

LOCAL GOVERNMENT SPENDING AND AT-LARGE VERSUS DISTRICT REPRESENTATION; DO WARDS RESULT IN MORE "PORK"?

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The issue of at-large versus ward representation has recently again become controversial. Wards are argued to better represent minorities, both ethnic and preference. However, an opposing argument is that wards encourage spending. It is suggested that one reason for this is that, with ward representation, a coalition can be put together to exploit other areas of the city. This question is tested empirically and it is found that spending, debt, and taxes are both significantly and substantially higher in cities where ward representatives have greater power than in cities where at-large representatives have the greater power. It is conjectured that this same effect results in higher state and federal expenditures than would be desired by the majority of voters.

1. INTRODUCTION

THE ISSUE of at-large versus district or ward representation on city councils has been a major concern in recent years with a good deal of pressure on at-large cities to shift to ward representation. An often cited reason for moving to ward council members is to give ethnic minorities better representation than they have with at-large elections.¹ This presumes that ethnic minorities are minorities in their preferences as well. In at-large elections, presumably, the majority population elects people solely from their majority and minorities have no representation (e.g. Packer, 1982). Frequently, ethnic minorities are concentrated in certain parts of the community and with district representation might then be able to elect some of the representatives to the city council.² This paper

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¹Bledsoe (1986), on the basis of a questionnaire, found that blacks perceived themselves as having a lesser influence in at-large cities than in ward cities. This did not seem to be as much the case for whites. He interprets this as indicating that blacks will have better feelings toward governments with more black office holders. Bobo and Gilliam (1990) found that black people are more active politically if there are more black office holders. More activity may result in greater influence.

²Wallawender (1986) shows, using a sample of 268 cities, that those with a ward system elect a proportion of ethnic minority council members significantly closer to the proportion of ethnic minority population than is the case in at-large cities.

will suggest that pork barrel spending or log-rolling is a more likely reason for this proposed change.

With district representation, any minority, whether it is an ethnic minority or simply one with preferences which are in the minority, would be able to elect only a minority of the city council. Consequently, any legislation preferred by the majority of the population would still get passed. Legislation preferred by the minority population would still be endorsed by only a minority of the city council and consequently would fail.³ The question then is why there should be such pressure to make any change.⁴

The fact is, however, that the effort to change city councils meets the market test. People are spending resources in order to effectuate or oppose this change. They would not do so unless they expected an increase/decrease in value from such a change that exceeded their expenses. What are the benefits/costs of the change? One benefit may include the salary of the representative if the pay is more than the opportunity cost of his or her time. Often, however, the salary is less than the resources expended in seeking office. There may be other benefits to the representative such as the power to name assistants. Congressional staff salaries, for example, add up to several million dollars to each congressman. In local governments these salaries are usually small and would not represent much of an incentive. There is some evidence (see Dye and Renick, 1981, for example) that increased racial minority representation does result in more employment of that racial minority. Some have suggested as motivation that "side payments" (bribes) may be received by the elected official. Based on the low receipts in the few scandals that occur, it would appear that these benefits are low or nonexistent.⁵

The largest benefit of a representative to his supporters is in the legislation which is enacted. Changing the legislator presumably changes legislative outcomes. If people are making an effort to change the legislative mode, they

³ MacManus (1985) argues that a mixed council (some at-large seats and some ward seats) will cause "a wider range of policy issues to be discussed at council meetings." She further believes that policy will be more responsive through coalition building on the council. There is no indication of any alterations in efficiency. In response to this, it could be argued that even if a different range of policy issues is discussed, there is no indication or reason to believe that opinions would be altered as to the outcomes which would most benefit the majority. Consequently, the decision making ought to be precisely the same as under fully at-large representation if the at-large representatives are in the majority.

⁴ It might also be noted that this shift is precisely opposite to the "good government" reforms of the early part of the century where the pressure was to move from wards to at-large representation. The basis then was to reduce the alleged corruption of ward politics and the parochialism associated with wards.

⁵ The author spent 20 years as a councilman (elected at-large) in a community of over 100,000 people. He never observed such side payments being taken by any of the people with whom he had contact. Of course, this may argue for poor powers of observation, but it seemed to be more the case that people were motivated by personal convictions and, to some extent, by the prestige of the office. On the other hand, Amherst, N.Y. may differ from, say, Albany, N.Y. or N.Y. City.

must expect a beneficial (to themselves) change in the legislation enacted by district representatives⁶ instead of at-large representatives.

