

Districts, Spillovers, and Government Overspending

Reza Baqir

Take an average city, keep its population and other characteristics constant, but divide it into a greater number of political districts, and you will get substantially greater government spending *per capita*. Install a strong-mayor form of city government — give the mayor veto power — and you may curtail the legislature's bias toward overspending.



Summary findings

Baqir considers the overspending bias in legislatures when the benefits of public policies are concentrated in particular districts but the costs of financing them are spread over the entire political jurisdiction. He formalizes this idea in a simple theoretic framework, in the context of externalities between districts.

His main prediction is that greater districting leads to bigger government, but the effects are mitigated if there are positive spillovers of government spending between districts.

Institutional forms of government that concentrate decisionmaking power can curtail the overspending bias. He presents evidence on these predictions from a cross-section of U.S. city governments.

His main findings are that:

- If we take an average city, keep its population and other characteristics constant, but divide it into a greater number of political districts, we get substantially greater government spending *per capita*.
- Greater jurisdictional heterogeneity and income equality are associated with bigger government.
- At-large electoral systems are not less sensitive to overspending than district electoral systems are.
- Strong-mayor forms of city government, especially those in which mayors have veto power, can curtail the overspending bias.

These findings are robust to controlling for socioeconomic characteristics of cities and to alternative measures of government size.

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1. Introduction

In recent years an interesting political economy literature has developed to explain the size and fiscal performance of government. A central feature of this literature is the prominence given to the role of distributive politics. By distributive politics is meant the politics of policies which produce benefits which are concentrated to a particular group of people and costs which are disbursed over the entire political jurisdiction. Pork-barrel projects are a prime example of such politics where the projects produce benefits for one geographical community and are financed through taxation on the entire population of the political jurisdiction. As discussed extensively in Weingast, Shepsle, and Johnsen (1981) such politics leads to a bias towards bigger project size and, in general, bigger government. The effect arises because legislators, when making their spending proposals for government projects, do not internalize the complete consequences of their proposals on other residents of the political jurisdiction. Acting on the behalf of the residents of their district they fully value the benefits accruing to population in their district but bear only a fraction of the cost of the project.¹ At a more general level the overspending bias arises due to districting and generalized taxation. Other recent papers in which the same basic channel affects fiscal performance include Velasco (1997), Hallerberg and von Hagen (1997), Chari and Cole (1993a,b), and Chari, Jones and Marimon (1994).

A central prediction that emerges from this class of models is that greater the number of districts, greater is the over-spending bias, and hence greater the size of government. The purpose of this paper is to test this and related predictions from a cross-section of city governments in the U.S. These governments exhibit substantial variation in both their fiscal outcomes and political structures and constitute a good data-set for testing theories relating political institutions to fiscal outcomes. These data have the additional virtue that cities share a common

¹ This is also referred to as the "common pool" problem in the literature on environmental economics.

national institutional set-up and problems in inference arising out of unobserved or unquantifiable historical and institutional factors, which in general plague cross-country studies, are likely to be less. I present a simple theoretical framework to formalize the overspending bias in the context of externalities between districts. The model relates per capita government spending in a political jurisdiction to the number of districts (alternatively, the size of the legislature) and to a measure of the externalities of government expenditure between districts and predicts that (i) districting and (ii) greater jurisdictional heterogeneity raise the scale of government expenditures.² The central empirical findings can be summarized as follows.

First, there is strong evidence that, controlling for city population and other characteristics, bigger city councils and greater heterogeneity amongst city residents leads to considerably greater local government expenditures per capita. Extensive sensitivity analysis of the baseline results—by including possible omitted variables, state-specific effects, and sample-splits, as well as instrumental variables estimations to address potential concerns of endogeneity—indicates that the finding is fairly robust. The findings are also robust to alternative measures of the size of government I use: share of total government expenditures in total city income and local government employment per capita. The results indicate that if we keep the population of an average city constant but add one more councilman to the city council, (s)he adds somewhere between \$15 to \$40 of government expenditures per capita. For the average sized city in the sample this amounts to an addition of \$0.46 - \$1.20 million to the city budget—an effect of considerable magnitude.³ The findings have substantial implications for the importance of institutional mechanisms to control the tendency for over-spending in legislatures.

² For the moment I shall use the terms number of districts and council size interchangeably. The two need not be the same when there are multi-member districts, as in at-large electoral systems in cities. I discuss this distinction in greater detail in section 4.

³ The median city budget for the sample is \$17.5 million. The effects are estimated from regressions corresponding to the regressions in tables 3 and 4 where the reported coefficients give a lower and upper bound on the magnitude of the effect of council size on government size.

Second, I investigate how different electoral systems affect government spending. The three predominant forms of electoral systems used in US cities are district (or ward) systems, at-large systems, and mixed systems where some councilmen are elected by district and some at-large.⁴ It is commonly believed that at-large systems, compared to district systems, can help to curtail pork-barrel type spending by inducing councilmen to treat the entire city as their constituency. If at-large councilmen *did* cater to the good of the entire city the asymmetry in sharing the benefits and costs of public expenditures would be removed and the overspending bias would disappear. The evidence I find contradicts this commonly held view. At-large cities are not less susceptible to pork-barrel type spending than district cities. Many cities in recent years have adopted mixed electoral systems in an effort to try to capture the best elements of both district and at-large systems. Results for these cities indicate that the effects of both district and at-large councilmen are slightly exacerbated in mixed electoral systems. One interpretation which these results admit is that in addition to the externalities which councilmen impose on each other within a group there are also inter-group externalities which they fail to internalize, hence leading to worse outcomes than either pure district or at-large systems.

Given that an overspending bias may arise in legislatures, and, more importantly, that ex post each legislator may prefer a coordinated outcome that entails less spending for all, a central question which emerges is what political institutions, if any, can we put into place to achieve better outcomes. Recent literature in the area of budget institutions—the study of how the rules of the game surrounding the budgetary process affects fiscal outcomes—indicates that political institutions which centralize decision-making authority in one figure in the government, as for instance the in the president of a presidential government system or the finance minister in a strong party parliamentary system, can help to

⁴ The multi-member at-large electoral systems in cities are not to be confused with proportional representation. The only city which uses proportional representation in city elections is Cambridge, MA.

alleviate the overspending bias. A strong finance minister can internalize the externalities inherent in spending proposals of the individual legislators and enforce discipline on the legislature, leading to better budgetary outcomes (smaller deficits, quicker adjustment to an adverse shock) and in general to smaller government expenditures. The third contribution of this paper is to present related evidence on this point by exploiting the variation in the institutional form of city governments in the U.S. City governments in the U.S. come in two predominant institutional forms: (i) the *Mayor-Council* form, where the city mayor is elected directly from the city population and is the head of the executive branch of the government and (ii) the *Council-Manager* form where the legislative and executive function of government is fused into the city council which may appoint a city manager to manage the day-to-day affairs of the government. The relevant difference between the two is that the former concentrates powers in the city mayor who cannot be fired by the city council and can therefore exert independent influence on the city council. In addition, cities vary considerably in how much power they concentrate in their mayors, for instance by giving them agenda setting powers and veto powers. To the extent that city governments are political jurisdictions which make fiscal decisions affecting government spending in their jurisdiction, and given that they vary in their political institutions and form of government, we should be able to test for predictions of theory from city government decisions. Using data on the institutional form of city governments I examine how political institutions affect fiscal outcomes. The findings indicate that there is some evidence that Mayor-council forms of government, particularly those which give mayors strong veto powers, can act to sever the link between council-size and legislature size—the central prediction of the common-pool class of models—and can help to curtail the overspending bias in government.

The plan of the paper is as follows. The next section briefly discusses the most closely related papers. Section 3 presents a simple theoretical framework in which we can consider how districting and spillovers affect government spending.

Section 4 describe the variables used in the empirical work and the sources of the data. Results are presented in section 5 and the last section concludes by discussing future research.

2. Related Literature

This paper fits in the literature on the relationship between political institutions and fiscal outcomes. On the theory side this paper is closest in spirit to the recent strand of this literature which has looked at the question of how the political institutions surrounding the budget making process (number of players, rules of the game by which they interact, etc.) affect budgetary outcomes: expenditures, deficits, and government debt. The papers closest in spirit are Weingast, Shepsle and Johnsen (1981), Velasco (1997), Hallerberg and von Hagen (1997), and Chari and Cole (1993a, b). The mechanism at the heart of many of these papers is the common-pool type framework considered here. Weingast, Shepsle and Johnsen (1981) consider this problem extensively in the context of a legislature deciding the size of a public project under very general taxation schemes. Velasco (1997) presents a intertemporal model where a common-pool problem leads to a deficit bias and an "endogenous" delay in adoption of stabilization policies. Hallerberg and von Hagen (1997) have a different set-up but get the same type of result: because of the common pool problem budget deficits are greater than those which would be chosen by a social planner. In this paper I add one feature to the basic story: the role of externalities of government spending between districts.⁵ I find that when there are positive spillovers of government spending between districts, as in a homogeneous jurisdiction where each district wants the same type of public expenditures, the common-pool problem is mitigated. Using data on ethnic heterogeneity in cities to proxy for the extent to which city residents benefit from spillovers of government spending I test this prediction of the model. I also focus

⁵ The importance of spillovers of government spending is particularly relevant for my purposes since I use local government data where there are likely to be spillovers between city districts.

in this paper on the predictions for government size (as opposed to budget balance). Although I plan to look at intertemporal issues in future work, the focus here on the size of expenditures helps to fill a gap in the literature. In their review of the literature on budget institutions, Persson and Tabellini (1998) note that most of the empirical literature has looked at intertemporal fiscal policy choices, such as deficits and debt, and “less attention has been devoted to implications for the size of government” (p. 60). They go on to comment “[t]his is an unfortunate omission, as one of the underlying problems ‘stricter’ budgetary procedures are supposed to solve, namely, the soft budget constraint problem, also distorts the level of spending.” This paper goes towards filling this gap.

