

BEHAVIORAL HEALTH EXPENDITURES AND STATE ORGANIZATIONAL STRUCTURE

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ABSTRACT: The authors present a study on expenditures by state mental health, substance abuse, and developmental disability agencies in the United States for the period between 1981 and 1993. The relationship between agency spending and organizational structure of state bureaucracy was examined. Results indicate that organizational structure is a determinant of agency spending. The more independent an agency, the higher its spending; conversely, the more independent its competitor, the lower the agency's spending. The number of levels between an agency and the governor's office was not significant in explaining agency expenditures.

The provision of health care in the United States is unlike much of the world, where it is budgeted through a political and administrative process. The U.S. relies more on markets, with public and private payers setting prices and regulations, and leaving to market forces the determination of total spending. In selected areas of health care, however, spending is budgeted. State governments set budgets for spending on mental health (MH) and substance abuse (SA) treatment, and on care for persons with developmental disabilities (DD). States fill gaps in insurance markets, providing MH and SA services to uninsured persons. DD services are often not covered in private health insurance plans, and the states often supply the necessary care. State spending for these services makes up a much larger share than

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spending for general health care (Triplett, 1998). States set budgets even when the management of care is privatized through a contract with a private firm.

In this article, we present the expenditures by three types of state behavioral health agencies in the U.S. for the period between 1981 and 1993. These state agencies, mental health, substance abuse, and developmental disability, are responsible for the delivery of the respective health services, and are members of the state administration. We group them under "behavioral health care," even though this term does not usually refer to the developmental disability service. We explore the relationship between the agencies' positions in the state bureaucracy and the expenditures on the services provided by them.

In the U.S., state governments are largely responsible for the financing and delivery of such behavioral health services as mental health, substance abuse, and developmental disability. Differences in the structures of state governments have resulted in a variety of ways in which the behavioral health agencies are positioned within state administrations. We classify a behavioral health agency by two criteria: inclusiveness of the services it provides, and its absolute position within the state bureaucracy. The inclusiveness measure puts an agency in one of four classes: independent, health, institutions, and umbrella. If an agency belongs to the independent class, then it is not under the control of another agency. Conversely, the umbrella class is the most broadly defined category: an agency belonging to it may be under the control of an organization that manages many other agencies as well. In addition, a state mental health agency may control the substance abuse or developmental disability agencies. The absolute position measure counts the number of levels that exist between an agency and the governor's office; in our data, there are at most four levels. Our study investigated whether the organizational structure of the state behavioral health system is a factor determining the variation of state behavioral health expenditures.

We propose a bargaining and competition theory to explain agency expenditures. If agencies compete and bargain against each other for state and federal funds, we expect that their bargaining power and competitive advantage to be correlated with their position in the state organizational structure. This implies that the organizational structure will be a determinant of agency spending. In fact, this is what we have found from our empirical analysis. Our result yields some evidence supporting the bargaining and competition theory. If an agency is more independent, then its spending can be expected to be higher; conversely, if its competitor is more independent, then its spending can be expected to be reduced. However, we do not find that the variable capturing the number of levels between

an agency and the governor's office is generally significant in explaining agency expenditures.

Our study continues a line of research started a few years ago by Shinnar, Rothbard, and Yin (1992) and Jacobsen, McGuire, and Notman (1996). While the "median voter" theory has been the dominant model for explaining the determinants of behavioral health expenditures, the attention paid to organizational structure has a very recent origin. Previous research has looked at behavioral health services as a "public" good (Bahl, Johnson, & Wasylenko, 1980; Inman, 1987; Jacobsen et al., 1996; McGuire & Porter, 1995). The expenditures are, therefore, determined by the demand for and the supply of this public good. The supply for the behavioral health services are largely determined by existing market conditions. The demand is thought of as coming from voters who elect state officials, and who value such services. Interest groups may even organize coalitions to lobby for the financing and delivery of these services. In any case, it is assumed that the legislature will respond to the voters' preferences, and, according to the median voter theory, will act to express the preferences of the median voter. States that have similar political, sociological, and market conditions, therefore, will have similar behavioral services spending patterns.

