error of coefficient

^c standardized coefficient

above 20 percent. Also, in most of these regressions the standard errors of the regression coefficients were much larger than the coefficients themselves. Consequently, these three health outcome measures were simply not predictable given the service and expenditure variables.

One can conclude from the two Malaysian regressions in Table 6 that at least some of the policy outcomes can be accounted for on the basis of the other policy measures. Furthermore, the Malay Death Index is probably the most important health outcome measure, since it includes several total death rate variables as individual components. Thus, both the single education outcome measure and the primary health outcome measure are functions of level of services provided in those policy areas. The point made earlier--that service indicators are more potent predictors of outcomes than are expenditure variables--was also reaffirmed by the results in Table 6.

Turning to the regressions on Turkish policy outcome measures, the same procedures were followed as in the Malaysian case. That is, the outcome measures were regressed on all the multiple indicator and unique service variables available for that issue area. After examining different combinations of service variables as predictors, impotent predictor variables were eliminated from the final regressions. The final regressions for the Educational Enrollment Index and the Graduation Index are shown in Table 7.

The results in Table 7 support inferences similar to those drawn from the Malaysian results. Both of the Turkish regressions are highly successful--with large amounts of variance explained. Thus, both of the education outcome measures are predictable from a number of policy effort indices. Second, the predictive power of expenditure level is negligible

TABLE 7: Regressions of Selected Turkish
Outcome Indices on Expenditure
and Service Variables (N=67)

Predictor Variable	Coefficient	Std. Error of Coef.	Standardized Coefficient	R	R ²
Dependent Variable: Education Enrollment Index				0.86	0.75
Intercept	1.56				
Education Expend./Student	0.185	0.934	0.017		
City and Second. Service Index	0.532	0.078	0.551		
Vill. Prim. Class Size	-0.024	0.012	-0.184		
Vill. Prim. Pup-Tchr. Ratio	-0.076	0.020	-0.335		
Vill. Prim. Stu-Sch. Ratio	0.010	0.003	0.291		
Avg. Secun. Tchr. Salary	0.0001	0.000	0.252		
Dependent Variable: Education Graduation Index				0.83	0.68
Intercept	2.57				
Education Expend./Student	0.930	1.201	0.080		
City and Second. Service Index	0.115	0.108	0.114		
Vill. Prim. Class Size	-0.021	0.014	-0.154		
Vill. Prim. Pup-Tchr. Ratio	-0.049	0.026	-0.207		
Orta Pup-Tchr. Ratio	0.0005	0.003	0.012		
Lise Pup-Tchr. Ratio	-0.017	0.010	-0.157		
Avg. Secun. Tchr. Salary	0.0001	0.000	0.136		
Pct. Vill. Without Schools	-0.005	0.001	-0.602		

in both these regressions. The standardized coefficients for expenditures are virtually zero in both equations. However, the service level predictors are potent in both equations. In fact, there are several service level predictors in each equation which appropriately influence educational outcomes. The City and Secondary Service Index is most prominent as a predictor of enrollment levels, while the best predictor of graduation levels is the percentage of villages without schools (a measure of the comprehensiveness of education services). Yet, in both equations pupil-teacher ratio and salary level variables are also useful predictors.

In general, the above outcome regressions have been rather successful. First, they have explained significant portions of the variation in outcome levels. Second, they have demonstrated again that expenditure measures are virtually negligible predictors to outcomes, while services are much more potent. Third, three of the four regressions in Tables 6 and 7 demonstrate that more than one dimension of service has a significant impact on outcomes. A number of the discrete measures of service level are important predictors in the two Turkish regressions, while two service indicators are prominent predictors in the Malay health outcome case. Thus, our multiple indicator approach has resulted in another dividend in highlighting the importance of different service indicators in explaining outcome levels.

Contextual Attributes as Outcome Predictors

The relative importance of expenditure and service variables in predicting outcomes has already been demonstrated in this research. However, even in the most successful outcome prediction equations, substantial portions of variance remain unexplained. That is, one cannot predict all

of the variation in outcomes only on the basis of expenditure and service levels. In order to account for this remaining variation, other variables might be considered for inclusion in the regressions. It was suggested in the research design above that some contextual variables might be appropriately included at this point.

Contextual variables could simply be added to the outcome equations to examine their predictive power. However, before doing so, one should pause and consider the rationale for the use of contextual indices in this situation. For example, one can reasonably argue that in areas of high development (as measured on the Level of Development Indices) students in school are exposed to a number of nonschool influences which can beneficially affect the likelihood of their remaining in school or graduating. Their social context may literally be more conducive to school success. As opposed to less developed, especially rural areas, all kinds of nonschool factors are more likely to be salient--family motivation regarding the importance of schooling, peer group motivation, local community emphasis on the importance of education, exemplary cases of former students who have found highly desirable employment or higher education opportunities, and so on. Clearly, one could hypothesize all sorts of contextual influences which operate to improve education and health policy outcomes in more developed areas.

