Do cost increases for the elderly reduce benefits for the disabled? State government design of Medicaid with distinct recipient groups

Steven Craig[1] and Larry L. Howard[2]

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Abstract

A panel of U.S. state governments over 28 years is used to examine demand for the provision of low-income public health care through the Medicaid program. Allocation of expenditure within the program and between other categories of expenditure is modeled using the demand system developed in Deaton and Muellbauer (1980). We disaggregate the recipient population into distinct groups consisting of the elderly, the disabled, and families, and estimate inter-group substitution patterns. Our main findings indicate that state governments respond unequally to changes in the program costs of each group by reallocating expenditure within Medicaid and between cash assistance welfare.

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[1]Address for correspondence: Steven Craig, Department of Economics, University of Houston, Houston, TX, 77204 USA. e-mail: scraig@uh.edu; Telephone: 1-713-743-3812; Fax: 1-713-743-3798.

[2]Department of Economics, California State University, Fullerton, CA, 92834. e-mail: larry-howard@fullerton.edu.

Introduction

This research examines how state governments alter inter-group benefits within the Medicaid program. Such an examination is possible because Medicaid consists of three distinct low income recipient groups; the elderly, the disabled, and families.[1] Whether state governments view each of these groups as equivalent, or instead whether one is more favored in the allocation process, motivates our examination. Specifically, if the costs affecting one of the three groups rises, our interest is to determine whether adjustments within a group accommodates the cost increase, whether adjustments affecting other groups within Medicaid are used, or instead whether a group is insulated from cost increases through adjustments outside of the Medicaid budget, including other government low income assistance programs or taxes.

Medicaid is the nations largest public provider of low-income health care insurance; and is unique in the sense that, conditional on income, participants are representative of the full spectrum of ages and disabilities in the country's general population. For this reason, Medicaid provides a unique opportunity to explore the influence of each group on state government behavior, whether that influence is direct (e.g. through lobbying) or indirect (e.g. through taxpayer demand). We accomplish this test by estimating the elasticity of output of each group as a function of the price the government perceives not only for the own group, but for the cross groups as well.

To accomplish the objective of understanding state government response to exogenous changes in the costs of Medicaid, our work carefully distinguishes the price each state faces for each Medicaid policy choice. The definition of price, and therefore of output, is somewhat arbitrary, in that recipients per capita times benefits per recipient equal total expenditure. We arbitrarily and non-substantively select benefits per

[1]Here, the disabled also include the blind and family refers to kids and their adult parents who receive Medicaid coverage as well as first time pregnant women and kids whose parents are not covered.

recipient as the output measure, which leaves recipients per capita as the price.[2] What is important about the selection is that there is an endogenous component to price, although of course it is also subject to many economic forces outside the control of state governments. Key to our analysis is that federally allocated programmatic discretion in Medicaid allows states to respond to budgetary pressure on one dimension of their welfare programs by choosing to emphasize a relatively less expensive alternative(Ribar and Wilhelm, 1999; Baicker, 2005).

The benefit levels chosen by state governments, defined here as group specific expenditure per recipient, reflect two critical characteristics of the health care provided through Medicaid. First, it measures the range of medical services covered. Although the federal government mandates that certain key services be provided (e.g. hospital and physician services), other services such as prescription drugs, rehabilitation therapies, and eye and dental care are made available to recipients only at the state's discretion (Sommers et al., 2005). Second, benefit levels reflect the implicit quality of health care chosen by state governments given the considerable control they have over the reimbursement rates paid to health care providers for specific medical services.[3] For these reasons, changes in eligibility or benefits of public health care are likely to introduce unequal budgetary pressure due to the vastly different demand for health care services across recipient groups (Holahan et al., 1993).

One reason analysis of governmental response to individual group cost pressures is interesting is to determine the extent to which demands for each group are consistent across states. We believe that such consistency would point to recipients being important determinants of public sector behavior, because the incentives facing recipients are

[2]We also show the inverse definition and results below.

[3]For example, Grabowski et al. (2004) find a positive relationship between Medicaid reimbursement rates and risk-adjusted nursing home quality measures and Intrator and Mor (2004) find a negative relationship with respect to the risk of hospitalization. See McNeil (2001) for a detailed discussion of the quality of care in the American health care system.

quite similar between states. Conversely, the influence of medical provider groups, or of taxpayers generally, is much more likely to exhibit considerable inter-state variation, as local conditions regarding constituency formation may vary significantly between states even with relatively similar underlying economic environments. In some senses, this question is the key unanswered question in the analysis of low income assistance. Rent seeking theory suggests that beneficiaries of government programs attempt to influence government behavior. This theory is generally given the least weight as an important component of low income assistance, however, because low income groups are the least politically active, and have the least amount of resources to devote to political participation.

On the other hand, the elderly and disabled are both well defined groups whose membership is not very dynamic. Further, both groups might be expected to be associated with a family that is much broader than the member of that group, giving them political power disproportionate to their size. To the extent that groups of constituents can be effective operating through a political party, each of these two groups might be expected to associate with a single party. It is difficult to ascertain, however, an ideological reason why the elderly or the disabled might be more associated with one political party compared to another. Our panel analysis by states will test whether there is consistency across states, which would be evidence corresponding to national rent seeking behavior. The comparison to low income families in this context is quite interesting, since this group would be expected to be much less effective as a group. That is, low income families are not generally as strongly associated with other families as are the elderly and disabled, so the membership is not as expansive. Further, low income families are a relatively dynamic group, and their differential concern over public policy formation is as likely to be directed toward cash welfare provision as to medical care. Thus our test of how state governments respond to the three individual groups

of recipients offers unique insight into the political process of low income assistance policy formation.

Reallocation of expenditure within the Medicaid program is modeled using the demand system developed in Deaton and Muellbauer (1980a)(D-M), where one outcome is the benefit level per recipient for each of the groups, and the price facing states is the number of recipients per capita, distinguished by group, and multiplied by the state matching share.[4] This enables estimation of inter-group substitution patterns between the recipient and benefit dimensions of programmatic design. It is shown that an overlooked mechanism of adjustment in response to budgetary pressure is reallocation of expenditure within the Medicaid program, rather than between Medicaid and other government expenditure, or between Medicaid and total taxes.

Because of the success of our estimation strategy, we expand the scope of the analysis to include a fourth good, cash welfare assistance. For this portion, we simply use as the price the net cost of cash welfare based on the matching rate from AFDC and later TANF (where the matching rate goes to zero), where the quantity is the expenditure per capita.[5] Cash welfare is available primarily to families with children, so the hypothesis to be tested is whether cash assistance substitutes for commodity assistance represented by Medicaid (Marton and Wildasin, 2007). The advantage of the specification here is that this idea can be tested with respect both to Medicaid benefits per recipient, and recipients per capita.

Our results quantify the extent to which states react differently depending on the recipient group, and provide an important cautionary tale to major policy changes in public health care provision. We find that state governments respond unequally to changes in the program costs of each group by reallocating expenditure within Medicaid

[4]Deaton and Muellbauer call their specification the Almost Ideal Demand System (AIDS).

[5]The federal matching rate for AFDC is generally identical to that for Medicaid, and depends on a three year average of state per capita income relative to the national per capita income, with a cap of 50which replaced AFDC, is a block grant program with no marginal impact.

and between cash welfare assistance. Cost increases affecting families are financed by reducing expenditure on the disabled. In contrast, cost increases affecting the elderly and the disabled are financed by reducing expenditure on their own group in addition to reducing expenditure on cash assistance welfare. The unequal response uncovered here suggests a number of policy implications.