On the empirical side most studies looking at how budgetary institutions impact fiscal outcomes have relied on cross-country and U.S. state data.⁶ The general approach in these papers, particularly the cross-country studies, has been to construct indices which measure the degree to which the budget-making process may be fragmented and subject to pressures by individual legislators, ministers, or political parties in coalition governments.⁷ While the papers differ with respect to specific details, a common overall theme in this literature is that institutions which centralize decision-making authority lead to budgetary outcomes which entail smaller deficits and quicker adjustment to adverse shocks.⁸

⁶ For the cross-country literature relevant papers include Roubini and Sachs (1989a,b), Von Hagen (1992), Von Hagen and Harden (1994), Alesina et. al. (1996), Hallerberg and von Hagen (1997), and Kontopoulos and Perotti (1998). The last of these cited papers is the most comprehensive study to date in this area using cross-country data. For state-level studies see for instance Poterba (1994), Alt and Lowry (1994), Bayoumi and Eichengreen (1995) and Bohn and Inman (1995).

⁷ In a different empirical approach, Inman and Fitts (1990) test the predictions of a common pool model using time series data for federal expenditures revenues for the U.S. for the period 1795 to 1988. Although they do not pose the direct test of the relationship between the number of districts and government size, their findings are in general in the same vein as the results presented here.

⁸ The terminology Alesina and Perotti (1996) use in their review of the budget institutions literature is that of *hierarchical* and *collegial* institutions. The former have the property that they limit the democratic accountability of the budget process—by for instance limiting the authority of the legislature to amend the budget proposed by the government—and attribute strong prerogatives to the Prime Minister (or the Finance, or Treasury Minister) to overrule spending ministers within intra governmental negotiations. Collegial institutions have the opposite property and emphasize the democratic rule in every stage. They argue that there is a tradeoff between these two types of institutions. Hierarchical institutions, in relation to collegial institutions, are more likely to promote fiscal restraint and avoid large and persistent budget deficits but they are

This paper adds to the existing empirical literature in the following ways. First, I use a sample of local governments in the U.S. which allows me to greatly increase the degrees of freedom and complements our set of findings pertaining to countries and states. Second, I focus on providing evidence on a central prediction of common-pool which has not received much attention: the effect of districting on government size. Common-pool type models make two central predictions: (i) greater is the number of districts and (ii) more decentralized is the decision-making process in the legislature, worse is the collective outcome. Most empirical studies have looked at how centralization of the budget institution affects the outcome but the related prediction on the effect of the number of players has not been systematically explored. One reason for this omission may be that direct tests of this relationship from cross-county or cross-state data are difficult since budgets at the national level are drafted by committees or cabinets and then are submitted for approval to the full legislature. In the absence of an explicit theoretical model of these institutions it is unclear whether by the number of districts we should mean the number of seats in the entire house, the number of members in the federal cabinet (or the number of members of the relevant committee), the number of political parties in the government, or some combination of the three.⁹ However, we can exploit the variation in the number of districts across U.S. city governments to test this prediction. City councils are relatively cabinet- and committee-free. They can thus offer a rather clean test of the relationship between districting and government size. Testing from a cross-section of cities in the U.S. also has the advantage that all these cities are in the same overall institutional environment of the U.S. There is likely to be less

also more likely to be less respectful of the rights of minorities and are likely to generate budgets which are heavily tilted in the interests of the majority.

⁹ Kontopoulos and Perotti (1998) look at the issue of the number of players as well as the fragmentation of the budgetary process in affecting fiscal outcomes. They measure the number of players alternatively as the number of political parties in a coalition government and as the number of spending ministries in a government. Using panel data on 20 OECD countries for the period 1960-95 they find that the number of players matters for fiscal outcomes—consistent with the results in this paper—but get some variation in which measure matters: for the 1970s they find that the number of spending ministries matters while for the 1980s the number of parties matters.

variation in unobserved institutions when we look across cities in one country than across countries in the world. Finally, I provide evidence on a question which has not yet received researchers' attention: how does a city's electoral system affect the extent of the overspending bias in the legislatures? Given that cities vary in the methods by which they elect councilmen this is a question that we can suitably explore with the data at hand.

3. Theoretical Framework

Consider a political jurisdiction with $J > 1$ districts. Each district elects one representative in the legislature so that there are J representatives in the legislature. Representative j maximizes the utility of a representative constituent from his district.¹⁰ The utility function of the representative constituent from the j -th district—alternatively the objective function for the j -th representative in the legislature—takes the quasi-linear form,

$$u_j = c_j + v(\alpha_j g_j + \beta_j g_{-j}) \quad v'(\cdot) > 0, v''(\cdot) < 0 \quad (1)$$

where c_j denotes private consumption, g_j is government expenditures in district j , g_{-j} denotes aggregate spending in all other districts, $\beta_j = \frac{1-\alpha_j}{J-1}$ and where I let $\alpha_j \in [\frac{1}{J}, 1]$. In this formulation, the representative agent in district j derives utility from a weighted average of government expenditures in his own as well as other districts. More specifically he puts a weight α_j on spending in his own district and a weight $(1 - \alpha_j) / (J - 1)$ on spending in each of the other $J - 1$ districts. The β 's are set to prevent any scale effects. The parameter α_j allows us to vary the extent of spillovers between districts: $\alpha_j = 1$ corresponds to the case where residents of district j derive utility from spending only in their own district and

¹⁰ Note that the politics of running for election has intentionally been suppressed here. It is assumed that the incumbent representative from district j is re-election motivated and simply tries to maximize the utility of a representative agent from his district.

$\alpha_j = \frac{1}{J}$ corresponds to the case where the agents put equal weight on all districts. Note two things about this formulation. First, all other districts are treated equally, that is, the same weight β_j is put on spending in each of the other districts, and second that districts may vary in how much they care for the others.

The parameter α_j can also be thought of as index of heterogeneity in the jurisdiction and indeed this is the interpretation I push in the empirical section below. The idea is that different districts may have different preferences over the type of government expenditures they may prefer. Since other districts like some other type of public good you discount the spending in that district to you. How much you discount depends on how dissimilar your preferences are for the desired type of public expenditures. If all districts want the same type of expenditures—a homogeneous jurisdiction—all you care about is the jurisdiction-wide per capita spending, putting equal weight on expenditures in each district ($\alpha_j = \frac{1}{J} \forall j$). On the other hand, if residents of different districts have differing preferences over which activities they want their tax dollars spent on—a more heterogeneous jurisdiction—they would put greater weight on their desired type of expenditure in their district and less on expenditures in other districts (higher α_j 's). One dimension along which preferences for local public goods may differ is race and ethnicity. A jurisdiction which is more ethnically heterogeneous would therefore be associated with districts which put less weight on expenditures in each others districts—high α_j 's. In the empirical work I use an index of racial heterogeneity of the city to proxy for α . Since debates in urban politics, particularly over the size and allocation of budget, often coalesce along ethnic lines, focusing on racial heterogeneity as the relevant dimension along which preferences for types of expenditures may differ is not inappropriate.¹¹

¹¹ In addition, dissimilarity in preferences on public expenditures may also be based on income. In the empirical work I also control for income inequality although the variable I use—ratio of the mean to median household income—is more readily interpreted in the Meltzer and Richard (1981) type redistributive spending framework.

Without loss of generality we normalize the population size of each district to unity. The variable g_j therefore conveniently denotes both per capita and aggregate public spending in district j . The public expenditure is financed by a lump-sum per capita tax levied equally on all districts.¹² Letting t denote the amount of tax per capita, and y_j the amount of pre-tax income of the representative agent in district j , private consumption is $y_j - t$ and the jurisdiction's budget balance condition is:

$$Jt = \sum_{j=1}^J g_j. \quad (2)$$

I first consider the social-planner solution to the problem of choosing the amount of government expenditures in each district and then consider the outcome when the same decision is taken in a legislature. Assuming that the social planner maximizes an unweighted sum of utilities, the solution is characterized by the first order conditions,

$$\alpha_j v'(a_j g_j + \beta_j g_{-j}) + \sum_{k \neq j} \beta_k v'(\alpha_k g_k + \beta_k g_{-k}) = 1, \quad j = 1, \dots, J \quad (3)$$

The interpretation is straightforward. The social planner equates the sum of marginal benefits that representative agents of all districts get from an increase in g_j to the marginal cost (in terms of units of private consumption forgone). I look at the symmetric case, $\alpha_j = \alpha \forall j$, to get a tractable solution to this problem. Note this is not the case people care only about their own district but that all districts weigh others in a similar way. In this case the above first order condition reduces to:

$$v'(g^*) = 1 \quad (4)$$

¹² Letting taxes being proportional rather than lump-sum does not change any of the central findings of this section. Neither are results sensitive to the assumption of equal taxes across districts. For unequally distributed taxes across districts, as long as the tax share of a district is non-increasing in the number of districts the results with respect to the effect of districting are the same.

where g^* denotes the symmetric government spending in each district in the social-planner solution. Note that optimal government spending g^* is invariant to the number of councilmen J and α , the extent of spillovers between districts.