Nonetheless, while one can hypothesize such relationships, the analysis of their distinct influence on outcomes may be difficult. First, it should be clear that contextual influences are of a different character than are direct policy influences such as based on levels of service. While the presumed intention of expenditures and services in these policy areas is to improve outcome levels, contextual influences as measured in the Level of

Development Indices are more like side effects which just happen to have beneficent or negative influences. In policy oriented terms, one cannot readily manipulate levels of social and economic development to achieve other policy goals as he could manipulate expenditure and service levels.

A second difficulty with contextual variables concerns their levels of association with some of the service indices. That is, a number of the level of service indices are highly correlated with the Level of Development Indices.¹ If both these kinds of variables were included as predictors in the same multiple regression equation, their separate influences on the dependent variable would be impossible to disentangle. The multicollinearity problem would result in unstable regression coefficients, disallowing the separate evaluation of the independent variables which were themselves intercorrelated. Thus, we find that not only are contextual indices theoretically distinct from service and expenditure measures, but analytic problems are associated with incorporating context measures into the same analysis with the other kinds of variables.

Since it is not possible to estimate the separate effects of services and contextualities, this research will consider a more limited question: how much of the presently unexplained variation in outcomes can be attributed to contextual influences? That is, do the unique contributions of the contextual variables increase significantly our ability to explain outcome variations?

¹As examples, the Malay Education Service Index and the Malay Health Personnel Index are correlated 0.82 and 0.96, respectively, with the Level of Development Index. Similarly, in Turkey the City and Secondary Education Service Index is associated 0.52, teacher's salaries associate 0.63, and the Health Service Index associates 0.92 with that nation's Level of Development Index.

Proceeding with this approach to the inclusion of contextual indices as outcome predictors, the regressions of Tables 6 and 7 were utilized to generate residuals for the outcome measures. That is, from these best-predicting equations using expenditures and services as independent variables, the portions of the dependent variables unexplained in these equations were derived. These residuals were then employed as criterion variables in regressions on the Level of Development contextual indices.¹ The results of the latter regressions are reported in Table 8. As can be seen in that table, the contextual indices were singularly unsuccessful in adding to the overall amount of outcome variation explained.² For three of the equations the explained variance is practically zero. The fourth equation--for Malaysian Education Enrollments--only explains 13 percent of the variation in the residual or less than 9 percent of the total variation in the Enrollment Index.³ Visual analysis of the scatterplots for these regressions supports the contention of no relationship.

¹An alternative analytic approach for the assessment of contextual variables would be to utilize a step-wise multiple regression procedure forcing the contextual variable to enter the equation last. This method would also provide the analyst an estimate of the amount of additional variation in the dependent variable explainable by the context variable (after the influence of the policy predictors had been eliminated in step-wise fashion). However, the residuals employed in this step-wise procedure are not the optimal ones. They would be larger than those generated by a full multiple regression, as employed to generate residuals in the present research. For more details on the comparability of step-wise and full multiple regression procedures, see Ronald J. Wonnacott and Thomas H. Wonnacott, Econometrics (New York: John Wiley & Sons, 1970), 309-312.

²The reader should recall that in these residual regressions the dependent variables only represent portions of the complete outcome indices. Those portions of the total variance are as follows: Turkish Education Index--25%, Turkish Education Graduation Index--32%, Malaysian Education Enrollment Index--64%, and the Malay Death Index--47%. The latter two figures are based on the R^2 computed in Table 6 rather than the uncorrected R^2 .

³That is, 13 percent of the residual, which is itself 64 percent of the total. Thus, the context score explains 8.32 percent of the total variation.

TABLE 8: Regressions of Outcome Residuals^a
on Level of Development Indicators

Dependent Variable	Intercept	Level of Devel. Index	r	r ²	r̄ ²
MALAYSIA					
Education Enroll. Index Residual	0.00	0.318 (0.201) (0.467)	0.47 (p = .148)	0.22	0.13
Malay Death Index Residual	0.00	0.013 (0.192) (0.022)	0.02 (p over .500)	0.00	0.00
TURKEY					
Education Grad. Index Residual	0.00	0.081 (0.073) (0.138)	0.14 (p = .269)	0.02	
Education Enroll. Index Residual	0.01	0.102 (0.061) (0.205)	0.21 (p = .099)	0.04	

^a The outcome residuals employed in these regressions were generated from the previous regressions in Tables 6 and 7.