The median theory model predicts that organizational structure has no independent influence on behavioral health expenditures. Shinnar and colleagues (1992) were the first to hypothesize that organizational structure affects state mental health expenditures, and to test it empirically. However, because their cross-sectional analysis included only a small number of covariates among a large number of variables that can be thought to influence mental health expenditures, the regression results may be subject to bias due to missing variables. Earlier papers have used variables that can be classified as factors from the supply and demand sides (Frank, 1985; Haas, 1989; Hudson, 1987). Common variables that have been used include costs of health services, federal and state grants, needs, income and wealth of the states, progressiveness of state taxes, and political variables such as power of lobby groups and legislative mandates, insurance, interest groups and citizen participation (Kronebusch, 1992; Pope, 1991). Jacobsen and colleagues (1996) used a different methodology for the analysis—a fixed effects model to control for variables that systematically affect mental health expenditures in a state-specific way, addressing the omitted variable problem (Hsiao, 1986). In this article, we use the same econometric implementation. Our data set is much larger. First, we have a longer time series; whereas Jacobsen et al. used data up to 1990, we use data up to 1993. Second, we study three behavioral agencies; only mental health agencies were studied by Jacobsen et al. Our method allows us to test the interdependence between agencies and organizational structure more completely.

ORGANIZATION OF MENTAL HEALTH, SUBSTANCE ABUSE, AND DEVELOPMENTAL DISABILITY AGENCIES

Departmental Location

Mental health, substance abuse, and developmental disability agencies reside in the bureaucracy of state government. Although each of these organizations has its specific missions and responsibilities, the way these functions are carried out may be affected by its relationship with other members of the state bureaucracy. Within the 50 states, the organizational variations for these three agencies are high. We characterize an agency according to two criteria: the inclusivity of services it provides, and its absolute position in the state bureaucracy.

First, the departmental location of state mental health, substance abuse, and developmental disabilities agencies (respectively MH, SA, and DD) is characterized for the 8 years between 1981 and 1993. Following Jacobsen and colleagues (1996), we classify agencies into four types: independent, department of health, department of institutions, and umbrella. The independent class is the most narrowly defined; an agency belongs to this class if it is a free-standing department. If an agency belongs to the department of health, it may be under an authority responsible for all health matters in the state. The department of institution represents a broader class, and the umbrella classification is the most inclusive. Substance abuse and developmental disabilities agencies, in addition to the above classification, may even be under the control of a mental health agency, a state mental health agency (SMHA).

Clearly, the classifications above imply an implicit assumption of relationships between agencies. For example, if both MH and SA in a state are independent organizations, direct interaction between them can be expected to be minimal. However, if both belong to the department of health or institutions, then some linkage is to be expected, although it is possible that the domains of responsibility can be completely separate, in which case linkage will be small. For example in Wyoming in 1981, MH and DD belonged to the department of health, while SA was part of SMHA, but in 1991 all three agencies became part of an umbrella agency. For Maryland, in 1981, MH and SA belonged to the department of health, while DD belonged to SMHA, with this structure remaining the same in 1991.

An agency's organizational relationship with other agencies can be an indicator of its relative bargaining strength. Alliance and conflict between agencies can affect their share of the state budget allocations. It can be expected that when the agency actually controls both SA and DD agencies, MH can enjoy a positive effect on its bargaining power. On the other hand, a different argument can be made. If a state has made a firm commitment

TABLE 1
Department Locations of Mental Health Agencies

	<i>Health</i>	<i>Institutions</i>	<i>Independent</i>	<i>Umbrella</i>	<i>Total</i>
1981	2	0	0	12	14
1983	1	0	0	13	14
1985	5	3	16	26	50
1987	5	3	16	26	50
1990	5	3	16	26	50
1991	5	3	15	27	50
1992	5	3	15	27	50
1993	5	3	15	27	50

to mental health services, then a MH that also controls SA and DD may raise the suspicion that any funds the state allocates to MH can be diverted to other agencies. Our interest in organizational relationships between agencies makes explicit the possibility that an agency's bargaining power may be determined (at least partially) by organizational structure. Clearly, if the strength of an agency, say SA, helps it secure a larger budget, then other competing agencies, such as MH and DD, may be affected adversely as a result. Therefore, it is important that the entire organizational structure be studied.

The classifications of MH, SA, and DD in the 50 states are found in Tables 1, 2, and 3 (data for 1981 and 1983 were incomplete). In the last year of our sample, 1993, 15 states have independent mental health agencies, far exceeding the number of states having independent substance abuse

TABLE 2
Department Locations of Substance Abuse Agencies

	<i>Health</i>	<i>Institutions</i>	<i>Independent</i>	<i>SMHA</i>	<i>Umbrella</i>	<i>Total</i>
1981	1	0	1	8	2	12
1983	1	0	1	7	3	12
1985	5	2	6	22	15	50
1987	5	2	6	19	18	50
1990	6	2	9	16	17	50
1991	7	2	9	15	17	50
1992	7	2	9	15	17	50
1993	7	2	9	15	17	50