Section 2 further elaborates on the motivation for disaggregating Medicaid recipients into demographic groups. The D-M demand system and the utilization of it to model state government expenditure allocation decisions is presented in section 3. The data are presented in section 4. An important component of the data is the use of an array of federal programmatic controls, as well as political configurations. Section 5 discusses the results, and a final section summarizes the main findings and policy implications.

2 Recipient diversity

The objective of our model is to determine how state governments design their Medicaid programs, accounting for the separate demands of the three recipient groups, the elderly, the disabled, and low income families. The disparity in Medicaid is evident in Table 1, where the average real cost of Medicaid benefits to state governments, defined here as group specific expenditure per recipient, is summarized. For example, one elderly recipient costs approximately ten times more than one family recipient on average. Similarly, a disabled recipient costs states about seven times more than a family recipient on average. Our concern is to determine whether changes in the relative costs affect eligibility criteria for each group, for other groups, or are instead smoothed by changes elsewhere in the state government budget.

The relative change in the price of medical care is well known, but changes in the

recipient base are also important alterations in the underlying environment affecting state government programmatic design. Recent research looking into the prevalence of disability in the U.S. has shown that the younger population experienced a rise in disability during the 1980s and 1990s; a period in which disability prevalence and other ailments actually declined for the elderly population (Lakdawalla et al., 2004; Kramarow et al., 2007). In addition to the role that individual characteristics and economic conditions play in the growth of disability, in-kind Medicaid benefits also have actuarial value that could be a financial incentive for certain individuals to exit the labor force or appeal to disability status in order to receive health care services (Autor and Duggan, 2003; Duggan and Imberman, 2006). If states understand that these trends in demographic groups differ and that tradeoffs in expenditure between groups are possible, such as for the cost of covering one elderly recipient they could choose to cover ten family recipients, then aggregate measures of state government price sensitivity can potentially obscure the true underlying response of state governments to budgetary pressure compared to separately examining recipients and benefits per recipient.

Our objective is therefore to construct a model that accounts for exogenous changes in the price and quantity for each recipient group within Medicaid, and to be sensitive to the endogenous components of change. Our model will summarize state government behavior by estimating own and cross price elasticities for the recipients of each group. An important element of our examination, however, will be to also capture how the political process affects the resulting elasticities. We accomplish these objectives by specifying our model with a flexible demand system, the D-M demand system.

3 The D-M demand system model

To accurately estimate inter-group substitution patterns, it is necessary to distinguish between the two main dimensions of programmatic design that are endogenous to state governments, eligibility and benefits, and assume that discretion over eligibility criteria translates into control of the level of recipients. Studies by Craig (1994), Ribar and Wilhelm (1999) and Baicker (2005) emphasize that states do differentiate between the recipient and benefit aspects of program choice in the context of cash-assistance welfare. Extending this distinction to in-kind health care is reasonable given the considerable programmatic discretion also devolved to state governments in this context (Sommers et al., 2005). Total per capita state expenditure on Medicaid can be decomposed in the standard fashion as

$$\frac{E_M}{N} = \frac{E_M}{R} \cdot \frac{R}{N} = Benefits \cdot Recipients \tag{1}$$

where E_M is total Medicaid expenditure, R is total Medicaid recipients, and N is the size of a state's population. Both benefits and recipients are variables endogenous to state governments, and differing constituencies within a state interact in conjunction with federal strictures to ultimately influence the degree to which each dimension is emphasized (Burwell and Rymer, 1987; Baicker, 2001). By explicitly modeling this distinction it is possible to disentangle the responsiveness of state expenditure to budgetary pressure affecting each dimension separately, and empirically verify that states do indeed tradeoff the benefit and recipient aspects of programmatic design as Baicker (2005) show in the context of cash-assistance welfare. We push our analysis further to show the relative importance of political as opposed to other influences on state governments to ascertain the extent to which low income assistance demand by governments is a function of taxpayer, or recipient demands.

3.1 Theoretical framework

To apply the D-M demand system in this context, we first abstract from all other commodity groups in which a state has demand and focus exclusively on its expenditure on Medicaid. The institutional framework in which state governments make budgetary decisions suggests that the determination of aggregate expenditure levels precedes the specific allocation of expenditure (Deacon, 1978), this assumption is relaxed later.[6] We denote a state's expenditure function for Medicaid as

$$E_M = E_M(U, P) \cdot S \tag{2}$$

where S is the share of total Medicaid outlay that states are responsible for financing internally.[7]

Assuming state governments minimize the expenditure E_M required to achieve a particular level of utility (U) when facing a vector of prices for each group of recipients (P) , the demand for Medicaid is derived in the standard manner by applying Shephard's lemma to this expenditure function in log form. The demand for Medicaid takes the form

$$\frac{\partial ln E_M}{\partial ln P_i} = \frac{P_i \cdot Q_i}{E_M} = \omega_i \tag{3}$$

where ω_i is the Medicaid expenditure share of recipient group i. At this point, minimal

[6] At this point, if a general utility function for a state government is thought to exist, preferences are assumed to be weakly separable with Medicaid comprising one out of many commodity groups. Specifically, preferences are separable in that the preference ordering over goods within a commodity group, here Medicaid, is not dependent on consumption levels outside the group. This assumption enables us to model subgroup or within group demands in isolation by focusing on one aspect of the more general maximization problem that a state faces (Deaton and Muellbauer, 1980b).

[7] S is equal to $(1 - FMAP)$ where the $FMAP$ is the federal medical assistance percentage that a state receives based on their three year average per capita income relative to national per capita income. It is bounded between 50% for the highest per capita income states and 83% for the lowest per capita income states.

structure has been placed on state government demand for Medicaid. To develop an exact specification of state demand that can be estimated we utilize the D-M cost function in order to express state Medicaid budget shares as a function of group prices and total expenditure such that

$$\omega_i = \alpha_i + \sum_j \gamma_{ij} lnP_j + \beta_i ln\{E_M/P^\star\} \quad \text{for all} \;\; i \tag{4}$$

where $P^\star = \sum \omega_i lnP_i$ is Stone's (1954) price index and is a reasonable linear approximation to the exact price index developed within the D-M demand system (Deaton and Muellbauer, 1980a; Coyte and Landon, 1990; Alston et al., 1994).[8] This set of structural equations allows for the estimation of the impact that each individual group price has on the budget shares for each group. Thus, a group's budget share is treated as being a function of own and cross prices in conjunction with the overall Medicaid budget.

The structural parameters in equation (4) are utilized to calculate price elasticities of demand. The elasticities can be used to simulate how budgetary pressure and proposed federal policy changes might differentially affect each of the recipient groups. As specified, the elasticities show the change in benefits per recipient as total recipients change. Uncompensated price elasticities of demand are expressed as

[8]The D-M cost function is $lnC(u,P) = \alpha_0 + \sum \alpha_k lnP_k + \frac{1}{2}\sum\sum \gamma^\star_{kj} lnP_k lnP_j + u\beta_0 \prod P_k^{\beta_k}$ whereby further assuming $E_M = C(u,P)$, as would be the case for a utility-maximizing consumer, gives the indirect utility function that is then substituted into the budget share function implied by equation (3) (Deaton and Muellbauer, 1980a).

$$\begin{aligned}
\eta_{ij} &= \frac{\partial lnQ_i}{\partial lnP_j} = -\delta_{ij} + \frac{\partial ln\omega_i}{\partial lnP_j} \\
&= -\delta_{ij} + \frac{\gamma_{ij}}{\omega_i} - \frac{\beta_i}{\omega_i} \cdot \frac{\partial lnP^\star}{\partial lnP_j} \\
&= -\delta_{ij} + \frac{\gamma_{ij}}{\omega_i} - \frac{\beta_i}{\omega_i} \cdot \omega_j \qquad (5)
\end{aligned}$$

where δ_{ij} is the Kronecker delta such that $\delta_{ij} = 1$ for $i = j$ and $\delta_{ij} = 0$ for $i \neq j$. These elasticities measure the tradeoffs states make within each of the component groups and are derived holding total Medicaid expenditure and cross-prices constant (Alston et al., 1994).