To consider the legislature outcome, we first have to specify the social choice rule in the legislature. The decision rule I model here is one which corresponds to what is known as the norm of “universalism” in the political science literature. This is an environment where through a policy of mutual support (“you scratch my back, I’ll scratch yours”) every legislator gets what he wants—in this case, his desired level of government spending in his district. In stipulating his desired level of government expenditure in his district a legislator takes the actions of other representatives as given and this sets up a classic common-pool problem. The collective outcome is then simply the aggregation of all such spending proposals. There is considerable discussion in the political science literature, both theoretical and empirical, on the prevalence and stability of such a norm of universalism in decentralized legislatures. On the theoretical side Weingast (1979) discusses conditions under which such a coalition of the whole can be a stable policy equilibrium. Fiorina (1978) and Shepsle and Weingast (1981) also consider situations where players may prefer universalistic criteria to pure majority rule. On the empirical side Weingast, Shepsle, and Johnsen (1981) cite considerable evidence for the claim that, particularly for the type of pork-barrel policies considered here, “universalism and reciprocity are the prevailing decision rules in the U.S. Congress” (p. 353).¹³ At the local government level, Cox and Tutt (1984) provide evidence on the prevalence of this norm in the Los Angeles County Board of Supervisors where, as they discuss, universalism is not just an informal or unwritten rule—it was in fact made official policy by a formal vote of the Board as a rule for allocating expenditures amongst the county districts. As discussed above, an interesting literature exists on

¹³ For systematic evidence on the prevalence of the norm of universalism see Collie (1988). For case studies see Maass (1951), Ferejohn (1974), Plott (1968), Manley (1970), and Mayhew (1974).

examining which sorts of political institutions can act to curtail this tendency towards universalism and common pool type problems in decentralized legislatures. I develop the model with this assumption, which does not seem to be devoid of empirical support, and then consider the predictions when the decision-making process is more centralized.

In choosing the desired amount of spending for his district, legislator j maximizes $y_j - [(g_j + g_{-j}) / J] + v(\alpha_j g_j + \beta_j g_{-j})$ with respect to g_j where he takes the spending proposals of other representatives as given. The corresponding first order condition is:

$$\alpha_j v'(\alpha_j g_j + \beta_j g_{-j}) = \frac{1}{J} \quad (5)$$

For given g_{-j} the higher is J , higher is the spending proposed by the j -th representative. Note however that if $\alpha_j = \frac{1}{J}$, the case of perfect homogeneity, $v'(\cdot) = 1$ which is the socially optimum. For $\alpha_j = 1$ we get the maximum spending bias.

To move further with the above condition I again consider the symmetric case of equal α 's across districts. In this case the above expression reduces to equal per capita spending given (implicitly) by:

$$v'(\hat{g}) = \frac{1}{\alpha J}, \quad (6)$$

where \hat{g} denotes the legislature outcome. The concavity of $v(\cdot)$ together with (4) and (6) readily gives the main result:

PROPOSITION 1. *For $J > 1$ and $\alpha \in (\frac{1}{J}, 1]$, per capita government spending is (a) greater than socially optimal; and (b) increasing in J and in α .*

Using the political and fiscal data on cities we can directly test for the effect of increasing councilmen on city government expenditures. For the second

prediction, I proxy for jurisdictional heterogeneity by using an index of the ethnic heterogeneity of the city. Greater ethnic heterogeneity by being associated with fewer inter-district spillovers would raise government expenditures. Finally note that the poor outcome in the legislature arises because of the decentralization of decision-making. With completely centralized decision-making, as in one legislator representing the entire jurisdiction ($J = 1$), we would get the social planner outcome shown in (4). This is one expression of the idea discussed in the literature that a strong finance minister or head of executive can internalize the externalities and yield a better outcome than a decentralized legislature. We should therefore expect that institutional forms of government where jurisdictions concentrate power in the executive should act to curtail the overspending bias and in particular we should expect that greater districting is not associated with greater per capita government expenditures. In the empirical part of the paper I use the variation in the institutional form of city governments in the U.S. to test for these predictions. Ways in which executives of city governments can be given greater influence in fiscal decisions include (i) having the position of an independent executive (a city mayor directly elected from the population), (ii) giving the mayor agenda-setting powers, as in the prerogative to draft and propose the budget to the city council, and (iii) giving the mayor veto power to enable him to credibly enforce discipline in the legislature. In the empirical work I use indicator variables for whether cities have these institutions and see how the presence of such institutions affects the magnitude of government expenditures.

4. Data

The data for this paper are a cross-section of U.S. city governments and have been combined from different sources. Fiscal data are from the 1992 Census of Governments conducted by the Census Department. Demographic and income

data are from the 1990 Census of Population.¹⁴ Data on the institutional form of local government have been put together from two sources. First is a survey of city governments conducted by an association of local governments in the U.S., the International City/County Management Association (ICMA), and pertain to the year 1990. This survey collected considerable information on political variables and structure of local government in a cross-section of U.S. municipalities. The second source for the data on political institutions is the 1992 Census of Governments, Government Organization File.¹⁵ The latter source has less coverage in terms of the number of variables for which information is collected but has greater coverage in terms of the number of cities covered. In the following paragraphs I describe the variables used in the empirical work.

I measure the size of the legislature by the number of officials elected to the chief governing body of the government. For municipalities and townships this refers to the number of councilmen in the city council (*Csize*). This measure varies from a minimum value of 3 to a maximum of 50 in the dataset. The cities with the three largest city councils are New York, NY (36), Stamford, CT (40), and Chicago, IL (50). However, most of the observations occur at smaller values of council-size: 2123 of the 2342 cities for which this measure is available have city councils composed of 9 or less members.¹⁶

I use three indicator variables to provide information on the institutional form of government. *MayorCouncil* is a dummy variable which equals one if the form of government is a mayor-council form, and zero otherwise. As discussed above mayor-council forms of government typically have an independent position of mayor who is elected directly from the city population. The other major form

¹⁴ The fiscal and demographic data were obtained from the County and City Compendium 1993—a data product similar to the Census Department’s County and City Databook 1994 but providing a more comprehensive coverage of U.S. cities—put out by Slater-Hall Information Products, Washington, DC

¹⁵ These data are used in the Census Department’s publication *1992 Census of Governments, Government Organization*.

¹⁶ The results presented below are robust to looking separately at cities with big and small councils, and in particular, to looking at cities with councils of more than 9 members.

of city government is the council-manager form where the position of the mayor may exist but is largely ceremonial. Legislative and executive authority is fused in the city council. The difference between these two forms of governments corresponds to the difference between presidential and parliamentary systems of national government. I also use two other indicator variables to try to get measures of how much power is given to the Mayor's office: *Budgetm* which equals 1 if the overall responsibility for developing the budget submitted to the council rests with the Mayor and *Mayveto* which equals 1 if the Mayor has the authority to veto council-passed measures.

The size of government is measured in three alternative ways: (i) city government spending per capita which corresponds to the model above (*Exppc*); (ii) city government spending as share of total city income (*Expsh*); and city government employment per capita (*Govempl*). All three of these measures have been used in the empirical literature on the size of government. I use three measures of government size partly to be comprehensive and partly because these different measures are likely to measure different aspects of the size of government. Consistent findings with these three measures would reassure us that the results on the size of government were not sensitive to a particular measure of government size used. These three measures are quite highly correlated as shown in the correlation matrix below:

Table 1:
Correlation between measures of government size

	<i>Exppc</i>	<i>Expsh</i>
<i>Expsh</i>	0.886	
<i>Govempl</i>	0.774	0.781

Notes: No. of observations = 1987

The measure of heterogeneity of the jurisdiction, corresponding to α above, is an index of ethnic heterogeneity (*Ethnic*) of the city population which I construct from population-by-race. This index measures the probability that two

randomly drawn people from a city will belong to different ethnic groups and is constructed as follows:

$$Ethnic = 1 - \sum_i s_i^2 ,$$

where s_i denotes the share of population of race i in the total city population, and

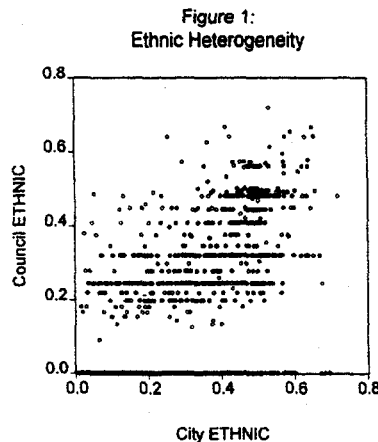
$$i \in \{White, Black, American Indian, Asian and Pacific Islander, Other\} .$$

The index ranges from 0 (complete homogeneity) to 1 (complete heterogeneity). The racial categories are the ones provided by the Census Department and come from the 1990 Census.¹⁷ I also construct a corresponding measure of ethnic heterogeneity for the city council (*Cethnic*) using councilmen-by-race data. If it is indeed true that race plays an important role in city politics and city residents choose council men at least partially along ethnic lines, as would be needed for *Ethnic* to be a good proxy for α , then we should expect to see an association between city *Ethnic* and council *Ethnic*. As shown in Figure 1 below there is strong positive correlation (0.66) between city *Ethnic* and the corresponding measure for the city council providing some support for using *Ethnic* as a proxy for α in the model.