TABLE 3
Department Locations of Developmental Disability Agencies

	<i>Health</i>	<i>Institutions</i>	<i>Independent</i>	<i>SMHA</i>	<i>Umbrella</i>	<i>Total</i>
1981	0	0	0	5	1	6
1983	0	0	0	4	2	6
1985	1	3	4	28	14	50
1987	1	3	4	27	15	50
1990	3	3	4	24	16	50
1991	3	3	4	23	17	50
1992	3	3	4	23	17	50
1993	3	3	4	23	17	50

(9) and developmental disability (4) agencies. The relatively dominant position of mental health agencies in 1993 is reinforced with 15 substance abuse agencies and 23 developmental disability agencies being located within MH. In 1993, more mental health agencies are grouped in umbrella organizations than the other two types of agencies; 27 states have their mental health agencies located in umbrella organizations versus 17 for substance abuse and 17 for developmental disability agencies. The variation is less widespread across agencies located in the departments of health or institutions. Over time, the distributions of locations of mental health agencies have not changed dramatically. Nevertheless, the distribution of mental health locations has seemed more stable than the other two.

Absolute Position of Agency Within State Bureaucracy

This concept is conveyed by the number of levels that exist between an agency and the governor's office. An organization chart for each of the states was constructed and the agencies of our interest were located in the "hierarchy tree" of the bureaucracy. Then the number of nodes between the agency and the governor were counted, with the number of levels limited to four (Tables 4, 5, and 6).

The dominant position of MH agencies is again seen in the levels between agencies and the governor's office. In 1993, 12 MH agencies were at the same level as the governor's office, in contrast with only 6 SA and 4 DD agencies. Three of the seven states that had located both SA and DD agencies in MH had all three agencies located at the governor's level. At the next level, 29 MH agencies were one level from the governor's office while only 22 SA and 24 DD agencies were at the same level.

Similar to our proposition that an agency's organizational inclusivity

TABLE 4
Levels from Governor's Office of Mental Health Agencies

	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>Total</i>
1981	13	28	7	2	50
1983	14	26	8	2	50
1985	13	28	7	2	50
1987	13	27	8	2	50
1990	13	28	7	2	50
1991	12	29	7	2	50
1992	12	29	7	2	50
1993	12	29	7	2	50

TABLE 5
Levels from Governor's Office of Substance Abuse Agencies

	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Total</i>
1981	4	21	17	7	1	50
1983	4	21	18	6	1	50
1985	5	20	18	6	1	50
1987	5	21	17	6	1	50
1990	6	23	14	6	1	50
1991	6	22	15	6	1	50
1992	6	22	15	6	1	50
1993	6	22	15	6	1	50

TABLE 6
Levels from Governor's Office of Developmental Disability Agencies

	<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>Total</i>
1981	3	22	19	6	50
1983	3	22	20	5	50
1985	4	21	20	5	50
1987	4	21	20	5	50
1990	4	25	16	5	50
1991	4	24	17	5	50
1992	4	24	17	5	50
1993	4	24	17	5	50

relative to other competing agencies affect its bargaining strength, an agency's absolute position in the state government hierarchy may also influence its ability to secure funding. The variable just described is used to capture bargaining power in an absolute sense, although we of course do not include every possible indicator of bargaining power in relation to users of state funds. It can be expected that the higher an agency's position in the hierarchy, the higher is its ability to exploit its strength to enhance its budget. Unlike the discussion of the relative organizational variables, an agency's absolute position should have an unambiguous effect on its budget.

Our data are organized at the state level. Each point includes the departmental locations and levels from the governor's office of the MH, SA and DD agencies in each state for each year of the sample period. Table 7 shows an example of the data points. Other variables used for the regressions are discussed later.

We used the inclusivity and absolute organizational variables to conduct a series of hypothesis tests:

- Variations in the inclusivity and absolute organizational positions do not have any significant effects on an agency's expenditure outcomes (The Null Hypothesis).
- An agency's relative inclusivity position affects its expenditure outcomes.
- An agency's absolute position in the state government hierarchy affects its expenditure outcomes in a "positive" way: the smaller the number of levels between an agency and the governor's office, the higher is its expenditure.

Worth emphasizing is that the effects of organizational variables on expenditures may be "relative." That is, suppose the organizational structure of MH remains unchanged, but SA's distance from the governor's office increases. In addition to the expectation that SA's expenditure declines, we anticipate that MH's expenditure increases. The influence of organizational structure on expenditure is assumed to have both absolute and relative effects.