This section can be concluded with the comment that the contextual indices do not offer any additional power to the models employing only expenditure and service variables. While we cannot assess the relative importance of services and contextualities, we can be confident of the satisfactoriness of one or the other model. At any rate, this issue is secondary to our primary intention of examining the relative potency of expenditure and service predictors.

Conclusions

This research has proceeded with two objects in mind: comparing the utility of expenditures and services as policy outcome predictors and exploring the overall predictability of outcome indices. With regard to the first intention, the results were entirely clear. Expenditure measures were found to be of virtually no utility in predicting outcomes; furthermore, only in one or two cases were expenditures even useful in predicting service levels. On the other hand, measures of service levels were able to account for substantial portions of the variation in several of the outcome indices. At least one outcome measure for each policy area and each country was well predicted on the basis of service levels.

The lack of relationship between expenditures and services or outcomes may be an especially surprising finding for some readers. There is the general expectation that expenditures and services, at least, would be closely related. A common assumption of studies of expenditure levels is that such indices have important functional relationships with services and outcomes. The results here suggest that this assumption may be untenable-- at least in its simplest form. More refined analyses and more carefully

formulated assumptions will be necessary to understand fully the influence of expenditure levels in the policy process.

In order to delineate more carefully the policy processes involved at this point, longitudinal analyses will probably be necessary. Within the framework of a time-series design, one could examine the importance of a number of more refined issues in the relationships among expenditures, services, and outcomes. Some prominent issues of this type are the possibility of lags between changes in one of the variables and resulting changes in another, and the possibility of economies of scale in the relationship between expenditures and services, or services and outcomes.

In terms of the overall predictability of policy outcome levels, the results were less systematic. A number of the outcome measures were well accounted for on the basis of service variations; however, not all of the outcome indices were so predictable. This fact highlights the need for more intensive analysis of the determinants of these indices. Future analysis of this type might profit greatly if more extensive measures of service variations and estimates of the public utilization of services--as with health care facilities--were available.

In the introduction to this paper, it was noted that much of the early "policy output" research was primarily concerned with disentangling the influence of different "inputs" into the policy-making process. However, more recent critics of this and other policy studies literature have urged a focus on the consequences of public policy rather than its determinants. This latter emphasis is espoused in the current research. To the extent that analyses of government expenditures are only concerned with the processes by which different expenditure levels are generated, the results here do not apply. However, if one wished to infer that expenditures have some direct

meaning for the actual implementation of public policy, or if he is simply concerned with what meaning expenditures might have for policy implementation, then the results of this research appear crucial.

APPENDIX: Gross Variable Sets for
the Individual Policy Concepts

<u>Policy concept</u>	<u>Variables (Abbreviated Name)</u>
Education outputs	Education expenditure/student (Educ. Expend./Std.)
Education service	City primary pupil-teacher ratio (City pup-tchr.) Village primary pupil-teacher ratio (Vill. pup-tchr.) Orta pupil-teacher ratio (Orta pup-tchr.) Lise pupil-teacher ratio (Lise pup-tchr.) City primary student-school ratio (City sch. size) Village primary student-school ratio (Vill. sch. size) Orta student-school ratio (Orta sch. size) Lise student-school ratio (Lise sch. size) City primary average class size (City class size) Village primary average class size (Vill. class size) Average secondary teacher salary (Teacher salary) Percent villages without schools (Vill. w/o sch.)
Education outcomes	City primary students/population 7-12 years. (City enroll.) Village primary students/population 7-12 yrs.(Vill. enroll.) Orta primary students/population 13-15 yrs. (Orta enroll.) Total lower secondary stud./pop. 13-15 yrs. (Low. sec. enroll.) Lise students/population 16-18 yrs. (Lise enroll.) Total upper sec. stud./pop. 16-18 yrs. (Up. sec. enroll.) Percent females 13-15 yrs. enrolled (Orta fem. enroll.) Primary graduation rate (1969-70 prim. grad./1965-66 class 1) (Prim. grad. rate) City primary graduates/total students (City grad. rate) Village primary grad./total stud. (Vill. grad. rate) Orta continuation rate (Orta 1970-71 entering class/primary graduates 1969-70)(Orta continu.) Lise continuation rate (Lise 1970-71 entering class Orta 1969-70 graduates)(Lise continu.) Percent females 16-18 years enrolled (Lise fem. enroll.)
Health outputs	Health expenditure/capita, 1968 (Hlt. Expend/cap.)
Health service	Hospitals/10,000 population (Hosp./cap.) Hospital beds/10,000 population (Hosp. beds/cap.) Pharmacies/10,000 population (Phar'cies/cap.) Infirmaries/10,000 population (Infirm./cap.) Health centers/10,000 population (Hlt. cent./cap.) Medical practitioners/10,000 population (Doctors/cap.)