Finally I use a number of control variables in the regressions. In all regressions I control for city size by using the log of city population (*Lpop90*). In addition I also control for per capita income (*Incomepc*), educational attainment as measured by the percentage of population with a BA or higher degree (*BAGrad*), and income inequality in the city as measured by the ratio of the mean to median household income (*MMI90*). The inequality variable is included since the size of government may respond to redistributive pressure arising out of income

¹⁷ Note that "Hispanic" is not treated as a category in the population-by-race question but in the population-by-origin question in the Census questionnaire. However, there is a high correlation (0.91) between Hispanic (fraction of population of Hispanic origin) and "other" in the above classification. This suggests that many Hispanics apparently respond "other" because they do not feel adequately represented in the multiple racial choice provided by the Census. For practical purposes, then, the category "other" is essentially "Hispanic."

inequality.¹⁸ Table 1 shows the summary statistics on all the variables used in the study.



Since council-size is the key variable of interest in the empirical section it is useful to consider what drives the variation of council-size in the sample. Theoretically the most obvious determinant of the number of representatives is city population. Bigger jurisdictions should, and do, have bigger councils. Regressing council-size on city population (in millions) yields the following equation (standard errors in parenthesis):

$$Csize = 6.62 + 5.36 Pop90, \quad R^2 = 0.15, N = 1972$$

(0.07) (0.29)

The coefficient on the council size variable however indicates that although bigger cities have bigger councils the effect is considerably small in magnitude. Considering that most of the cities in the sample have populations of less than 100,000, an increase in the city population from 10,000 to 100,000 would be associated with an increase in the council size from 6.7 to 7.2—a fairly small

¹⁸ For a subset of the cross-section I had data on the Gini coefficient as the measure of income inequality in cities, and on unemployment rate city. The findings on inequality are robust to either measure of inequality used. The unemployment variable was used to control for government spending responding to unemployment rate for standard Keynesian reasons. The results reported on the relationship between council size and government size were robust to the inclusion of unemployment rate as one of the explanatory variables.

effect.¹⁹ One reason for the slow response of council size to population is that there are significant costs involved in changing a political institution like the size of the legislature. Typically, the process for changing the size of the council involves a proposal brought forward either directly by the voters if the city has a provision for initiative or by the council, extensive discussion of the merits and demerits of change in the size of the council and the likely impact of a change on representation (with a commission being appointed sometimes to consider the issue at length), and approval by the council or the city population (by a referendum) or both. There is an additional reason why council size may be particularly difficult to change: a change in the number of seats inevitably involves some amount of redistricting which, by reapportioning the constituencies of the incumbent council-men, is likely to introduce uncertainty in their re-election prospects. In their influential study of the world's electoral systems, Taagepera and Shugart (1989) convey this point well when they discuss the resilience in electoral laws: "Reforms usually require the approval of current assembly members. But these are by definition the very people whom the current electoral system has served well. Why should they want to change a system that got them elected?" (p. 5). To a large extent therefore council-size is determined by historical reasons. The inertia in council-size should give us greater confidence in attaching inference to results from ordinary least squares regressions of government size on council size, although as part of the sensitivity analysis of the base results I also run instrumental-variables specifications.

The other important sample correlates of council-size are the state in which the city is located and the city's ethnic and income heterogeneity. Since city councils derive their authority from state governments and states vary in their laws governing local governments, there is likely to be systematic variation in

¹⁹ The same equation estimated in log-log form yields an elasticity of council-size with respect to city population of 0.11. For the same relationship at the national level see chapter 15 of Taagepera and Shugart (1989). They look at a cross-section of countries for the year 1985 and report an elasticity of national legislature size (lower house) with respect to country population of around 0.33.

council-size by state. Running the same regression as reported above with a complete list of state indicator variables yields an adjusted R-squared of 0.41 while the estimated coefficient on population remains virtually unchanged (and highly significant), confirming the presence of state-specific institutional features in the determination of council-size. To the extent that preferences for public services are correlated along ethnic and income lines we should expect greater demand for political representation in more heterogeneous jurisdictions for a given population. Regressing council-size on population and two measures of heterogeneity (ethnic, as defined above, and income, measured by the ratio of the mean to median income) as well as a complete list of state indicator variables gives:

$$Csize = 5.87 + 5.22 Pop90 + 1.64 Ethnic + 1.02 MMI, \quad \bar{R}^2 = 0.42$$

(0.25) (0.39) (0.40)

The regressions for government size reported below include these measures of income and ethnic heterogeneity on the right hand side of the equation. The coefficients on these variables therefore measure their direct impact on government size, controlling for the effect that may go through council-size.

5. Results

The discussion of empirical results is organized in three sections. First I present the base results concerning council size, ethnic heterogeneity and government size. I present results from a sensitivity analysis of the base specification and argue that the basic relationship is fairly robust. Next I present results concerning at-large, district, and mixed electoral systems. Finally I present results concerning the institutional form of government and degree to which it can act to curtail overspending.

5.1 Base Results

Table 3 shows the base results from OLS regressions. Expenditures per capita, government employment per capita, population and council size are all used in log form because of the presence of large outliers in these series.²⁰ For each of the three measures of government size the first regression includes only population and council size. The second regression adds *Ethnic*. The third regression adds the control variables. The controls include per capita income, educational attainment, and a measure of income inequality. I control for per capita income since richer cities may have greater demand for public services. In the traditional explanation for the existence of government—namely that governments exist to provide public goods and alleviate problems of externalities—the coefficient on income measures the income elasticity of demand for public goods. Most studies find this demand to be income inelastic.²¹ This would imply a positive coefficient in the regression for expenditures per capita but a negative coefficient when government size is measured as the share of government expenditure in total income. I include educational attainment of the city population since more educated city residents may be able to better monitor the conduct of the councilmen and limit the size of government. I control for income inequality since a broad class of models in the macro/political economy literature relate size of government to redistributive pressure arising out of income inequality.²² Since error variances may be affected by city size, heteroskedasticity is likely to be an issue and I use White's heteroskedasticity consistent variance-covariance matrix for estimating the standard errors. The number of observations is close to 2,000 for all the regressions.

The results presented in table 3 indicate statistically significant evidence for the presence of overspending bias in legislatures. The coefficients on council-size

²⁰ The qualitative results, and statistical significance of estimated coefficients, is robust to using these variables in levels rather than logs.

²¹ See for instance the review provided by Mueller (1985).

²² The classic reference on this is Meltzer and Richard (1981).

are positive and strongly significant, with and without control variables. The findings are consistent across the alternative measures used of the size of government. The magnitude of the effect is also considerable. The coefficients on the council-size variable indicate that, controlling for population of the city and other socio-economic variables, a 10% increase in the size of legislature is associated with a 3% increase in government spending per capita, a 2% point increase in share of government in total income, and a 5% increase in local government employment per capita. Evaluated at the sample means, these coefficients imply that, keeping city population and other characteristics constant, an additional councilman adds on average \$0.8 million to the city budget. Median city budget for the sample is \$17.5 million.²³

The coefficient on *Ethnic* is in the expected direction. Greater ethnic heterogeneity is associated with a bigger government, consistent with the theory above that in a more heterogeneous society α is likely to be greater and hence the over-spending bias likely to be greater. This variable is significant in all specifications with council-size except for the specification with government employment with the controls (last equation in table 3). A one standard deviation increase in ethnic heterogeneity is associated with approximately a 3% increase in government expenditures per capita (\$22 per capita at sample mean). For further investigating the effect of this variable, particularly if the effect is coming from lack of internalization of externalities by councilmen when they are a more heterogeneous group, I repeated the regressions using the corresponding measure of ethnic heterogeneity for the council, *CEthnic*. The results were very similar although the estimated coefficients on *CEthnic* were slightly smaller. Note also that the magnitude of the coefficient on *Ethnic* becomes considerably smaller when the controls are added. Further investigation revealed that the effect comes primarily from the inclusion of the inequality variable. More heterogeneous cities

²³ I checked the regression results for the presence of influential outliers. Three (Dana Point, CA; Laguna Niguel, CA; and Yucaipa, CA) cities come out with particularly negative residuals in

have greater income inequality (correlation coefficient = 0.26) and both act to increase government size.

The results on the inequality variable are particularly interesting. There is an extensive macro/political economy literature on income inequality, redistribution, and economic growth. The stylized relationship is that more inequality leads to greater redistributive activity by the government which hurts economic growth. However the empirical evidence for the relationship between inequality and redistributive activity is weak.²⁴ The results in table 3 indicate strong evidence for the positive relationship between income inequality and government size. To the extent that at least some governmental expenditures are redistributive in nature, particularly local government employment which is often used for patronage purposes, these findings provide some support for the hypothesized positive relationship between inequality and redistributive government activity. A one standard deviation increase in the ratio of mean-to-median household income is correlated with a 10% increase in government expenditures per capita—an effect of considerable magnitude. The results were similar from a subset of the sample for which I had data on the Gini coefficient of income inequality. These results corroborate the finding in Alesina, Baqir, and Easterly (1998).

The results on the other variables are in the expected direction. Government expenditures per capita go up with per capita income, but government as a share in total income declines with income, consistent with the empirical literature on the income elasticity of demand for local public goods. Educational attainment is negatively associated with government size—more educated cities have smaller governments.

regressions for government size. All regressions were estimated excluding these three cities. No major changes in the results were observed.

²⁴ See for instance the review by Benabou (1996).

5.2 Sensitivity Analysis

In this section I address several possible areas of concern in interpreting the above results, namely, omitted variables (particularly state-specific fixed effects), non-linear interactions, and potential endogeneity in the basic specification. My main variable of interest is the council size variable. Results of the sensitivity analysis for the ethnic heterogeneity variable are largely consistent with the base results.