The data set consists of expenditure and organizational variables for the 50 states for the following years: 1981, 1983, 1985, 1987, and 1990 to 1993. MH-controlled expenditures were provided by the National Association of State Mental Health Program Directors (NASMHPD) and the NASMHPD Research Institute. Expenditure data include funds for mental health services only, and exclude MH-controlled expenditures on substance abuse and developmental disabilities programs. Expenditures by each state alcohol/drug agency were obtained from various issues of *State Resources Related to Alcohol and Other Drug Problems* which are compiled by data submitted

TABLE 7
Example of Organizational Variables of States over Time

Location	Indiana		West Virginia		Maryland		Wyoming	
	1981	1991	1981	1991	1981	1991	1981	1991
MH	Umbrella	Independent	Umbrella	Health	Health	Health	Health	Umbrella
SA	SMHA	SMHA	SMHA	SMHA	Health	Health	SMHA	Umbrella
DD	Umbrella	Independent	SMHA	SMHA	SMHA	SMHA	Health	Umbrella
Level								
MH	1	0	2	1	1	1	1	2
SA	2	1	3	2	1	1	2	2
DD	2	1	3	2	2	2	1	2

to the National Association of State Alcohol and Drug Abuse Directors (NASADAD) by the state alcohol and drug agencies. DD expenditures are based on the total funds available to the principal DD and developmental disabilities state agency. The data were collected from *The State of the States in Developmental Disabilities* (Braddock, Hemp, Fujiura, Bachelder, & Mitchell, 1995). The organizational variables of departmental location and the SMHA's linkages with the other two agencies were constructed from data provided by NASMHPD's special survey reports, the University of Pennsylvania's Policy Modeling Workshop, and NASADAD. Additional information was gathered by the authors through telephone interviews with personnel in the substance abuse agencies of each of the 50 states. Data on the levels from the governor's office were also obtained through telephone interviews with personnel in the relevant agencies. (A complete copy of the data used in the paper may be obtained from the authors.)

METHODS OF ANALYSIS

Our goal is to identify the effects of organizational structure on expenditures of state MH, SA, and DD agencies. It can be expected that a large number of variables (political, economic, sociological, as well as organizational) affect these expenditures in statistically significant ways. For feasibility, only a limited number of these variables contributing to state agency spendings can be included; most previous studies typically have used less than 10 variables. Because of omitted variables, cross-sectional analysis will yield estimates that are severely biased in unknown direction and size.

Our methodology differs from those in existing papers. We use a "fixed effects" approach for the empirical implementation of the model. With a minimum of 6 years of data for each of the MH, DD, and SA state agencies, our study avoided the problem of omitted variables by controlling for each state with its own dummy variable. (Data of SA expenditures in 1981 and 1983 are not comparable to those in later years. The data for DD in 1993 was not available at the time of the study.) This allowed us to take into account many of the effects of the large number of variables affecting agency expenditures without modelling them explicitly. Similarly, because we have many states in the data, a year dummy was included to capture time-dependent effects. With the state and year dummies included, the estimates of the effects of organizational variables were identified by their changes over time. We actually tested the specification of the fixed effect model against a random effects model using a Hausmann's test (1978).

Our organizational variables fall into two classes, as described above. The inclusiveness variable categorizes an agency into independent, department of health, department of institutions, and umbrella subgroups, capturing

the “relative” dimension of an agency’s bargaining power. Then the level variable documents each state agency’s “distance” from the governor’s office, capturing the “absolute” dimension of an agency’s bargaining power. Our fixed effects model relies on changes in these variables over time, and we now describe how these variables change in our sample period. (Agencies were initially classified according to their mailing addresses. Changes over the sample period were determined from telephone interviews with agency personnel and from data collected by NASMPHD.)

Unfortunately for our study, the number of relevant organizational changes during this period is small, leaving us only a few cases to work with and thereby rendering some of our results tentative. This is especially the case with MH, which experienced very few departmental changes during the period under consideration. From 1981 to 1993 there were only four changes in the organizational form of the MH. The MH agency went from being part of the department of health to an umbrella agency in two states: North Dakota between 1981 and 1983, and West Virginia between 1987 and 1990. The SMHA in Wyoming made the reverse move, from an umbrella to the department of health between 1987 and 1990. Indiana was the only SMHA to lose “independence” during the sample period. Reliance on changes in organization to estimate organizational effects means that for SMHAs we are restricted to the use of these three changes to identify the organization effect, and that the only organizational effect that can be estimated is the SMHA’s shift between an umbrella agency and the department of health.