The flexibility of the D-M demand system is appealing for three main reasons. First, the literature often models state government demand for both in-kind and cash welfare assistance as that of a representative state resident; typically based on the notion that it is the decisive voter's preferences (Sloan, 1984; Ribar and Wilhelm, 1999; Adams and Wade, 2001; Baicker, 2001, 2005). The functional form of equation (4) allows us to test directly whether state government demand for Medicaid follows from the utility maximization of a rational representative consumer.[9] A priori it is not clear whether state government demand for Medicaid would be consistent with that of a rational consumer. A model of demand in which the features of rational choice can be nested as a hypothesized restricted form is informative; especially considering the prevalence of modeling government demand as that of a representative state resident.[10] If the restricted form of the model is rejected we are left with a demand specification where

[9]Three properties of demand functions implied by behavior consistent with utility maximization are homogeneity, symmetry, and negativity. While homogeneity is a direct consequence of specifying a linear budget constraint, symmetry and negativity hold if preferences are consistent with the axioms of rational choice (Deaton and Muellbauer, 1980b).

[10]Baicker (2001) develops a general model of the state government maximization problem that does not rely on the extensive assumptions of a decisive voter framework; however, the model does not permit direct testing of the demand function properties implied by rational choice.

budget shares are a continuous function of prices and overall budget. With the inclusion of an intercept term, the estimated unrestricted model yields a local first-order approximation to any demand function (Deaton and Muellbauer, 1980a). Thus, the alternative to the hypothesis of a rational representative consumer is a demand function which allows for a general relationship between expenditure, prices, and observed purchases of state governments.

Second, applying the D-M demand system in this context permits the conceptualization of groups of the total recipient population in order to formally test whether state governments exhibit differential preferences for each group. The classification of Medicaid recipients considered here is the elderly ($i = 1$), the disabled ($i = 2$), and families ($i = 3$). Given the importance of various constituencies in the determination of state government behavior, it is unlikely that budgetary pressure on either the eligibility or benefits dimension of Medicaid would stimulate state government policy changes equally for each group. Accordingly, the distinction between recipient groups allows for alternative political environments to exhibit differential effects. Variation in the willingness of state governments to alter aspects of Medicaid particular to each group is also interesting in the context of understanding how states tradeoff group-specific eligibility and benefits in response to budgetary pressures originating from "cross" groups.

Finally, the model can be expanded to incorporate expenditure outside of the Medicaid. A broader model of state government expenditure allocation will allow for an assessment of how inter-group substitution is affected by the budgetary formation process that states utilize. We first formulate the model under the assumption of a two-stage budgeting process for total Medicaid expenditure and then for total welfare program expenditure. Lastly, we formulate the model under the assumption of a single-stage budgeting process that allows for interrelationships between Medicaid allocation decisions, other governmental expenditure, and private expenditure through taxes.

3.2 Empirical framework

We utilize equation (4) to estimate states' intergroup substitution patterns between Medicaid recipient groups. The model for state government demand for Medicaid is postulated in equation (6):

$$\omega_{ist} = \alpha_{is} + \tau_{it} + \sum_{j} \gamma_{ij} lnP_{jst} + \beta_i ln\{E_{st}/P^{\star}_{st}\} + \mathbf{X}_{st}\Lambda + u_{ist} \tag{6}$$

where the outcome of interest ω_{ist} is defined as in equation (3), $i = (1, 2, 3)$ denotes the recipient groups of the elderly, the disabled, and families, respectively, for state s during fiscal year t, and u_{ist} are independent group–state-year-specific stochastic errors. Additionally, state fixed effects by group α_{is} are included to control for time-invariant factors that may impact the distribution of Medicaid expenditure across groups as well as time fixed effects by group τ_{it} to control for macroeconomic factors and federal policy changes affecting all states' Medicaid expenditure over the sample period of 1977-2004. In order to restrict our parameter estimates to reflecting preference variation at the state level to the extent possible we include a vector $\mathbf{X}$ of explanatory variables representing economic, political, and demographic environments that a state would take into account when choosing its Medicaid expenditure on each group.

One crucial advantage of the D-M specification in equation (6) is that the parametrization of the model is sufficient to recover estimates of key bidirectional relationships in state Medicaid program design. Total Medicaid program cost is dependent on the costs at the extensive (recipients) and intensive (benefits) margin; that is, costs can be shifted back and forth by state governments resulting in no net increase in program expenditure. By disaggregating total Medicaid program spending into expenditure on constituent groups it is possible to quantify the extent to which states shift costs. We estimate the model of demand in budget share form assuming the output demanded

Q_{Bi} is the average benefits for each group chosen by states and that the prices states face in order to change group benefits by one dollar P_{Bi} is equal to the number of per capita recipients in each group net of federal matching aid. Information on state response for the alternative recipient dimension is obtained by taking the reciprocal of the estimated price elasticity of demand for benefits given in equation (5). The demand for the recipient dimension is directly derived from the estimates of states' price elasticities of demand for group-specific Medicaid benefits by noting that

$$\widehat{\eta}_{Bij} = \frac{\partial lnQ_{Bi}}{\partial lnP_{Bj}} = \frac{\partial ln\ Benefits}{\partial ln\ Recipients} \tag{7}$$

and

$$\widehat{\eta}_{Rij} = \frac{\partial lnQ_{Ri}}{\partial lnP_{Rj}} = \frac{\partial ln\ Recipients}{\partial ln\ Benefits} = \frac{1}{\widehat{\eta}_{Bij}} \tag{8}$$

noindent The price elasticities obtained from the estimated parameters in equation (6) fully acknowledge the fact that the price of one choice dimension (benefits) is simultaneously part of the price for the other choice dimension (recipients). Lastly, the effects of a states changing political environment are estimated. The percentage change in each group's benefits are calculated as

$$\frac{\partial lnQ_{Bij}}{\partial G_{ig}} = \frac{\partial \omega_i}{\partial \delta_{ig}} \cdot \frac{\partial lnP_{Bi}}{\partial \omega_i} \cdot \frac{\partial lnQ_{Bi}}{\partial lnP_{Bi}} = \frac{\widehat{\delta_{ig}} \cdot \widehat{\eta}_{Bij}}{\widehat{\gamma_{ij}}} \tag{9}$$

and recipient levels as

$$\frac{\partial lnQ_{Rij}}{\partial G_{ig}} = \frac{\partial \omega_i}{\partial \delta_{ig}} \cdot \frac{\partial lnP_{Bi}}{\partial \omega_i} = \frac{\widehat{\delta_{ig}}}{\widehat{\gamma_{ij}}} \tag{10}$$

where $\widehat{\delta_g}$ are the estimated coefficients on G explanatory variables in $\mathbf{X}$ capturing state legislature ideology and state government partisanship.

3.3 Estimation and identification of D-M demand system model

In the context of Medicaid, prices for both benefits and recipients are endogenous choices devolved to states by the federal government. When estimating benefit demand, for example, it is a concern that states choosing to cover more recipients in a particular group one year might also choose to offer more (less) benefits to that group or "cross" groups during the same fiscal year. OLS estimates of our key parameters of state demand would be biased upward (downward) because the demand system as formulated is not explicitly modeling the bidirectional effects of group benefits on recipient levels. To obtain consistent estimates in this context we apply an instrumental variables estimation strategy and employ the standard heteroscedasticity-robust generalized method of moments (GMM) estimator.