The first area I address is the presence of state-specific fixed effects. It is possible that because of state-specific institutional features both government size and council size may vary systematically by state. For example, some states may have a more decentralized institutional set up for the provision of local public services. This may lead to both greater city government expenditure and bigger city councils, leading to a spurious correlation between the two. This seems to be an important concern and therefore I try to address it in three ways. First, I add a complete list of state dummies to the regression equations presented above.²⁵ Second, I use a proxy variable to try to measure the degree to which there might be state influence on the city government. The variable I use is the share, in total city revenue, of intergovernmental revenue from the state. I present regression results including this variable both with and without state dummies. Finally, I run regressions for just one state, California, which has the largest number of observations in the sample.

Results are shown in rows 2 - 5 in table 4. The table reports coefficients on *Csize* for a number of alternative specifications.²⁶ The first row corresponds to the baseline coefficients from the equation with the full sets of controls in table 3. Each successive row shows the effect of including additional control variables or splitting the sample along different dimensions. There is some evidence for state-specific effects in affecting the relationship between *Csize* and government size. Comparing the first row of table 4 to the third equation of table 3, we see that the

²⁵ Note there are no observations in the data set for the District of Columbia and Hawaii.

²⁶ Complete results are available upon request.

coefficient on council size drops to about a third of its value.²⁷ The second equation in table 4 shows that directly controlling for state influence, using the state-share variable, does not affect much the estimated coefficient on council size. The state-specific effects therefore seem to be going through some other channel. Note that, in contrast to equations the first and third rows of table 4, when regressions are run just for California—therefore fully taking into account any state specific effects—the coefficient on council size is as strong as in the regressions of table 3. This pattern of results is consistent across the three measures of government size. Note that council size is statistically significant at conventional levels in all specifications.²⁸

Another possible area of concern in interpreting the results on the council size variable is the claim that it is not council size per se but the number of ethnic groups in the city council which, possibly through a similar common-pool type argument, is driving up government expenditures. Since bigger councils are likely to be more heterogeneous, council-size may be proxying for the number of (effective) ethnic groups in the council. Note this would have different implications since it would imply that for ethnically homogeneous councils we should not see an overspending bias depending on the number of council men. It turns out that while the number of ethnic groups in the city council may also be driving up government expenditures, the council-size effect persists. First note that the correlation between the effective number of ethnic groups and council-

²⁷ Some of this effect is coming from not controlling for the institutional form of city government. When we control for this in section 5.4, the estimated coefficient on the council-size variable is about two-thirds of its magnitude in the base results. See table 8.

²⁸ An interesting finding also emerges on the state revenue share variable. It is negative and significant when we control for state dummies. Theoretically there is a reason to expect either a positive or a negative relationship between this variable and government size. On the one hand, when a greater fraction of expenditures are financed by transfers from the state, the costs of additional spending proposals are spread over the entire state while the benefits are concentrated only in the city. The overspending bias should therefore be greater and the entire city council should be united in wanting higher expenditures. On the other hand, however, a higher state share in total revenue may indicate that the state has greater say in the fiscal decisions of the local government. If this is the case then the state can act to correct the overspending bias in the local legislature, yielding a negative relationship between state revenue share and local government expenditures. The evidence seems more consistent with the latter interpretation.

size in the sample is very weak: the correlation coefficient is 0.04 and is not statistically significant.²⁹ Second, we are already controlling to some extent for the number of ethnic groups in the city council since more heterogeneous cities elect more heterogeneous councils and we control for ethnic heterogeneity of the city. Third, I explicitly control for the effective number of ethnic groups in the city council in addition to the standard set of variables (including *Ethnic*). Results are in row 6 of table 4 where the coefficients on *Csize* are reported after controlling for the effective number of ethnic groups in the council. Compared to the base-line coefficients there is a slight reduction in the magnitude of the coefficient indicating that a small part of the effect may be going through this channel. The council-size effect persists however. In addition the coefficient on the effective number of ethnic groups is positive although not significant at 5% in 2 out of the three specifications.

The remaining rows in table 4 show the results from other checks on the basic result. I investigate non-linear interactions with city size and with ethnic heterogeneity. This is done partly to capture the commonly discussed idea that big cities (which are also more heterogeneous) have their special problems and may attain poorer outcomes for reasons other than the externalities inherent in distributive politics. Although we control for both of these because of non-linear interactions we may not be capturing the true relationship and the results may be being driven by the differences between two distinct groups of cities. Splitting the sample at the median with respect to each of the variables and running the base-line regressions (next four rows of table 4) indicates that the effect of districting on government size is present within each group as well. The results also indicate that the magnitude of the relationship is stronger in bigger and more

²⁹ The *effective* number of ethnic groups is simply the reciprocal of 1 minus the *ETHNIC* variable for the city council using councilmen-by-race data. When ethnic groups are distributed equally, it equals the number of ethnic groups. When groups are not distributed symmetrically, as in one large group and several small groups, it is less than the number of groups to capture the “effective” number of groups. This is the same variable used by, for instance, Taagepera and Shugart (1989), Ordeshook and Shvetsova (1994), and Cox (1997) in their studies of the effects of electoral systems on the number of effective parties in the legislature.

heterogeneous cities. Note that the standard errors associated with the coefficient on *Csize* are somewhat bigger in regression for cities smaller than the median population (and in one specification *Csize* is not significant at 5%). This is likely due to the smaller variation in the *Csize* variable when we look at just smaller cities. The *Csize* variable ranges from 3 to 19 in one sample and from 4 to 50 in the other.

Related to the spirit of the above analysis I look at two more potentially omitted variables: inner-city versus suburban versus rural cities and population density. There may be systematic difference between inner cities and suburbs which are correlated with both desired government expenditures and council size. Central city residents typically favour greater public services and because of being more heterogeneous may also desire bigger city councils. Suburbs generally have the opposite characteristics. The same effect to some extent can be picked up in the population density variable. Controlling for each of these types of possible omissions indicates shows that the council-size-government size relationship is robust even though it declines in magnitude somewhat when we take the central city / suburban city difference into account.

Another possible source of bias in the results could be from systematic variation in political preferences across cities. Residents of some cities, because of their political inclinations on the left-right spectrum, may prefer government to play a bigger role in their lives and this may lead to both greater government expenditures and bigger city councils. To the extent that political preferences are determined in part by income, ethnicity, and other economic characteristics, it should be noted that we are already controlling, at least to some extent, for such factors. Nevertheless it would be useful to try to directly control for the variation in political preferences across cities. One way we could try to measure this is by using voting data in the 1992 presidential election on the percentages voting for a Democrat President. Although many factors are likely to go into a voting decision, given the conventional political platforms of the Democrat and

Republican parties we should expect that city residents with an innate political preference for big government are, all else being equal, more likely to vote for a Democrat candidate. Unfortunately data at the city level for the 1992 presidential election are not available but such data are available at the county level.³⁰ I mapped each city in the sample to the county it is located in and used the county electoral data as a proxy for the city electoral variable.³¹ The results after controlling for this variable are shown in the last row in table 4. The estimated magnitude on the council-size variable reduces somewhat in magnitude but is statistically significant. The coefficient on the voting variable is positive in 2 out of the 3 specifications but is not statistically significant.

A final area of concern is the potential endogeneity of the council-size variable. It could be argued that bigger city government *needs* bigger city councils. Thus, if residents of a particular city want, *a priori*, bigger government we will get bigger councils and the direction of causality might be the opposite to that hypothesized above. It is not obvious, however, why wanting bigger government should lead to wanting bigger city councils. The city council refers to the legislative function of government, as opposed to the executive function. If people, for whatever reason, desire greater redistribution they can get the same sized council to raise the scale of transfer programs for instance. If redistribution is to be effected through public works projects, a greater number of projects may require more staff for planning and executing these projects. However these staff would typically not mean more council men but more employees in the relevant city departments. Empirically the strongest argument for the exogeneity of the council-size variable is that council-size is relatively difficult to change—as discussed above in the context of how population affects council size—while government expenditures change frequently.

³⁰ I was also unable to find data for the entire cross-section of cities for House or Senate elections.

³¹ For this to be a good proxy it requires that there be relatively high correlation across cities in a county on voting patterns. In the absence of direct information on how large or small this variation may be, the results on this variable should be interpreted with caution.

I present results with instrumental variables to empirically address this issue of endogeneity. I instrument for *Csize* using its decade earlier value.³² Results from two-stage least squares regressions are presented in table 5, with and without state dummies. For convenience the table also reports OLS regressions for the corresponding samples. For each measure of government size, the first pair of equations (one OLS the other TSLS) excludes state dummies and the second pair includes them. Note that the decade earlier value of *Csize* is available for a smaller number of observations. If endogeneity were an issue, OLS coefficient estimates would be biased and inconsistent, while TSLS estimates would be consistent (although they might be biased). The OLS and TSLS results presented side-by-side in the table show that the point estimates remain virtually unchanged. Moreover, when the difference is noticeable, as in the first two equations for expenditure shares, the relationship becomes stronger. The standard errors are generally larger in the TSLS specification than the ones in the corresponding OLS regressions but this is to be expected since TSLS is not efficient. The results in table 5 therefore indicate that, to the extent that the decade earlier value of *Csize* is a good instrument, results are not contaminated by endogeneity.

5.3 Electoral Systems: District, Mixed, and At-large Systems

So far I have been using the terms number of districts and council-size interchangeably. To be precise I have been using the number of councilmen and not the number of political districts as the relevant right hand side variable. The two may not be the same in cities with mixed or at-large electoral districts where more than one candidate is returned from the same district.³³ The results in this section will justify the use of council-size as the relevant variable.