In the other two agencies, a greater number of departmental changes took place; this allows us to test for their effect more reliably. In general, the trend was for these agencies to move out of the embrace of SMHAs and either become independent or move into health or umbrella departments. Substance abuse agencies experienced the largest number of changes (14) during the study period. In Illinois, Maine, New York, Ohio, and Rhode Island the SA agency became independent and in Iowa it lost independence and was placed under the department of health. In Louisiana, Maryland, Minnesota, New Mexico, Oregon, and Tennessee the SA agencies moved out of SMHAs into other departments, and in Wyoming the reverse occurred with the SMHA gaining control of the SA agency. In South Dakota it moved from the department of health into an umbrella department.

Six states changed the location of their DD agencies in this period. New York’s gained independence, moving out of the SMHA. Six states moved out of the SMHA and into either umbrella departments (Indiana, Massachusetts, Minnesota, North Dakota, and South Dakota), or the department of health (New Mexico), and in Wyoming the DD agency changed location from an umbrella to the department of health.

In Maryland, North Dakota, and Wyoming the SMHA moved up to one

level from the governor's office while in Louisiana the SMHA dropped a level to two levels from the governor's office. Indiana was the only state in which the SMHA dropped a level from the governor's office. In West Virginia, the SMHA temporarily moved to the same level as the governor's office during 1983 before dropping one level in 1985 and again in 1990. The SMHA in North Carolina dropped one level in 1983, but returned to one level from the governor's office in 1985.

Substance abuse agencies again experienced the largest number of changes (15). In Illinois, New York, and Ohio the substance abuse agencies moved up one level to the governor's level, while Iowa did the reverse. Five states (Maine, Minnesota, Mississippi, New Mexico, and Oregon) moved up a level to one level from the governor's office, while three states (Indiana, Kansas, and Massachusetts) dropped one to the second level. In West Virginia the substance abuse agency moved up a level to two levels from the governor's office in 1983 before dropping down again in 1990. The substance abuse agency in Maryland moved two levels in 1990 to one level from the governor's office.

Developmental disabilities agencies changed levels 11 times. Again, New York's moved to the same level as the governor's office. The DD agencies in Massachusetts, Minnesota, New Mexico, South Dakota, and Wyoming moved up a level to one level from the governor's office, while in Indiana and Louisiana the reverse happened. In Maryland the DD agency moved up from three to two levels from the governor's office, and in West Virginia the agency moved up from three to two levels between 1981 and 1983, but dropped down again between 1987 and 1990.

As seen above, in our sample period the number of changes in the organizational variables, both inclusiveness and level, is small. For example, MH experienced only a handful of changes, whereas SA and DD showed somewhat more changes. This creates two problems. First, our results must be regarded as tentative, since the fixed effects model relies on changes in the regressors. Second, when an organizational variable does not change at all over the sample period, its effect cannot be separated from the state fixed effect, and hence must be dropped when the regression estimates are computed. For these reasons, we have chosen to merge and condense the inclusiveness and level variables. In the actual implementation, we merge the lower two inclusiveness variables into one, and the remaining into another; likewise for the level variables. The merging of variables weakens the sharpness of the results although it does not affect the testing of hypotheses on the influence of organizational variables as a group on the expenditure of MH, SA, and DD.

Besides the organizational variables and the state and year dummies, we include two other variables, the per capita median income of each state (in constant 1988 dollars, deflated by the Consumer Price Index for all items)

TABLE 8
Summary of Median Income and Hospital Wage

<i>Year</i>	<i>Median Income</i>				<i>Hospital Wage</i>			
	<i>Mean</i>	<i>Std Dev</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std Dev.</i>	<i>Min</i>	<i>Max</i>
1981	25,389	3,318	18,644	36,709	19,957	2,329	16,491	29,987
1984	25,638	4,174	18,174	35,161	21,253	2,579	16,972	26,477

and the hospital wage index (Table 8). (We have also replaced the per capita median income variable with per capita mean income, and the results remain almost the same.) Although the fixed effects dummies pick up the effects of variables that are state and time specific, including some other obvious variables will ensure a better fit. It is very plausible that an “income” variable and a “price” variable (here, the per capita income and hospital wage index) will yield significant estimates, improving the regression results. Median income of households is the middle value of money income of households when ranked from lowest to highest. Hospital wage is the annual wage per employee in general medical and surgical hospitals which was obtained from the U.S. Department of Labor.

ANALYSIS AND RESULTS

We estimate a series of regression models using state and time fixed effects. In each model, the dependent variable is the logarithm of state per capita expenditure of MH, SA, or DD. The control variables present in all regressions are the logarithms of state median income and hospital wage. These variables (including the fixed effects) represent a version of the null hypothesis that organizational structures have no influence on MH, SA, and DD expenditures. According to the median voter theory, states’ allocation of these expenditures are decided by the preferences of the median voter. These preferences are largely influenced by market variables, which are measured by prices and incomes. We use hospital wages as a proxy for price, and median household income for income. A list of the variables and their abbreviations are in Table 9 (where some variables are missing, the data for that state and year will be omitted).