Key to our identification strategy is the utilization of information on the number of state residents participating in federal welfare programs in a given year. These federal programs include the Food Stamp Program (FSP) and the Supplemental Security Income (SSI) program, which have uniform standards of benefit levels and eligibility criteria across the U.S. We construct three variables measuring the per capita recipient levels of FSP participants, SSI elderly recipients, and SSI blind and disabled recipients in each state for each year. The variables are assumed to be exogenous measures of a state's changing income distribution for the primary poverty populations served by the Medicaid program and explicitly modeled here as the elderly, the disabled, and families. To further assess the validity of our identification strategy and the consistency of estimates of the key model parameters, we construct national growth rates of total Medicaid recipients and interact these rates with the out-of-sample initial level of recipients of each group in states for fiscal year 1976. These instrumental variables are strongly correlated with the observed variation in the Medicaid recipient levels of each

group.[11] We include this last measure as an additional instrumental variable in order to improve overall efficiency and, perhaps more importantly, to assess the validity of our identification strategy by performing tests of overidentifying restrictions.[12]

4 Data

Equation (6) is estimated on a pooled sample of U.S. states for the fiscal years spanning 1977-2004. To capture the exogenous environment in which states operate, so as to restrict our elasticity estimates to reflecting preference variation at the state level to the extent possible, data from a number of government agencies is incorporated into the vector of state-specific characteristics $\mathbf{X}$. Summary statistics for these variables are reported in Table A-1 of the appendix. A brief description of the data source and reasoning for inclusion in the model is discussed below.

4.1 State government expenditure

Data on state government Medicaid expenditures and recipients come from the Health Care Financing Administration (HCFA) 2082 forms for 1977-1998. As of fiscal year 1999, all states are required to submit Medicaid expenditure and recipient infor-

[11] We calculate F-statistics testing the null hypothesis that the instrumental variables are jointly insignificant predictors of state Medicaid recipient levels in each group. Treating total Medicaid expenditure as separable from all other government expenditure, we calculate F-statistics equal to 28.57, 15.72, and 74.24 for the natural log of recipient levels for the elderly, the disabled, and families, respectively; these are reported in Table A-2. Treating total Medicaid and cash assistance welfare expenditure as separable from all other government expenditure, we calculate F-statistics equal to 37.60, 12.26, and 68.74 for each of the groups, respectively; these results are not reported here and are available from the authors by request.

[12] We calculate the Hansen J test of overidentifying restrictions. Treating total Medicaid expenditure as separable from all other government expenditure, the J tests are distributed as Chi-square variables with degrees of freedom equal to one and are reported in Table A-3. The corresponding p-values are 0.397, 0.199, and 0.819 for the elderly, the disabled, and families, respectively. Treating total Medicaid and cash assistance welfare expenditure as separable from all other government expenditure, p-values are 0.102, 0.506, 0.966, and 0.335 for each of the groups and the budget share of cash assistance welfare, respectively; these are reported in Table A-4.

mation via the Medicaid Statistical Information System (MSIS) and complete data is currently available through fiscal year 2004. Due to missing Medicaid program data and other considerations discussed below, panel data for 47 states are assembled. Arizona is excluded because it has operated under a 1115 waiver since it began its Medicaid program in 1982 and does not show up in the HCFA 2082 reports until 1991. Hawaii is not included because they have implemented a universal health care program and the reported Medicaid expenditure and recipient data conflates Medicaid and their universal health care values (Kousser, 2002). Data on other state government expenditure is obtained from the Annual Survey of Government Finances conducted by the United States Census Bureau for fiscal years 1977-2004. Lastly, the federal medical assistance percentages used to calculate the state share of total Medicaid expenditure are obtained from the Green Book for all years and all expenditure values are adjusted using the medical care consumer price index (CPI) indexed in 1983-84 dollars to reflect changes in health care costs over time.[13]

4.2 State environment

Variables reflecting the state specific political environment are constructed from two sources. Data on the partisan affiliation of state governors, the partisan composition of state legislatures, and the fraction of state legislature which is affiliated with the Democrat party is obtained from the National Conference of State Legislatures for the entire sample period. We utilize this information to define dichotomous variables equal to one if a state has a unified Democratic state legislature, a divided state legislature,

[13]The medical care CPI is designed by the Bureau of Labor Statistics to reflect the average out-of-pocket costs at the retail level to maintain a constant quantity and quality of medical care goods and services over time; reflecting the cost of medical care services and the cost of medical care commodities. Examples of the medical care services taken into account include inpatient and outpatient hospital services, nursing home services, physician services, dental services, and eye care. Examples of medical care commodities accounted for include prescription and nonprescription drugs, medical care supplies, and medical care equipment.

a Democratic state governor, and an Independent state governor. Thus the omitted categories captured in the constant term are a unified Republican legislature, and a Republican governor, respectively. We construct variables measuring a state's changing ideological composition by interacting the percentage of the state legislature which is Democrat with the Democrat and Republican state ideology measures developed in (Erikson et al., 1989). The two ideological indices were based on a survey of political party leaders in each state.[14]

To control for general state demographic characteristics representative of the tax-payer and target populations of Medicaid we use the percent of the state population that is female and between the ages of 15 and 44, the percent of the state population age 14 or younger, and the percent of the state population age 65 or older reported by the U.S. Census Bureau.[15] Additionally, a proxy for cyclical economic factors is the state annual unemployment rate from the U.S. Bureau of Labor Statistics.

4.3 Federal welfare programs

Participation data is employed from three separate federally controlled low income assistance programs and used as instrumental variables for Medicaid recipient levels in each group. Because the federal program parameters are identical for all states, participation reflects the income distribution characteristics of each specific group. Second, however, the other element captured by federal program participation is the

[14]See (Erikson et al., 1989) for details on how the indices were constructed and standardized by party; the indices are based on data collected in the late 1970s and early 1980s. We employ these indices as time-invariant variables capturing cross-sectional variation in ideology. We therefore assume that a state's ideology of the Democrat and Republican elite legislature members is constant over the time frame analyzed here. By interacting the indices with a state's changing partisan composition within both houses of the state legislature we allow for time-varying effects of party ideology beyond the time-invariant effects captured with state fixed effects.

[15]Certain people over the age of 65 are eligible for both Medicare and Medicaid; federal law requires Medicaid to pay for any difference in medical care costs not covered by Medicare up to the state specific payment limit.

willingness of the population to participate in government assistance (take-up). The underlying propensity of a given state population to take up welfare is likely to influence the choices state governments make when designing their Medicaid programs. State specific data is collected on Supplemental Security Income (SSI) recipients from the U.S. Social Security Administration to construct per capita measures of elderly SSI and blind-disabled SSI recipients. Additionally, a per capita measure of Food Stamp Program participants is constructed with data obtained from the U.S. Department of Agriculture. Lastly, to proxy for the underlying prices of medical care, as well as the propensity of people to use purchased medical inputs, a variable measuring state specific Medicare expenditure per recipient is constructed from data obtained from the U.S. Department of Health and Human Services.

5 Results

We present the estimation results for two separate models, the three good model which only considers the distinct groups within Medicaid, and the four good model, which estimates in addition the substitution with cash welfare assistance. The results have two components. The key one from the perspective of understanding how state governments respond to external budgetary pressure is the estimated price elasticities. We show both the own and cross price elasticities, which are central to understanding how much within-program adjustment is made to accommodate external pressures. That is, an increase in the number of otherwise eligible recipients may result in reduced benefits per recipient for that group, which can be the services covered or the implicit quality of that service, or it may result in reductions in the benefits affecting other groups within Medicaid. The four good model results expands this view to ascertain the importance of the programmatic boundary, as we examine adjustments outside of

Medicaid which are nonetheless pertinent for many Medicaid recipients.