³² An earlier observation on council-size would be a better instrument but such data do not seem to be readily available for a large-enough cross-section considered here. Between 1980 and 1990 the council size changed in approximately 20% of the cities in the sample.

³³ In nearly all cities at-large councilmen are elected from the whole city. Only in a small fraction however are there several multi-member districts. Although I do not have the data to distinguish between single-member and multi-member district systems, Welch (1990) collected these data in a

The three predominant forms of electoral systems used in US cities are district (or ward) systems, at-large systems, and mixed systems where some councilmen are elected by district and some at-large from the city. Most cities in the sample have at-large systems: 56% of the total number of cities in the sample have at-large systems, 17% have district systems, and the remaining 27% have a mixed system. It is commonly believed that at-large systems, compared to district systems, can help to curtail pork-barrel type spending by inducing councilmen to treat the entire city as their constituency. For instance, Richard S. Childs, an early municipal reformer, noted the following as a criticism of ward systems (and a recommendation for at-large systems): “ward elections notoriously produced political small fry who intrigued in the council for petty favors and sought appropriations for their wards in reckless disregard of city-wide interests and the total budget” (Childs (1965), p. 37). In their review of the argument for adopting at-large systems in U.S. cities, Engstrom and McDonald (1986) note that councilmen elected at large were “expected to make decisions on the basis of what they perceived to be good for the entire city, not just one geographic or social segment of it” (p. 203). If at-large councilmen *did* cater to the good of the entire city the asymmetry in sharing the benefits and costs of public expenditures would be removed and the overspending bias would disappear. Alternatively, if at-large councilmen, despite running from the whole city, had “home bases” or particular constituencies comprising of subsets of the city population that they sought to distribute expenditures to in exchange for votes we would expect the same effect from increasing at-large councilmen as from district council men. In this section I contrast the predictions of these two hypotheses and test them from the data on electoral systems.³⁴ Results indicate that although critics of district systems may

survey and found that 1.9% of her sample comprised of such cities. For the empirical purposes therefore I take the district electoral systems to mean single-member district systems.

³⁴ The existing discussion of at-large/district/mixed systems in the literature has been in terms of the impact on how well they represent minorities in city councils. The stylized relationship is that at-large systems, compared to district systems, do poorly at representing minorities in city councils. Using my data I can check for this and do find evidence consistent with this view: the marginal effect of city ethnic heterogeneity on council heterogeneity is systematically lower in at-

have been right in thinking that district systems contribute to overspending, they were likely wrong in supposing that at-large councilmen would not cater to particular constituencies within the jurisdiction.

In a city with J total elected council-men let J_D denote the number elected by district, and let $J_L = J - J_D$ denote the number elected at-large. Desired per capita government spending of each type is denoted g^D and g^L respectively. With these two types of councilmen wanting in general different amounts of city expenditures we have to model some kind of rule by which the outcome is chosen. It is natural to assume that the degree to which each group can influence the outcome is proportional to its relative strength in the council. In particular assume that the outcome (g) is a weighted average of the two desired expenditures:

$$g = \lambda(g^D) + (1 - \lambda)g^L \quad 0 \leq \lambda \leq 1. \quad (7)$$

In general λ could be modeled as $\lambda = \lambda\left(\frac{J_D}{J}\right)$ with the properties that $\lambda(0) = 0$, $\lambda(1) = 1$, and $\lambda'(\cdot) \geq 0$. For simplicity assume that $\lambda = \frac{J_D}{J}$ so that the extent to which district councilmen get their desired outcome directly depends on their proportionate share in the council. We can now state two alternative hypotheses for how at-large councilmen act in comparison to district council-men.

Hypothesis I: *At-large councilmen cater to the common good of the whole city.*

Their constituency is the whole city, as such they face no asymmetry between benefits and costs of policies and face no overspending bias. In particular their desired spending is given by the social optimum given in equation (4) above. That is, $g^L = g^*$ and recall that this is invariant to the number of councilmen. District councilmen behave as before and their desired spending goes up in the

large cities than in mixed and district cities. If at-large systems reduce the effective number of ethnic groups in the city council (and this reduces total expenditures) we could be over-measuring the effect of district and at-large systems on expenditures. For all results reported below I repeat them controlling for the effective number of ethnic groups in the city council (both overall and

total number of districts. From (6), $g^D = \hat{g} = \hat{g}(J_D)$ where $\hat{g}'(\cdot) > 0$. City-wide per capita spending is therefore:

$$g = \lambda \hat{g}(J_D) + (1 - \lambda)g^*.$$

Differentiating with respect to J_D and J_L we can derive the predictions of Hypothesis I:

<u>District systems</u>	<u>At-large systems</u>	<u>Mixed systems</u>
$\frac{\partial g}{\partial J_D} > 0$	$\frac{\partial g}{\partial J_L} = 0$	$\frac{\partial g}{\partial J_D} > 0, \frac{\partial g}{\partial J_L} < 0$

Thus in mixed systems, for given number of district councilmen, increasing the number at-large should decrease overall expenditures per capita since at-large councilmen gain in strength and can push the outcome toward their ideal of smaller spending.

Now consider the implications of the alternative hypothesis.

Hypothesis II: *At-large councilmen cater to particular constituencies and face the same asymmetry between benefits and costs of their policy proposals as district councilmen.*

In this case both councilmen at-large and by-district would face the same overspending bias so that the desired spending of each would depend on the total size of the council. If district and at-large councilmen face exactly the same overspending bias we have $g^L = g^D = \hat{g}(J) = g$ and we readily have the predicted marginal effects³⁵:

interacted with the electoral system). None of the results presented below are sensitive to these additional controls.

³⁵ We can also allow for a weaker version of hypothesis II: $g^L = g^L(J), g^D = g^D(J)$, $g^i(\cdot) > 0, i = L, D$, where possibly $g^L(\cdot) \equiv g^D(\cdot)$. That is, the two types of councilmen can face an overspending bias to different degrees. In this more general case we get the same predicted marginal effects with the additional assumption that $g^i(\cdot) > 0, i = L, D$, is not too small. This weak assumption is needed because suppose that $g^L < g^D$ and there is an increase in the number of at-large councilmen. Both g^L and g^D will rise but at the same time the weight λ will shift

District systemsAt-large systemsMixed systems

$$\frac{\partial g}{\partial J_D} > 0$$

$$\frac{\partial g}{\partial J_L} > 0$$

$$\frac{\partial g}{\partial J_D} > 0, \frac{\partial g}{\partial J_L} > 0.$$

The empirical test to discriminate between these two hypotheses can be implemented by running the regression:

$$g = \beta_0 + \beta_1 D_D J_D + \beta_2 D_L J_L + \beta_3 (1 - D_D - D_L) J_D + \beta_4 (1 - D_D - D_L) J_L + Z\beta_5 + \varepsilon$$

where $D_i, i = D, L$, is a indicator variable for district and at-large electoral systems respectively and the matrix Z includes the standard set of controls. β_1 and β_2 pick out the marginal effects in pure district and at-large systems while β_3 and β_4 pick out the effects in mixed systems. The predicted coefficients are as follows:

	β_1	β_2	β_3	β_4
Hypothesis I:	+	0	+	-
Hypothesis II:	+	+	+	+

Identification rests on the different predictions for β_2 and β_4 , that is the effect of at-large councilmen in at-large and mixed systems.

Results are presented in table 6.³⁶ In addition to the variable shown the regressions include the standard set of controls. For each specification the F -statistic corresponding to the joint test $\beta_2 = 0, \beta_4 = 0$ along with the p-value are also reported. The test strongly rejects for each specification. The evidence is inconsistent with the view that at-large councilmen suffer less from an

towards g^L . If g^L does not rise fast enough the weighted average could fall. This weaker version of the hypothesis yields another prediction (which does not this assumption) and which can be tested: $g^D > g^L \Rightarrow g^D(\cdot) > g^L(\cdot)$.

³⁶ I revert to using levels rather than logs since under the hypothesis that the effects of at-large and district councilmen are exactly the same $\beta_3 = \beta_4$ but $\log(J_D) + \log(J_L) \neq \log(J_D + J_L)$.

overspending bias. The similarity of results across the two types of electoral systems suggests that in at-large systems politicians can specialize along some dimension other than geography. The difference between the two systems is that in district systems the voter pool for a politician is pre-defined based on geography. To win, a candidate needs a plurality of votes cast in that city ward. In at large systems, politicians can carve out their own voter pool, or “district,” and this frees them up to specialize along some other dimension, such as ethnicity, age group, or other dimensions. In effect therefore both types of politicians have districts they seek to bring distributive spending to and this can account for the similarity of results across the two types.³⁷

Further inspection of the coefficients in table 6 indicates two other patterns. First, comparing β_1 to β_2 and β_3 to β_4 we see that if anything at-large councilmen suffer slightly more from an overspending bias (the formal joint test $\beta_1 = \beta_2$ and $\beta_3 = \beta_4$ does not reject (at 5%) for 2 out of the 3 specifications). Second, mixed systems seem to be worse than both pure district and at-large systems. The effect of an additional councilmen (whether elected by district or at-large) is greater if he is in a mixed electoral system instead of a non-mixed system. I explore this further by looking separately at mixed and non-mixed samples. The difference with the earlier specification is that I am unconstraining all the coefficients and not just the ones on the at-large and district councilmen with respect to the two samples. I also use a log specification which allows us to compare the magnitudes of the effects to the results presented earlier while at the