The estimated models differ by the ways in which the cross-sectional as well as time-series variations are controlled for. When state fixed effects and time fixed effects (implemented with dummy variables) are included, omitted variables that affect agency expenditures across states and over time (in aggregate) will be controlled for. When only state fixed effects are included,

TABLE 9
List of Variable Definitions

<i>Variable</i>	<i>Description</i>
Income	Log of median income
Wage	Log of hospital wage
MH-loc	Equals 1 if MH is an independent agency or located within the Department of Health; 0 otherwise
SA-loc	Equals 1 if SA is an independent agency or located within the Department of Health; 0 otherwise
DD-loc	Equals 1 if DD is an independent agency or located within the Department of Health; 0 otherwise
SA-SMHA	Equals 1 if SA is located within the State Mental Health Association (SMHA); 0 otherwise
DD-SMHA	Equals 1 if DD is located within the State Mental Health Association (SMHA); 0 otherwise
MH-lev	Equals 1 if MH is 2 or 3 levels from the Governor's office; 0 otherwise
SA-lev	Equals 1 if SA is 2, 3 or 4 levels from the Governor's office; 0 otherwise
DD-lev	Equals 1 if DD is 2 or 3 levels from the Governor's office; 0 otherwise

the models will not be protected against bias due to missing variables that affect agency expenditures systematically over time. Likewise, when only time fixed effects are used, the model will suffer from bias due to omitted cross-sectional variables systematically affecting agency expenditures.

For each agency, three regression estimates are reported: the full model, the model without state fixed effects, and the model without year fixed effects (Tables 10, 11, and 12). We first observe that the estimates of the models without state fixed effects differ from the respective full models with state fixed effects. Very often the corresponding estimates in the full fixed effects models and those omitting the state dummies have opposite signs. Moreover, some variables that are significant in the fixed effects models fail to become so when the state dummies are omitted; conversely, some variables that are insignificant in the fixed effects models become significant. These support our earlier criticism that common cross-sectional regressions suffer from omitted variables bias.

Our results indicate a statistically significant interdependence between the expenditures of the mental health, substance abuse and developmental disability agencies. For mental health expenditures, one of the three location

TABLE 10
Regressions Result: Mental Health Spending per Capita
as Dependent Variable^a

	<i>Full Model</i>	<i>No State Dummies</i>	<i>No Year Dummies</i>
Income	.126 (0.646)	.900 (5.764)	-.083 (-1.073)
Wage	.314 (1.629)	.910 (4.082)	0.021 (0.244)
MH-loc	.071 (0.756)	.065 (1.004)	.018 (0.188)
SA-loc	.071 (-0.928)	-.103 (-1.681)	-.161 (-2.074)
DD-loc	-.521 (-4.378)	.102 (1.208)	-.069 (-1.008)
SA-SMHA	-.017 (-0.219)	-.090 (-1.492)	-.118 (-1.460)
DD-SMHA	.029 (0.335)	.059 (0.884)	-.065 (-1.417)
MH-lev	-.169 (-2.263)	.048 (0.700)	0.792 (5.732)
SA-lev	-.097 (-1.466)	-.011 (-.179)	-.097 (-1.227)
DD-lev	-.085 (-1.092)	-.168 (-2.249)	-.388 (-3.208)
Adjusted- R^2	0.896	0.341	0.886

Note. Data for the mental health expenditure regression include those in 1981, 83, 85, 87, 90-93, a total of 310 observations.

^a*t*-statistics in parentheses.

variables in that regression is significant at 5%; all of them have the signs that our model predicts. In the mental health expenditure regression, for example, if MH-loc is more independent (having a value of 1), then state mental health spending increases. Conversely, if the other agencies, namely SA and DD, are more independent, mental health spending decreases. For the substance abuse expenditure regression, all location variables are significant; the SA-loc estimate turns out to be negative (and significant), but the other two estimates (for MH-loc and DD-loc) exhibit the same (negative) tendency as in the regression for mental health expenditures. For the developmental disability expenditure regression, the estimate for

TABLE 11
Regressions Result: Substance Abuse Spending per Capita
as Dependent Variable^a