Table 2 presents the elasticity calculations for the three good model, based on the coefficient estimates presented in Appendix Table A-3 using our panel of state governments over time. We find significant own price elasticities for all three groups. The own price elasticity for the disabled is estimated to be larger than one (although not statistically different from one), which suggests that at the margin an increase in recipients would lead to a reduction in benefits per recipient large enough to entirely self finance the increase. The estimated own price elasticity for the elderly is 0.7, which suggests significant benefit reductions when the eligible population is found to increase. Families face the smallest own price elasticity, only 0.30.

The interesting element of the relatively small own price elasticity for families is that only for this group do we see significant cross price elasticities with the elderly and disabled. Benefits for both of the other groups are found to be reduced by state legislators in response to an exogenous increase in the demand for family medical care. We further find similar substitution between the elderly and disabled in three of the four relevant point estimates, although these estimates are not significantly different from zero at conventional levels. The only weak evidence for complementarity is that increases in disabled recipients are found to result in increased benefits per elderly recipient.

The results for the four good model, presented in Table 3, offer a considerably richer view of the inter-group substitutions that characterize state government demand for Medicaid, and indeed for low income assistance generally. First, despite considering substitution with a poverty program outside of Medicaid, the estimated own price elasticities are significantly negative for all three groups, as well as for cash welfare assistance. We do find, however, that the own price elasticities for each of the groups within Medicaid are now essentially indistinguishable, at about 0.50. Consistent with

this result, the elasticities also show significant substitution between Medicaid health care for families, relative to the disabled and elderly. The complementarity between the elderly and disabled is shown to be significantly stronger, and statistically significant for the effect of disabled recipients on elderly benefits per recipient. The additional striking element, however, is the strong substitution found between both the elderly and disabled and the cash assistance program directed toward families.

Specifically, the earlier finding that there is complementarity between the elderly and disabled is considerably strengthened. We find that the benefits to the elderly are increased when the number of disabled are found to increase, the estimate of 0.78 is large and statistically significant. While the mirror elasticity is not significant at conventional levels, we nonetheless show a positive point estimate. What is interesting about the four good model, however, is that understanding is shed on the insignificance of the cross price elasticities found earlier between families on the one hand, and the elderly and disabled on the other. In particular, we see that increases in either the elderly or disabled populations result in statistically significant and quantitatively important reductions in expenditure on cash welfare assistance. Thus the competition between recipient groups is not played out entirely within the Medicaid budget, we see that the competition spills over in important ways into the overall poverty assistance budget.[16]

The other element of interest in the cross price elasticity estimates in the four good model is a test of the hypothesis in Marton and Wildasin (2007). They build a model showing that the conversion from AFDC to TANF may be important for the provision of Medicaid. Our methodology here provides a significant refinement to their hypothesis. The AFDC program provided a cost sharing incentive at the margin to states, as the federal government paid on average about 60% of each additional dollar spent on the program. The conversion to TANF in 1997 eliminated this incentive, as all federal aid

[16]It would be interesting if we had separate state funded programs for the elderly or disabled.

was converted to a block grant. As hypothesized in Marton and Wildasin (2007), we find that this conversion would not only lower state provision of cash welfare assistance, but would lower Medicaid payments to families as well. This reduction occurs in the benefits per recipient (-0.21), we speculate the process is mostly in reduced payments to providers resulting in fewer providers being available to Medicaid families. The other interesting result, however, is that we also show that benefits per recipient to the disabled are found to fall as the price for cash assistance increases, the significant cross-price elasticity is estimated to be negative at -0.27.

One method to summarize the above results is to consider how a given cost increase would be accommodated within the Medicaid budget (3 good model), or within the combined Medicaid and cash assistance budget (4 good model). Table 4 presents the results of this experiment. The results in the table rely on the elasticities in Tables 2 and 3, as well as their inverses. The elasticities presented are the change in benefits per recipient as a result of exogenous change in recipients, while the inverse describes the change in recipients as a result of changes in benefits per recipient. As described above, this is a result of the way we have described elasticity, and is not a re-estimation.

Table 4 shows that increases in the eligible elderly or disabled essentially results in self financed changes, as most of the expenditure change comes out of the own benefits per recipient. Conversely, however, changes in benefits per recipient result in eligibility reductions primarily upon the family recipients. In contrast, exogenous changes in either the number of eligible families, or in the benefits per family, are spread among all recipients, in no instance do the own program changes amount to 70% of any exogenous expenditure increases (and these only for changes in the number of recipients).

6 Discussion

Our elasticity estimates of Medicaid program design, using a panel of states over twenty six years, suggest an element of political competition, as the elderly and disabled appear to be more likely to act together and consistently, while state government design of the family portion of Medicaid appears to have different motivation as represented by the differential response to external pressures. To explore this idea, Table 6 presents the results with respect to the political structure variables. Specifically, we look for how state government behavior changes with the party of the governor, with the party that has a legislative majority, and with an ideology index. These results suggest that political structure is at least one of the elements that affect how state governments design their Medicaid programs, and that further exploration along these lines is likely to be potentially useful.

The important element for understanding state government programmatic design appears to be whether one party is the majority of both houses (except for Nebraska), as the simple proportions are not found to matter. If the Democrats control both legislative houses, however, we find that eligibility criteria for the disabled will be looser, while that for families will be more stringent. Given that the mixed legislature is also found to be positive for eligibility criteria for the disabled, Republican control of the legislature leads to more stringent criteria for the disabled, and more relaxed eligibility for families.

The political affiliation of the governor is not fully consistent with the legislative results, as we find that Democratic governors favor looser eligibility criteria for both disabled and families. It does not seem that this result reflects exclusively the desire to spread given dollars to more recipients, as the point estimate for the elderly is negative, although not statistically different from zero. All of the discussion of the

recipient results is reversed for benefits, consistent with our modeling strategy.

In the political context, the ideology results are also interesting, and perhaps suggestive. Our ideology index is based on the philosophy of the party leaders, not the general population. These results show that if Democrats are more liberal (a larger positive value of the index), then they favor higher recipients among all groups, although only weakly so for the disabled. On the other hand, as Republicans become more conservative (a more negative value of the index), they favor reductions in eligibility only among the disabled and elderly, but not families.

On the one hand, it is possible to argue that political affiliation is unlikely to affect the relative benefits between the three Medicaid recipient groups, that instead constituency creation would be a state specific component that might not show any national regularity. That we find some regularity, using both party affiliation and ideology, suggests that there may be influence at the national level as well. Further, we surely have not modelled all of the potential sources of influence on Medicaid policy, especially notable is that we have not modelled the behavior of the suppliers of medical services.

There is additional evidence that there is considerable regularity in how state governments design their low income health care policy. Table 5 presents the results of statistical tests for the consistency of the implied utility function that leads to our demand system. The results of the three good model would be disappointing in this context, since we do not find that as a whole states satisfy symmetry or homogeneity. On the other hand, when we perform the same tests for the four good model with the addition of cash welfare, we find that both conditions are satisfied, although we lose one eigenvalue. These results are therefore consistent with a model where state governments trade-off in a theoretically consistent way the benefits directed at each group of recipients, while exhibiting that they are sensitive to the relative costs and envi-

ronment that they face. That governments are not constrained by the programmatic definitions is also interesting in this context, and suggests that the programmatic externalities as suggested in Marton and Wildasin (2007) may spread much beyond simply the substitution between cash and commodities.