³⁷ There does not exist much theoretical work in either economics or political science on the effect of differential impact of at-large and district systems on pork-barrel spending. One theoretical piece which is consistent with the findings presented here is Myerson (1993). He considers the issue of when a candidate would try to appeal more broadly to all voters versus when she will concentrate more narrowly on winning the support of minorities or special interest groups. Interestingly he finds that for both single-member and multi-member districts the incentives to cultivate the vote of a minority are the same if the electoral system is based on plurality voting, as city systems are. The findings are different for single-member vs. multi-member districts when the system is based on proportional representation. As noted earlier all cities in the U.S. except Cambridge, MA use a form of plurality voting.

same time allowing us to compare the relative effects of the district and at-large councilmen:

$$g = \alpha_0 + \alpha_1 \frac{J_D}{J} \log(J) + \alpha_2 \frac{J_L}{J} \log(J) + Z\alpha_3 + \varepsilon$$

This way of transforming the at-large and district councilmen variables has the advantage that under the null hypothesis of $\alpha_1 = \alpha_2$ we simply get $\log(J)$ and that

$$\alpha_1 > \alpha_2 \Leftrightarrow \frac{\partial g}{\partial J_D} > \frac{\partial g}{\partial J_L}.$$

Results are presented in table 7. The pattern of results is similar to the one in table 6 with the difference between mixed and non-mixed systems somewhat more striking. For all three measures of government size the marginal effects are stronger in mixed systems than non-mixed systems. One hypothesis consistent with these findings is that in addition to the externalities which councilmen impose on each other within a group there are also *inter*-group externalities which they fail to internalize, hence leading to worse outcomes than either pure district or at-large systems. The results also shed some light on the choice of electoral systems. Historically cities had district electoral systems. During the early parts of the century the at-large system was introduced to break up the power of machines on city governments. However one feature of at-large systems is that they do poorer at representing minorities in city councils. Hence some cities argued for adopting mixed systems where they could get the representation of district systems and at the same time the whole-city oriented influence of at-large councilmen. The evidence in the results discussed above indicates that mixed system may in fact end up faring worse.

5.4 Institutional Form of Government

Finally I turn to testing the effect of institutional form of government on government size. Theory predicts that institutions which credibly concentrate

power in one figure in the government can help to sever the link between council size and government size. To test for this I run the following regression:

$$\log(g) = \alpha + \beta \log(J) + \gamma D \cdot \log(J) + Z\delta + \varepsilon$$

where D is an indicator variable (or a set of indicator variables) for a centralized budget institution and the matrix Z includes the remaining variables used in the above regressions. As discussed above a city government is likely to have a more centralized budget institution when it has the mayor-council form of government, the mayor has agenda setting powers, and the mayor has veto-power to credibly enforce discipline in the legislature. In such forms of government we should expect to see the link between legislature size and government size weakened.

That is we should expect $\frac{\partial \log(g)}{\partial \log(J)} = \beta + \gamma \approx 0$.

The results of estimating the above equation are presented in table 8. The first regression, for each measure of government size, is run with an indicator for the form of government. The second includes indicators for mayor's agenda setting and veto powers—measures of actual mayor power and the degree to which he can enforce discipline on the council. In the third regression both the form of government and mayor strength indicators are included.

The general results are in the expected direction although the evidence on the institutional variables is not as clear-cut as that on the council size variable. The findings are stronger on two measures of government size: expenditures per capita and government employment per capita. Actual measures of mayor power seem to be more important than the form of government. In particular, mayor veto power seems to be an important determinant of government size. There is a fair degree of multicollinearity between the three institutional variables. Since in independent regressions mayor strength variables seem more important, I concentrate on the second and third regressions for each measure of government size. A comparison of the coefficients on $\log(\text{Council Size})$ and $\text{Mayveto} \times \log(\text{Council Size})$ provides some evidence for the hypothesized

relationship above and can be stated as follows: the relationship between council size and government size is severed when we switch to a strong-mayor form of government. The closeness of the coefficients is again striking for government employment per capita. It should also be noted that the coefficients on the council size variable are bigger in magnitude than those reported in table 4 though still not as large as those in the base results of table 3. This is reassuring since it indicates that part of the reduction in the magnitude of the council size effect when we controlled for state dummies was coming from the variation in the institutional form of government.

A somewhat puzzling finding emerges on the strong-mayor dummy variable. The mayor-veto dummy is positive and significant in two out of the three specifications. This means that when we switch to a strong mayor form of government two effects happen: one, there is a positive intercept increase in the size of government and, two, there is a decrease in the size of government from the council size effect. Evaluated at the sample means these effects cancel each other out. However, city governments with small councils, are likely to have a bigger government with a strong-mayor form than otherwise. This is somewhat puzzling because *a priori* we would have expected the intercept effect to be non-positive. One possible explanation is that there may be strong-mayor related patronage spending which we do not account for. If strong mayor forms mean that the mayor, in addition to enforcing discipline in the council, finds it easier to pursue patronage related spending for his own political ambitions then we would get a positive independent effect of a strong-mayor form on the size of government.³⁸ Another interesting possibility is to consider that the institutional form of government is also a choice at some level. If cities which are more prone to having fiscal problems choose strong-mayor forms of government then the coefficient on the institutional dummy is likely to be biased upwards. Probit and logit regressions for the mayor-strength variable indicate a very strong effect of

council size: cities with bigger councils—thus those where the overspending bias is greater—are much more likely to choose a strong-mayor form of government. This opens up an interesting avenue of research for estimating a simultaneous system for the size and institutional form of government.³⁹

6. Conclusion

The purpose of this paper has been to present theory and evidence on the overspending bias that can arise in a political jurisdiction in the context of districting, generalized taxation, and a norm of universalism. The empirical results can be summarized as follows:

- Government spending goes up with districting and ethnic heterogeneity and the relationship is robust to controlling for a number of possible omitted variables.
- At-large electoral systems do not reduce the over-spending bias in legislatures. The sensitivity of expenditures to council size is greater in mixed systems than either pure district or pure at-large systems.
- There is some evidence that strong mayor forms of city government, particularly those where mayors have veto powers can curtail the overspending bias.

I close by describing ways in which I am working on extending the line of research started in this paper.

One issue that has not been addressed in the present framework has been the issue of equity in the *distribution* of government expenditures across districts. The model makes predictions about the size of government expenditures but does not make predictions about how their distribution across districts may change with

³⁸ For this argument to explain the results it would have to be the case that strong mayors get away with patronage related spending more easily when they are faced with smaller city councils.

³⁹ In a related paper I am pursuing this further.

greater districting. Part of the reason why I restrict attention in this paper to the size dimension is that the data I have is at the most micro level of government and I do not have expenditure data by city district. One likely benefit of greater districting would seem to be to produce a more equitable, or more democratic, distribution of government expenditures across districts. This tradeoff between the costs and benefits of greater districting could be usefully added to the theoretical framework considered here.

On the empirical side there are two directions to extend the work. First, I intend to examine how districting may affect measures of fiscal balance—budget deficits and city government debt. The findings presented so far relate to the size of the budget and not to indicators of budgetary balance. Second, as was suggested above a simultaneous system should be estimated for the size and institutional form of government. A key issue in this area would be identification of a suitable instrument for the form of government. The findings should be particularly interesting since not much empirical literature exists on explaining the choice of the institutional form of government.

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Table 2: Summary Statistics

<i>Variable</i>	<i>Units</i>	<i>Min</i>	<i>Max</i>	<i>Median</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>N</i>
<i>Csize</i>	No. of people	3	50	6	6.859	2.888	2342
<i>Exppc</i>	\$1,000 per capita	0.020	7.836	0.641	0.791	0.539	1991
<i>Expsh</i>	Percentage	0.078	44.660	4.933	5.973	4.123	1991
<i>Govempl</i>	Employees per 1,000 population	0.429	98.873	9.746	12.101	8.835	1996
<i>Ethnic</i>	Fraction	0.004	0.730	0.187	0.235	0.173	3146
<i>Cethnic</i>	Fraction	0	0.720	0	0.122	0.180	1779
<i>Pop90</i>	No. of people	10,005	7,322,564	21,099	45,540	173,103	3146
<i>Incomepc</i>	\$1,000 per capita	4.382	63.302	13.865	15.277	5.973	3146
<i>BAGrad</i>	Fraction	0.007	0.909	0.188	0.225	0.129	3146
<i>MMI90</i>	Ratio	0.986	4.777	1.213	1.248	0.185	3146
<i>Districtcg</i>	No. of people	0	50	0	2.856	4.048	2342
<i>Largecg</i>	No. of people	0	16	5	4.003	2.731	2342
<i>Mayorouncil</i>	Dummy variable	0	1	0	0.377	0.485	1785
<i>Budgetm</i>	Dummy variable	0	1	0	0.171	0.377	1751
<i>Mayveto</i>	Dummy variable	0	1	0	0.343	0.475	1745

Table 3: Base Results
OLS Regressions for Government Size

	Log (Expenditures per capita)			Expenditure share			Log (Govt. employment per capita)		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Constant	-2.482	-2.382	-3.397	-5.518	-3.090	-8.543	0.990	1.218	-0.512
	-17.283	-16.488	-18.612	-3.636	-2.055	-4.975	6.414	7.796	-2.581
Log (Council Size)	0.276	0.295	0.302	2.012	2.468	2.066	0.508	0.550	0.500
	7.185	7.545	7.885	6.701	8.251	7.014	12.109	13.085	12.270
Log(Pop90)	0.151	0.133	0.131	0.748	0.301	0.563	0.035	-0.007	0.023
	11.428	9.348	9.387	5.806	2.229	4.330	2.364	-0.473	1.541
Ethnic		0.226	0.192		5.482	2.522		0.517	0.070
		3.040	2.432		8.620	4.000		5.965	0.790
Income per capita			0.023			-0.115			-0.004
			6.405			-5.651			-0.996
% BA Grad			-0.606			-4.259			-0.544
			-3.943			-3.933			-3.125
Mean/Median Income			0.661			5.408			1.424
			7.177			8.688			13.192
No. of obs.	1972	1972	1972	1972	1972	1972	1977	1977	1977
Adj. R-sq	0.102	0.106	0.146	0.065	0.109	0.187	0.082	0.100	0.198
S.E. of regression	0.536	0.535	0.523	3.994	3.898	3.723	0.590	0.584	0.551

Notes: White's heteroskedasticity consistent t-statistics are reported below coefficient estimates.