	<i>Full Model</i>	<i>No State Dummies</i>	<i>No Year Dummies</i>
Income	-.007 (-0.021)	1.206 (5.303)	-.562 (-1.873)
Wage	.484 (1.484)	.721 (2.148)	2.017 (7.528)
MH-loc	-.109 (-0.499)	-.064 (-0.674)	-.339 (-1.356)
SA-loc	-.448 (-3.249)	.015 (0.165)	-.466 (-2.942)
DD-loc	-.868 (-3.151)	.265 (2.033)	-.752 (-2.374)
SA-SMHA	-.494 (-3.656)	-.274 (-3.142)	-.676 (-4.426)
DD-SMHA	-.047 (-0.274)	.068 (0.698)	-.040 (-0.200)
MH-lev	-.103 (-0.678)	.355 (3.569)	-.076 (-0.433)
SA-lev	-.142 (-1.205)	.073 (0.808)	-.088 (-0.644)
DD-lev	-.045 (-0.313)	-.277 (-2.534)	-.141 (-0.852)
Adjusted- R^2	0.870	0.406	0.825

Note. Data for the substance abuse expenditure regression include those in 1985, 87, 90–93, a total of 294 observations. Data for Oregon in 1990 and 92, as well as for Wyoming in 1990–93, are unavailable.
^a*t*-statistics in parentheses.

the DD-loc is positive and significant, giving support to the hypothesis that a more independent developmental disability department is associated with a higher DD expenditure. While the effect of a more independent MH location is to decrease DD expenditure, similar to what has been found in the regression for MH, a *more* independent SA location will correspond to a higher DD expenditure. Overall, the evidence supports a “competitive” or “bargaining” interpretation of the process by which state funds are allocated across the behavioral service agencies.

The control of SA and DD by state mental health associations (SMHAs) does not seem to affect MH spending. Nevertheless, we have found that

TABLE 12
Regressions Result: Developmental Disabilities Spending
per Capita as Dependent Variable^a

	<i>Full Model</i>	<i>No State Dummies</i>	<i>No Year Dummies</i>
Income	-.167 (-.733)	1.070 (5.968)	-.167 (-.733)
Wage	-.015 (-.062)	-.869 (-3.187)	-.015 (-.062)
MH-loc	-.452 (-4.440)	-.235 (-2.985)	0.195 (2.306)
SA-loc	.158 (1.826)	.155 (2.073)	.106 (1.086)
DD-loc	0.428 (3.205)	.277 (2.636)	-.452 (-4.440)
SA-SMHA	0.195 (2.306)	-.149 (-2.033)	0.158 (1.826)
DD-SMHA	0.106 (1.086)	0.068 (0.824)	0.428 (3.205)
MH-lev	.083 (0.995)	-.066 (-.786)	0.083 (0.995)
SA-lev	0.048 (0.649)	-.008 (-.105)	0.048 (0.649)
DD-lev	0.000 (0.002)	-.176 (-1.912)	0.000 (0.002)
Adjusted- R^2	0.943	0.589	0.943

Note. Data for the developmental disability expenditure regression include those in 1981, 83, 85, 87, 90-92, a total of 260 observations.

^at-statistics in parentheses.

the control of SA and DD agencies by SMHAs may have significant effects on SA and DD spendings. For SA expenditures, the control of SA by SMHA tends to decrease it significantly, whereas the control of DD by SMHA has a negative but insignificant effect. For DD expenditures, controls of SA and DD by SMHA both have a positive effect, but only the former is statistically significant. The number of administrative levels between an agency and the governor's office in a state has insignificant effects on agency spendings. Except for one (that of MH-lev in the mental health expenditure regression), the MH-lev, SA-lev, and DD-lev estimates in the full-model regressions are insignificant.

In a previous paper (Jacobsen et al., 1996), a subset of the data here was used to estimate the effects of organizational structure on state mental health and substance abuse expenditures. Only data up to 1990, and the location inclusiveness variables were used. In contrast the regression results just reported also include state developmental disability expenditures, the levels of administrations between agencies and the governors' offices, and use data up to 1993 for mental health and developmental disability, and to 1992 for substance abuse spendings. Jacobsen and colleagues found that the inclusiveness variables are significant in explaining state mental health expenditures, and are broadly consistent with ours. That is, a "more independent" agency and other "competing" agencies being less independent imply a higher expenditure. Our results from the DD expenditure regression suggest that the bargaining and competing agency theory also holds for developmental disability agencies. In addition, we have also identified more organizational structures (SMHAs) that may affect spendings.

It is important to note that our results indicate that the importance of the organizational inclusiveness variables extend beyond mental health expenditures. Substance abuse and developmental disability expenditures exhibit the same kind of influence by the inclusiveness variables. Our "levels" variables are mostly insignificant; this suggests that the Jacobsen et al. results may not be changed substantially even if the levels variables were available in their prior study.