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Table 1: Sample means of demand system variables for Medicaid benefits[1,2]

Group:	Elderly ($i=1$)	Disabled ($i=2$)	Families ($i=3$)
Budget share (ω_i)	0.38	0.35	0.27
	(0.11)	(0.07)	(0.08)
Benefits per recipient (Q_{Bi})	23,253	15,637	2,306
	(21718)	(14524)	(2033)
Recipients per 100,000 (P_{Bi})	521	646	2,940
	(211)	(351)	(1392)

Note: Data from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998.
Sources: Medicaid data from HCFA 2082 forms through FY1998 and MSIS system thereafter; population data from the U.S. Census Bureau.
[1]Standard deviations reported in parentheses.
[2]Expenditures adjusted for inflation using medical care CPI in 1983-84 dollars.

Table 2: Uncompensated price elasticities of demand for Medicaid benefits by recipient group treating state government Medicaid program budgets as separable[1,2]

Group:	Elderly ($i=1$)	Disabled ($i=2$)	Families ($i=3$)
Elderly ($\widehat{\eta}_{Bi1}$)	-0.70^{**}	-0.25	-0.14
	(0.19)	(0.18)	(0.19)
Disabled ($\widehat{\eta}_{Bi2}$)	0.42	-1.29^{**}	-0.27
	(0.30)	(0.28)	(0.31)
Families ($\widehat{\eta}_{Bi3}$)	-0.27^{**}	-0.24^{**}	-0.30^{**}
	(0.05)	(0.04)	(0.06)

Note: Robust standard errors calculated using delta method. Data are from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998.
** Significant at 5-percent level; * Significant at 10-percent level.
[1]Price elasticities defined as $\widehat{\eta}_{Bij} = \frac{\%\Delta Q_i}{\%\Delta P_j}$, where Q equals average group benefits per recipient and P equals group recipients per 100,000 state residents net of federal matching aid.
[2] Evaluated using parameter estimates from Table A-3 and sample mean budget shares.
[3]Price elasticity for recipient dimension $\widehat{\eta}_{Rij}$ is the reciprocal of $\widehat{\eta}_{Bij}$; noted in equation (8).

Table 3: Uncompensated price elasticities of demand for cash welfare assistance and Medicaid benefits by recipient group treating state government cash welfare assistance and Medicaid program budgets as separable[1,2,3]

Group:	Elderly ($i=1$)	Disabled ($i=2$)	Families ($i=3$)	Cash assistance[4] ($i=4$)
Elderly ($\widehat{\eta}_{Bi1}$)	-0.51^{**}	0.12	-0.10	-0.68^{**}
	(0.14)	(0.11)	(0.10)	(0.24)
Disabled ($\widehat{\eta}_{Bi2}$)	0.78^{**}	-0.38^{**}	-0.26	-1.48^{**}
	(0.25)	(0.19)	(0.21)	(0.41)
Families ($\widehat{\eta}_{Bi3}$)	-0.34^{**}	-0.61^{**}	-0.53^{**}	0.74^{**}
	(0.07)	(0.06)	(0.06)	(0.12)
Cash assistance ($\widehat{\eta}_{Bi4}$)	0.08	-0.27^{**}	-0.21^{**}	-0.61^{**}
	(0.05)	(0.04)	(0.05)	(0.09)

Note: Robust standard errors calculated using delta method. Data are from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998.

** Significant at 5-percent level; * Significant at 10-percent level.

[1]Medicaid price elasticities defined as $\widehat{\eta}_{Bij} = \frac{\%\Delta Q_i}{\%\Delta P_j}$, where Q equals average group benefits and P equals group recipients per 100,000 state residents net of federal matching aid.

[2]Price elasticity for recipient dimension $\widehat{\eta}_{Rij}$ is the reciprocal of $\widehat{\eta}_{Bij}$; noted in equation (8).

[3] Evaluated using parameter estimates from Table A-4 and sample mean budget shares.

[4]Q equals total state expenditure on cash assistance welfare per 100,000 state residents and P equals a state's own share of AFDC expenditure through FY1996 and 100% thereafter reflecting the change to federal block grant financing with TANF.

Table 4: Predicted state government response to Medicaid program cost increases affecting a specific group on the recipient and benefit dimension of program design[1]

		% change of total state adjustment			
		Medicaid[2]		Cash Welfare and Medicaid[3]	
Group		Benefits[4]	Recipients[5]	Benefits[4]	Recipients[5]
Elderly:	Own	-79	-3	-116	-4
	Disabled	-19	-11	18	22
	Families	-2	-86	-2	-117
Disabled:	Own	-183	-5	-51	-14
	Elderly	89	12	156	5
	Families	-6	-107	-5	-92
Families:	Own	-6	-68	-7	-68
	Elderly	-59	-13	-42	-19
	Disabled	-35	-19	-51	-13

Note: Predicted adjustment calculated using the price elasticities in Table 2 for group-specific Medicaid expenditure alone; using the price elasticities in Table 3 for cash welfare and group-specific Medicaid expenditure together.

[1]Table values indicate the percent of total net adjustment in response to a group specific cost increase; sum of adjustment across groups equals 100% of total net adjustment.

[2]Treating state government Medicaid program budgets as separable.

[3]Treating state government cash welfare assistance and Medicaid program budgets as separable.

[4]Cost increase is 1 unit increase in group recipients per capita.

[5]Cost increase is $1 increase in group benefits per group recipient.

Table 5: Evidence of state government utility maximization for expenditure on group-specific Medicaid benefits alone and expenditure on cash welfare assistance and group-specific Medicaid benefits together

Medicaid	
Negative Semidefinite[1]:	$\lambda = (-0.39, -0.07, -0.001)$
χ^2 test for Symmetry[2] (df=3):	5.94 [0.115]
χ^2 test for Homogeneity[3] (df=3):	3.67 [0.299]
Cash Welfare and Medicaid	
Negative Semidefinite[1]:	$\lambda = (0.07, -0.26, -0.05, -0.002)$
χ^2 test for Symmetry[2] (df=6):	128.2^{**} [< 0.0001]
χ^2 test for Homogeneity[3] (df=4):	7.80^{*} [0.099]

Note: P-values in brackets; ** Significant at 5-percent level; * Significant at 10-percent level.
[1]Eigenvalues(λ) for Slutsky matrix shown; the negativity property follows from the assumed concavity of the expenditure function in prices which implies that for an increase in price, holding utility constant, demand must fall or at least remain unchanged for that good.
[2]Tests the null hypothesis that the Slutsky substitution matrix is symmetric; essentially it is a test of whether states' are making consistent choices in this context.
[3]Tests the null hypothesis that the Hicksian demand functions are homogeneous of degree zero in prices; that is, the units in which prices are measured have no influence on state choice beyond determining the budget constraint.

Table 6: Predicted effects of a state's political environment on their design of the Medicaid program by recipient group treating state government cash welfare assistance and Medicaid program budgets as separable[1,2]

	Δ ln(Recipients)[3]			Δ ln(Benefits)[4]		
	Elderly	Disabled	Families	Elderly	Disabled	Families
Percent of state legislature that is Democrat	0.11	0.34	−0.46	−0.08	−0.14	0.26
	(0.51)	(0.35)	(0.50)	(0.34)	(0.14)	(0.31)
Ideology index of Democrat state legislature[5]	0.21**	0.05	0.19**	−0.15	−0.02	−0.11
	(0.09)	(0.05)	(0.08)	(0.12)	(0.03)	(0.07)
Ideology index of Republican state legislature[6]	0.11	0.25**	−0.08	−0.07	−0.10**	0.04
	(0.10)	(0.07)	(0.10)	(0.08)	(0.05)	(0.05)
Independent governor	−0.13	0.01	0.15*	0.09	−0.01	−0.08
	(0.15)	(0.07)	(0.09)	(0.11)	(0.03)	(0.06)
Democrat governor	−0.03	0.04**	0.07**	0.02	−0.02**	−0.04**
	(0.03)	(0.02)	(0.03)	(0.03)	(0.01)	(0.01)
Democrat state legislature[7]	−0.04	0.14**	−0.10**	0.02	−0.05**	0.06*
	(0.07)	(0.04)	(0.05)	(0.04)	(0.03)	(0.03)
Divided state legislature	−0.06	0.09**	0.03	0.04	−0.04**	−0.02
	(0.05)	(0.03)	(0.04)	(0.03)	(0.02)	(0.02)

Note: Robust standard errors in parentheses calculated using delta method. Data are from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998.