Table 4: Sensitivity Analysis

<i>Specification</i>	<i>Log (Exppc)</i>		<i>Expsh</i>		<i>Log (Govempl)</i>	
	<i>Coeff</i>	<i>t-stat</i>	<i>Coeff</i>	<i>t-stat</i>	<i>Coeff</i>	<i>t-stat</i>
0) Base-line estimates	0.302	7.89	2.066	7.01	0.500	12.27
1) State-specific effects:						
a) State dummies	0.103	2.79	0.870	2.78	0.144	3.85
b) State share in total revenue	0.254	6.86	1.754	6.17	0.470	11.38
c) State dummies with state share in total revenue	0.108	2.89	0.886	2.77	0.147	3.84
d) Sample = California	0.307	2.06	2.842	2.38	0.379	2.43
2) Effective number of ethnic groups	0.274	5.61	1.778	4.87	0.481	9.32
3) Big cities vs. small cities						
a) Pop90 >= Median (25,794)	0.386	7.97	2.832	7.23	0.582	11.17
b) Pop90 < Median	0.139	2.25	0.561	1.38	0.316	4.69
4) Ethnic heterogeneity						
a) Ethnic90 >= Median (0.20)	0.328	6.09	2.628	5.42	0.580	9.94
b) Ethnic90 < Median	0.274	5.15	1.472	4.61	0.421	7.44
5) Central vs. suburban cities	0.193	4.22	1.397	4.07	0.370	7.86
Includes dummies for central and suburban cities						
6) Population density	0.301	7.85	2.058	6.95	0.497	12.26
Controls for log (population density)						
7) Percent voting for a Democrat President	0.222	5.85	1.409	5.18	0.445	10.63

Notes: The table reports coefficients on the council-size variable as additional controls are added and the sample is split by some of the right hand side variables. The reported t-statistics use White's heteroskedasticity consistent covariance matrix. Baseline estimates refer to the coefficients in table 3 corresponding to the regressions with the full set of controls.

Table 5: Endogeneity

	Log (Expenditures per capita)				Expenditure share				Log (Govt. employ	
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)
Estimation methodology	OLS	TSLs	OLS	TSLs	OLS	TSLs	OLS	TSLs	OLS	TSLs
Constant	-3.256 -16.355	-3.267 -16.382	-2.595 -11.682	-2.594 -11.659	-8.419 -4.267	-8.505 -5.861	-2.451 -0.797	-2.466 -1.487	-0.601 -2.789	-0.603 -2.786
Log (Council Size)	0.268 6.451	0.286 6.009	0.108 2.546	0.106 1.996	1.963 5.702	2.113 6.095	0.775 2.088	0.800 2.023	0.458 10.156	0.461 8.935
Log(Pop90)	0.133 8.728	0.131 7.923	0.105 7.603	0.106 7.094	0.615 4.423	0.597 4.954	0.467 3.458	0.464 4.186	0.039 2.384	0.038 2.140
Ethnic	0.187 2.233	0.195 2.304	0.387 4.161	0.387 4.307	2.233 3.443	2.295 3.733	3.778 5.163	3.777 5.638	-0.020 -0.211	-0.019 -0.211
Income per capita	0.026 7.616	0.026 7.748	0.020 5.772	0.020 6.279	-0.101 -5.628	-0.100 -4.103	-0.124 -6.234	-0.124 -5.305	0.003 0.914	0.003 0.907
% BA Grad	-0.679 -4.384	-0.679 -4.272	-0.520 -3.606	-0.520 -3.713	-4.948 -5.250	-4.950 -4.281	-4.397 -4.881	-4.395 -4.214	-0.804 -4.553	-0.804 -4.647
Mean/Median Income	0.574 5.980	0.571 5.968	0.838 8.829	0.838 9.717	5.060 7.439	5.037 7.228	6.623 9.901	6.620 10.300	1.416 12.931	1.416 13.615
State dummies	No	No	Yes	Yes	No	No	Yes	Yes	No	No
No. of obs.	1514	1514	1514	1514	1514	1514	1514	1514	1516	1516
Adj. R-sq	0.157	0.156	0.424	0.424	0.192	0.192	0.422	0.422	0.193	0.193
S.E. of regression	0.484	0.484	0.400	0.400	3.521	3.522	2.979	2.979	0.525	0.525

Notes: White's heteroskedasticity consistent t-statistics are reported below coefficient estimates. Csize is instrumented with its decade earlier value.

Table 6: District, At-large, and Mixed Electoral Systems

	<i>Log(exppc92)</i>	<i>Expsh92</i>	<i>Govemplpc92</i>
Intercept	-3.006 -15.75	-5.914 -4.35	0.142 0.70
District dummy x District councilmen	0.027 5.74	0.197 5.98	0.038 7.81
At-large dummy x At-large councilmen	0.034 5.47	0.284 6.39	0.039 5.82
Mixed system dummy x District councilmen	0.032 4.82	0.282 5.92	0.046 6.48
Mixed system dummy x At-large councilmen	0.060 5.09	0.334 3.97	0.083 6.63
F-statistic	21.212	22.502	29.665
p-value	0.00	0.00	0.00
No. of obs.	1972	1972	1977
Adj. R-sq	0.15	0.19	0.20
S.E. of regression	0.52	3.71	0.55

Note: Regressions includes the following additional variables: Ethnic90, 1990 population, Income per capita in 1990, % BA Grad, Mean-to-Median income

Table 7: At-Large and District Results by Sample

<i>Sample</i>	<i>(By-district/Csize) x log(Csize)</i>	<i>(At-large/Csize) x log(Csize)</i>
<i>Regressions for log (Expenditures per capita):</i>		
All	0.308 7.771	0.318 6.834
Mixed electoral systems (some at-large and some by district)	0.425 5.185	0.527 6.159
Non-mixed electoral systems (all at-large or all by-district)	0.209 4.338	0.221 3.945
<i>Regressions for Expenditure Share:</i>		
All	2.165 7.089	2.351 6.546
Mixed electoral systems (some at-large and some by district)	3.105 4.458	3.527 5.324
Non-mixed electoral systems (all at-large or all by-district)	1.522 4.156	1.692 3.972
<i>Regressions for log (Govt. employment per capita):</i>		
All	0.483 11.479	0.451 9.202
Mixed electoral systems (some at-large and some by district)	0.422 4.902	0.568 6.464
Non-mixed electoral systems (all at-large or all by-district)	0.407 8.129	0.391 6.717

Notes: White's heteroskedasticity consistent t-statistics are reported below coefficient

Table 8: Institutional Form of Government

	<i>Log (Expenditures per capita)</i>			<i>Expenditure share</i>			<i>Log (Govt. employment p</i>	
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)
Constant	-2.583 -6.531	-2.531 -6.540	-2.585 -6.557	-1.480 -0.444	-0.667 -0.200	-1.147 -0.340	0.636 1.803	0.613 1.750
Log (Council Size)	0.212 2.919	0.180 2.595	0.224 3.025	1.191 2.546	0.698 1.513	1.066 2.211	0.198 2.760	0.205 2.695
Mayor council	0.308 1.793		0.234 0.956	1.342 1.084		2.070 1.218	0.056 0.316	
Mayor council x Log(Csize)	-0.177 -2.026		-0.154 -1.216	-0.783 -1.209		-1.322 -1.460	-0.046 -0.519	
Budgetm		-0.240 -1.097	-0.294 -1.263		-1.624 -1.053	-2.136 -1.249		-0.290 -1.273
Budgetm x Log(Csize)		0.117 1.132	0.157 1.417		0.735 0.959	1.087 1.277		0.161 1.533
Mayveto		0.541 2.635	0.410 1.739		2.053 1.348	0.915 0.566		0.446 2.228
Mayveto x Log(Csize)		-0.262 -2.544	-0.182 -1.521		-0.827 -1.072	-0.142 -0.171		-0.222 -2.231
Log(Pop90)	0.092 6.046	0.092 6.103	0.088 5.768	0.236 1.707	0.232 1.700	0.201 1.453	0.042 2.657	0.040 2.549
Ethnic	0.469 4.312	0.470 4.332	0.467 4.299	4.096 5.331	4.110 5.327	4.089 5.316	0.315 2.926	0.320 2.976
No. of obs.	1420	1420	1420	1420	1420	1420	1418	1418
Adj. R-sq	0.346	0.346	0.347	0.348	0.349	0.350	0.464	0.465
S.E. of regression	0.430	0.430	0.430	3.091	3.090	3.087	0.434	0.434

Notes: White's heteroskedasticity consistent t-statistics are reported below coefficient estimates.
Regressions include a complete list of state dummies.
Regressions control for per capita income, educational attainment and ratio of mean to median income.

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