Our working hypothesis has been that the "full" model with both state and time fixed effects is the preferred specification. We evaluate this specification with a Hausmann (1978) test, which checks whether the coefficients obtained from a fixed effects specification are significantly different from those from a random effects specification. The Hausmann test rejects the random effects specification for MH and SA at the 5% significance level, but fails to do so for DD. We have reestimated the DD equation using a random effects specification on the states (but kept the fixed effects specification on the years). Among the organizations and levels variables, only the estimate for DD-lev has changed significantly. For this reason and for brevity, we do not report the random effects estimates here (these are available upon request from the authors).

To illustrate the magnitudes of the impact of changing organizational structures on state spending in behavioral health, we perform a number of simulations using the regression results. First, we hypothetically construct a "median" state. From our sample, we calculate the median per capita expenditures of MH, SA, and DD to be \$33, \$7, and \$43 respectively. Because we have applied logarithms to the dependent variables, the estimates in the regressions represent the effects of the changes of the independent variables on the percentage change of the dependent variables. From the regression result of the full model on expenditures of MH, we see that

making that agency more independent will raise per capita expenditure by about 7%. For the median per capita expenditure, this translates into an amount of \$2.30; on the other hand, making a DD agency more independent is expected to reduce mental health spending by more than 50%. For the median per capita expenditure, this translates into an amount of \$2.30; on the other hand, making a DD agency more independent is expected to reduce mental health spending by more than 50%. Finally, according to the results in Table 12, if DD agency is under the control of SMHA, then the agency's spending will be expected to increase by more than 10%; this translates to more than \$4.30 for the median developmental disability spending level.

We must interpret these illustrations carefully. First, the above numbers are predictions of average changes among states collectively. The regressions actually predict different impacts of organizational changes for different states because states may have different demographic and economic circumstances. Second, the magnitude of some of the predictions appears to be high. For example, the effect of a DD agency becoming more independent reduces spending by 50%. This is actually less implausible than it might first appear. We emphasize that this is a reduced form model; the structural changes that are associated with an agency becoming independent is not captured by our model. It is entirely possible that bureaucratic, political, and administrative changes involved with an agency becoming more or less independent are very significant. When these changes are taken into account, it does not seem entirely implausible that organizational changes can have large impact on spendings. Third, we do not model the source of agency funds, and implicitly assume that they are exogenous (and captured by the fixed effect variables). Federal funds account for large portions of agency spendings in most states. Regression estimates in Table 11 show a very large percentage reduction in substance abuse spending when the MH and DD agencies become more independent. Our results indicate that the more independent the agency is, the more funds it will attract. These should be interpreted as saying that without an increase in federal funds, this leads to a reduction in funding of comparatively less independent agencies, in this case, SA agencies. It is entirely possible that federal funding to states change when organizational changes occur; our regression results then may not apply straightforwardly.

CONCLUSION

In this article, we investigate the effect of organizational structure on the spending of mental health, substance abuse, and developmental disability agencies at the state level. The null hypothesis that organizational structure

does not affect agency spendings is easily rejected. In fact, the data and the analysis suggest strong relationships between the agencies' organizational structure, and their spending levels. Moreover, this relationship seems to be interrelated: for example, a state's mental health expenditure is influenced by the organization of all the behavioral health agencies; a change in the organization structure of the substance abuse, developmental disability, or both agencies is expected to affect mental health agency spending. We suggest a theory of competition and bargaining between agencies: an agency's position in the state bureaucracy determines its bargaining power and competitive advantage over the other agencies. Our analysis supports such a theory.

Various limitations in the data set have forced us to regard the results as tentative. Our methodology of using fixed effects avoids the common problem of biased regression estimates in cross-section models when only a very small number of covariates can be included. But our method relies on changes in the independent variables. Unfortunately, the organizational structures for the period of our analysis (1981–92) simply have not undergone many changes. In fact, we have made some compromise by reducing the classifications of organizational variables. Despite these “second-best” considerations, our results imply that organizational structures are important determinants of expenditures.

The empirical implementation of the model is based on our assumption that the organizational variables are exogenous. One may come up with reasons for why these variables are actually endogenous. A possible reason could be that organizational structures and behavioral health agency spendings are jointly decided by the legislative and the executive branches, or both, to achieve a certain goal (such as an efficient provision of behavioral health care). A complete model then will need to account for the endogeneity of the organizational variables; this may be a topic for further research.

As we approach the next century, more changes in the financing and spending of behavioral health services are only to be expected. Our article adds to the policy discussions on the spendings by behavioral health agencies. Attention should be paid to the way these agencies are organized in the state bureaucracy, their relationships to each other, as well as with other state agencies.

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