** Significant at 5-percent level; * Significant at 10-percent level.

[1]Multiply estimates by 100 to obtain the percentage change in recipients or benefits as a result of a change in the political variables.

[2]Republican is the omitted category for variables indicating the partisanship of governor and state legislature.

[3]The Δ ln(Recipients) is calculated using coefficient estimates in Table A-5 and Table A-4.

[4]The Δ ln(Benefits) is calculated using coefficient estimates in Table A-5 and Table A-4 and the own price elasticities in Table 3.

[5]Larger positive values imply a more liberal ideology of Democrat members of state legislature.

[6]Larger negative values imply a more conservative ideology of Republican members of state legislature.

[7]Democrats have the majority in both the upper and the lower houses of the state legislature.

Appendix

Table A-1: Sample means of selected state characteristics for 1977-2004[1]

	Mean	SD
Instrumental variables		
Per capita elderly SSI recipients	504	389
Per capita blind-disabled SSI recipients	1,374	723
Per capita Food Stamp Program recipients	7,929	3242
State-specific Medicaid recipient trend[2]	9,552	3755
Political environment variables		
Percent of state legislature that is Democrat	0.56	0.19
Ideology index of Democrat state legislature[3]	1.59	1.24
Ideology index of Republican state legislature[4]	-1.71	1.36
Democrat controlled state legislature, 0-1	0.50	-
Divided state legislature, 0-1	0.25	-
Democrat state governor, 0-1	0.50	-
Independent state governor, 0-1	0.01	-
State environment variables		
Annual state unemployment rate	0.060	0.020
Medicare expenditure per recipient[5]	7,108	6206
Per capita residents age 65 or older	12,077	2188
Per capita residents age 14 or younger	22,157	2218
Per capita residents age 15-44 and female	22,780	1192

Note: Data from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998.
Sources: National Conference of State Legislatures, U.S. Bureau of Labor Statistics, U.S. Census Bureau, U.S. Department of Agriculture, U.S. Department of Health and Human Services, and U.S. Social Security Administration.

[1]Variables defined in per capita terms are per 100,000 state residents.

[2]A state's per capita Medicaid recipients in FY 1976 multiplied by the national population growth rate for the subsequent years.

[3]Percent of state legislature that is Democrat multiplied by the Democrat ideology index developed by ?; larger values in ideology index indicate ?.

[4]Percent of state legislature that is Democrat multiplied by the Republican ideology index developed by ?; larger values in ideology index indicate ?.

[5]Expenditures adjusted for inflation using medical care CPI in 1983-84 dollars.

Table A-2: First stage estimates of the effect of the instrumental variables on Medicaid recipient group prices[1,2]

	Endogenous Recipient Prices		
Dependent Variable:	Elderly (lnP_1)	Disabled (lnP_2)	Families (lnP_3)
Per capita elderly SSI recipients	0.00032**	−0.00012**	−0.00022**
	(0.00004)	(0.00004)	(0.00006)
Per capita blind-disabled SSI recipients	−0.00014**	0.00008**	−0.00016**
	(0.00003)	(0.00002)	(0.00003)
Per capita Food Stamp Program recipients	0.000001	0.000003	0.00005**
	(0.000004)	(0.000004)	(0.000005)
State-specific Medicaid recipient trend[3]	0.00001**	−0.000023**	−0.00004**
	(0.000005)	(0.000003)	(0.000005)
F statistic[4]	28.57**	15.72**	74.24**
	[<0.0001]	[<0.0001]	[<0.0001]
Number of observations	1342	1342	1342

Note: Robust standard errors in parentheses and p-values in brackets. Data are from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998.

** Significant at 5-percent level; * Significant at 10-percent level.

[1]All regressions include state and time fixed effects; control variables included are state annual unemployment, Medicare expenditure per recipient, per capita residents age 65 or older, per capita residents age 14 or younger, per capita residents age 15-44 and female, percent of state legislature that is Democrat, ideology index of Democrat and Republican state legislature, Democrat controlled state legislature, divided state legislature, Democrat state governor, and Independent state governor.

[2]Group specific price equals the natural log of group recipients per 100,000 state residents net of federal matching aid.

[3]A state's per capita Medicaid recipients in FY 1976 multiplied by the national population growth rate for the subsequent years.

[4]Test that the instruments are jointly insignificant; df= 4, 1251.

Table A-3: GMM parameter estimates of state demand for Medicaid benefits treating the recipient group prices as endogenous[1,2,3]

	Share of Medicaid Budget		
Dependent Variable:	Elderly (ω_1)	Disabled (ω_2)	Families (ω_3)
Price of Elderly ($\widehat{\gamma}_{i1}$)	0.087^{*}	-0.049	-0.045
	(0.052)	(0.047)	(0.036)
Price of Disabled ($\widehat{\gamma}_{i,2}$)	0.135	-0.064	-0.079
	(0.097)	(0.083)	(0.070)
Price of Families ($\widehat{\gamma}_{i3}$)	-0.121^{**}	-0.058^{**}	0.180^{**}
	(0.026)	(0.022)	(0.019)
Medicaid Expenditure ($\widehat{\beta}_i$)	-0.074	0.103^{**}	-0.022
	(0.054)	(0.047)	(0.038)
χ^2 test of the	0.72	1.65	0.05
overidentifying restriction[4]	[0.397]	[0.199]	[0.819]
Number of observations	1342	1342	1342

Note: Robust standard errors in parentheses and p-values in brackets. Data are from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998.

** Significant at 5-percent level; * Significant at 10-percent level.

[1]All regressions include state and time fixed effects; control variables included are state annual unemployment, Medicare expenditure per recipient, per capita residents age 65 or older, per capita residents age 14 or younger, per capita residents age 15-44 and female, percent of state legislature that is Democrat, ideology index of Democrat and Republican state legislature, Democrat controlled state legislature, divided state legislature, Democrat state governor, and Independent state governor.

[2]Group specific price equals the natural log of group recipients per 100,000 state residents net of federal matching aid.

[3]Instrumental variables are per capita elderly SSI recipients, per capita blind-disabled SSI recipients, per capita Food Stamp Program recipients, and state-specific Medicaid recipient trend; trend is formulated as a state's per capita Medicaid recipients in FY 1976 multiplied by the national population growth rate for the subsequent years.

[4]Hansen J test of the overidentifying restriction; df=1.