Appendix--continued

	Medical specialists/10,000 population (Specialists/cap.)
	Dentists/10,000 population (Dentists/cap.)
	Nurses/10,000 population (Nurses/cap.)
	Pharmacists/10,000 population (Phar'cists/cap.)
	Midwives/10,000 population (Midwives/cap)
	Health officials/10,000 population (Hlt. off./cap.)
Socio-Economic context	Percent work force in manufacturing (Pct. in manu.)
	Percent work force in construction (Pct. in const.)
	Percent work force in services (Pct. in services)
	Percent work force in agriculture (Pct. in agriculture)
	Percent work force in mining (Pct. in mining)
	Percent populatin in urban areas (Pct. urban)
	Population density (Pop. density)
	Percent population List graduates (Pct. Lise grad.)
	Percent population Orta graduate (Pct. Orta grad.)
	Percent population primary graduates (Pct. prim. grad.)
	Percent population literate (Pct. literate)
<hr/>	
MALAYSIA	
<hr/>	
Education outputs	Education expenditure/student, 1970 (Educ. expend./std.)
Education service	Primary pupil-teacher ratio (Prim. pup-tchr.)
	Secondary pupil-teacher ratio (Secon. pup.-tchr.)
	Primary student-school ratio (Prim. sch. size)
	Secondary student-school ratio (Secon. sch. size)
	Average primary class size (Prim. class size)
	Average secondary class size (Secon. class size)
Education outcomes	Primary students/population 6-11 years (Prim. enroll.)
	Secondary students/population 12-18 years (Secon. enroll.)
	Female primary students/female pop. 6-11 yrs. (Fem. prim. enroll.)
Health outputs	Health expenditure/capita, 1970 (Hlt. expend./cap.)
Health service	Hospitals/10,000 population (Hosp./cap.)
	Hospital beds/10,000 population (Hosp. beds/cap.)
	Dispensaries/10,000 population (Dispen./cap.)
	Main health centers/10,000 population (Hlt. cent./cap.)
	Health subcenters/10,000 population (Subcent./cap.)
	Midwife clinics/10,000 population (MW clin./cap.)
	Medical practitioners/10,000 population (Doctors/cap.)
	Dentists/10,000 population (Dentists/cap.)
	Assistant nurses/10,000 population (Ast. Nur./cap.)
	Midwives/10,000 population (Midwives/cap.)
Health outcomes	Infant deaths/live births, 1970 (Infant dth. rate)
	Deaths under 28 days of age/live births, 1970 (Neonat. dth. rate)
	Deaths ages 1-4 years/population 1-4 years (Toddler dth. rate)
	Maternal deaths/live births, 1970 (Maternal dth. rate)
	Total deaths/total population, 1970 (Death rate 1970)

Malay infant death rate (Mal. inf. dth. rate)
Malay neonatal death rate (Mal. neonat. rate)
Malay crude death rate (Mal. crude rate)
Chinese infant death rate (Chin. inf. rate)
Chinese neonatal death rate (Chin. neonat. rate)
Chinese toddler death rate (Chin. tod. rate)
Chinese crude death rate (Chin. crude rate)
Indian infant death rate (Ind. inf. dth. rate)
Indian neonatal death rate (Ind. neonat. rate)
Indian toddler death rate (Ind. tod. rate)
Indian crude death rate (Ind. crude rate)

Socio-Economic context Percent work force in agriculture (Pct. in agric.)
 Percent work force in utilities (Pct. in util.)
 Percent work force in commerce (Pct. in commerce)
 Percent work force in transportation (Pct. in transp.)
 Percent work force in mining (Pct. in mining)
 Percent work force in manufacturing (Pct. manu.)
 Percent work force in agriculture processing (Pct. agric. proc.)
 Percent population Malay (Pct. Malay)
 Percent population Chinese (Pct. Chinese)
 Percent population Indian (Pct. Indian)
 Percent population literate (Pct. literate)
 Percent population with no schooling (Pct. no school)
 Percent population primary graduates (Pct. prim. grad.)
 Percent population lower secondary graduates (Pct. low sec. grad.)
 Percent population upper secondary graduates (Pct. upp. sec. grad.)
 Percent population sixth form graduates (Pct. 6th form grad.)

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