Table A-4: GMM parameter estimates of state demand for Medicaid benefits and cash assistance treating the recipient group prices as endogenous[1,2,3]

	Share of Medicaid and Cash Assistance Budget			
Dependent Variable:	Elderly (ω_1)	Disabled (ω_2)	Families (ω_3)	Cash assistance (ω_4)
Price of Elderly ($\widehat{\gamma}_{i1}$)	0.118**	0.029	−0.026	−0.119**
	(0.034)	(0.025)	(0.017)	(0.047)
Price of Disabled ($\widehat{\gamma}_{i,2}$)	0.206**	0.167**	−0.057	−0.307**
	(0.068)	(0.047)	(0.038)	(0.085)
Price of Families ($\widehat{\gamma}_{i3}$)	−0.120**	−0.168**	0.090**	0.197**
	(0.019)	(0.014)	(0.012)	(0.025)
Price of cash assistance ($\widehat{\gamma}_{i4}$)	0.002	−0.077**	−0.046**	0.119**
	(0.013)	(0.011)	(0.008)	(0.018)
Medicaid Expenditure ($\widehat{\beta}_i$)	−0.096**	−0.012	−0.019	0.126**
	(0.031)	(0.021)	(0.018)	(0.040)
χ^2 test of the overidentifying restriction[4]	2.68 [0.102]	0.44 [0.506]	0.002 [0.966]	0.93 [0.335]
Number of observations	1342	1342	1342	1342

Note: Robust standard errors in parentheses and p-values in brackets. Data are from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998.

** Significant at 5-percent level; * Significant at 10-percent level.

[1]All regressions include state and time fixed effects; control variables included are state annual unemployment, Medicare expenditure per recipient, per capita residents age 65 or older, per capita residents age 14 or younger, per capita residents age 15-44 and female, percent of state legislature that is Democrat, ideology index of Democrat and Republican state legislature, Democrat controlled state legislature, divided state legislature, Democrat state governor, and Independent state governor.

[2]Group specific price equals the natural log of group recipients per 100,000 state residents net of federal matching aid; for cash assistance price equals a state's own share of AFDC expenditure through FY1996 and 100% thereafter reflecting the change to federal block grant financing with TANF.

[3]Instrumental variables are per capita elderly SSI recipients, per capita blind-disabled SSI recipients, per capita Food Stamp Program recipients, and state-specific Medicaid recipient trend; trend is formulated as a state's per capita Medicaid recipients in FY 1976 multiplied by the national population growth rate for the subsequent years.

[4]Hansen J test of the overidentifying restriction; df=1.

Table A-5: GMM parameter estimates of the effect of the state political environment on the allocation of welfare expenditure between cash assistance and Medicaid recipient groups treating the recipient group prices as endogenous[1,2,3]

	Share of Medicaid and Cash Assistance Budget			
Dependent Variable:	Elderly (ω_1)	Disabled (ω_2)	Families (ω_3)	Cash assistance (ω_4)
Percent of state legislature that is Democrat	0.013	0.056	−0.042	−0.030
	(0.059)	(0.055)	(0.045)	(0.091)
Ideology of Democrat state legislature[4]	0.025**	0.009	0.017**	−0.048**
	(0.012)	(0.009)	(0.008)	(0.017)
Ideology of Republican state legislature[5]	0.012	0.041**	−0.007	−0.046**
	(0.011)	(0.011)	(0.009)	(0.017)
Democrat controlled state legislature	−0.004	0.022**	−0.009**	−0.010
	(0.008)	(0.005)	(0.004)	(0.010)
Divided state legislature	−0.007	0.016**	0.002	−0.011*
	(0.005)	(0.004)	(0.003)	(0.006)
Democrat state governor	−0.004	0.007**	0.006**	−0.009*
	(0.004)	(0.003)	(0.002)	(0.005)
Independent state governor	−0.015	0.002	0.014*	−0.0001
	(0.017)	(0.012)	(0.008)	(0.022)
Number of observations	1342	1342	1342	1342

Note: Robust standard errors in parentheses and p-values in brackets. Data are from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998.

** Significant at 5-percent level; * Significant at 10-percent level.

[1]All regressions include state and time fixed effects; control variables included are state annual unemployment, Medicare expenditure per recipient, per capita residents age 65 or older, per capita residents age 14 or younger, per capita residents age 15-44 and female, percent of state legislature that is Democrat, ideology index of Democrat and Republican state legislature, Democrat controlled state legislature, divided state legislature, Democrat state governor, and Independent state governor.

[2]Group specific price equals the natural log of group recipients per 100,000 state residents net of federal matching aid; for cash assistance price equals a state's own share of AFDC expenditure through FY1996 and 100% thereafter reflecting the change to federal block grant financing with TANF.

[3]Instrumental variables are per capita elderly SSI recipients, per capita blind-disabled SSI recipients, per capita Food Stamp Program recipients, and state-specific Medicaid recipient trend; trend is formulated as a state's per capita Medicaid recipients in FY 1976 multiplied by the national population growth rate for the subsequent years.

[4]Percent of state legislature that is Democrat multiplied by the Democrat ideology index developed by ?; larger values in ideology index indicate ?.

[5]Percent of state legislature that is Democrat multiplied by the Republican ideology index developed by ?; larger values in ideology index indicate ?.

Table A-6: Price elasticities of demand for cash welfare assistance, group-specific Medicaid benefits, all other state government expenditure, and private state resident expenditure[1,2,3]

Group:	Elderly ($i=1$)	Disabled ($i=2$)	Families ($i=3$)	Cash assistance[4] ($i=4$)	Other gov't. expenditure[5] ($i=5$)	Private expenditure[6] ($i=6$)
Elderly ($\widehat{\eta}_{Bi1}$)	−0.29	0.41	0.25	−3.92	0.09	0.0006
	(0.21)	(0.78)	(0.20)	(2.59)	(0.11)	(0.0005)
Disabled ($\widehat{\eta}_{Bi2}$)	1.02**	−0.07	−0.25	−0.53	−0.21	−0.00002
	(0.34)	(4.48)	(0.48)	(4.74)	(0.20)	(0.0010)
Families ($\widehat{\eta}_{Bi3}$)	−0.54**	−1.37	−0.99**	0.71	0.08	0.0020**
	(0.15)	(3.78)	(0.22)	(1.34)	(0.06)	(0.0003)
Cash assistance ($\widehat{\eta}_{Bi4}$)	0.61	0.31	0.09	0.02	−0.19**	0.0014
	(0.57)	(17.75)	(2.67)	(3.57)	(0.05)	(0.0029)
Other gov't. expenditure ($\widehat{\eta}_{Bi5}$)	−0.67	−0.24	−0.13	32.28	−2.25	−0.0004
	(1.29)	(28.86)	(2.23)	(110.14)	(5.45)	(0.0081)
Private expenditure ($\widehat{\eta}_{Bi6}$)	−5.38**	0.53	4.46	−63.21	5.07	−0.99**
	(2.50)	(182.71)	(3.05)	(148.31)	(6.66)	(0.0056)

Note: Robust standard errors calculated using delta method. Data are from all U.S states except AZ and HI for FY 1977-2004; OK missing for FY 1997-1998 and AK missing for FY 2002-2004.

** Significant at 5-percent level; * Significant at 10-percent level.

[1]Medicaid price elasticities defined as $\widehat{\eta}_{Bij} = \frac{\%\Delta Q_i}{\%\Delta P_j}$, where Q equals average group benefits and P equals group recipients per 100,000 state residents net of federal matching aid.

[2]Price elasticity for recipient dimension $\widehat{\eta}_{Rij}$ is the reciprocal of $\widehat{\eta}_{Bij}$; noted in equation (8).

[3] Evaluated using parameter estimates from Table **??** and sample mean budget shares

[4]Q equals total state expenditure on cash assistance welfare per 100,000 state residents and P equals a state's own share of AFDC expenditure through FY1996 and 100% thereafter reflecting the change to federal block grant financing with TANF.

[5]Q equals total state government expenditure per 100,000 state residents net of Medicaid and cash assistance welfare and P equals one minus the ratio of federal grants to other expenditure; does not include federal grants to states for air transportation, health and hospitals, public welfare, and all utilities (water supply, electric power, gas supply, and transit system).

[6]Q equals total state personal income per 100,000 state residents net of total state and local tax revenue and P equals one minus the average federal personal income tax rate for a state.