While gerrymandering could allow a majority of representatives to be elected by as few as 25 percent of the voters,⁷ a majority of citizens should generally be able to elect a majority of the legislators. If gerrymandering occurs, it seems more likely that the majority would be the group doing it to protect itself. In the following, presume that there will be no deliberate gerrymandering.⁸ Legislative outcomes will be altered only if legislators alter their views on how to get reelected. In order to appeal to their constituents, representatives have to provide services which are desired or valued by constituents. At-large representatives will typically be seen as responsible for all aspects of city government while district representatives will generally be seen as responsible only for services provided to their own districts. The natural result is expected to be that district representatives will focus solely on services to their districts while at-large representatives will focus their efforts on city-wide concerns such as fiscal responsibility or the efficient operation of city-wide departments or functions.⁹ The at-large representative may well feel less concerned about the provision of services to any particular area of the city since he or she is elected by all parts of the city.¹⁰ A likely result is that governments which are composed of district representatives will have higher spending levels on various services than those governments which are elected at-large.¹¹ With less concern for overall fiscal performance, ward representatives will tend to act, through vote trading or

⁶ Haselswerdt (1984) used data from Buffalo, N.Y. to look at spending and incomplete ballots in at-large and district elections. The per capita spending on elections was substantially higher in wards and incomplete ballots were more prevalent in at-large elections.

⁷ Let just over half of the districts have bare majorities for one group and the rest of the districts be composed entirely of the other group.

⁸ A precise definition of gerrymandering does not appear to be available. Generally, it is a drawing of political boundaries to give an advantage to the drawer. However, it also has another interpretation which is to draw boundaries so that the enclosed areas are not convex sets or that the total length of borders is not minimized. The assumption is made here that the sets are equal and cohesive but randomized. Thus, there is no gerrymandering.

⁹ Adrian and Press (1968, p. 254) argue that "aldermen selected from small wards tend to become local errand boys. They are unable safely to consider the needs of the whole city lest they be told by their constituents that they were sent to city hall to protect the interests of their own ward". Caraley (1977, p. 241) states that, "District-elected councilmen . . . want to . . . better satisfy the needs of their particular areas of the city." When James Buckley lost re-election to the U.S. Senate, one major campaign issue was what he had or had failed to do for New York State rather than his service for the benefit of the U.S. as a whole. It is clearly the case that an official who is elected from a district can be expected to be interested in increasing the services provided to that district with the costs falling on a larger tax base. Then, his or her constituents will pay only part of the cost and will receive the whole benefit. Under the situation, the amount of the service desired will be greater than if the recipients had to pay the whole cost.

¹⁰ Of course, the at-large representative lives in some district, but it will be presumed that re-election is more important to him or her than is the service provided to him or her.

¹¹ Wilson (1968, p. 34) argues the upper middle class values are more likely to prevail in at-large elections while working-class interests are more likely to be in control of wards. It is not quite clear what this argument means unless the upper middle class values include lower taxes and working class interests include greater spending on services. There is some sense of this as implicitly part of his argument.

“log-rolling”, so as to insure that more services are provided.¹² Hoffman (1976, p. 69) found that ward representatives were less likely to represent the median voter than were at-large representatives, particularly with respect to taxes.

It may be that those who are seeking to alter representation from at-large to districts are seeking just such a result because the taxes collected are based on property values which in turn are highly correlated with incomes.¹³ Thus, there is an effective redistribution from the well off to the poor if services are equal. Since city services, at least according to law, are provided equally to all citizens, a higher level of services will result in greater redistribution from the more well off to the less well off. It follows, then, that if a higher level of services results from a change to wards, there will be more redistribution.¹⁴

The object of this paper is to test whether such an expenditure effect occurs. That is, does the presence of a larger number or proportion of district representatives result in increased expenditures by the municipality? This test is to be conducted across a number of U.S. municipalities. Of course, there are numerous other determinants of local government expenditures in addition to the electoral structure and controls must be included for these effects.¹⁵

This issue of wards and at-large representation is also important on the state and federal levels. All state and federal legislators are elected from districts; consequently, their interests are aligned with those districts rather than with the state or national community as a whole.¹⁶ In 1992, city and other local governments spent \$655 billion, state governments spent \$700 billion, and the federal government spent \$1527 billion, so local governments are less than 27 percent of the total. If the theory to be tested in this paper is correct, it would be

¹²It is most satisfactory to the elected official to be always able to vote the way his or her constituents want, even if that means losing on some (or most) issues. Log-rolling, on the other hand, allows for more successes even if his constituents must pay a price for it. The satisfaction level of the politician, of course, is not at issue here; we want to know how decisions will change with a change from at-large to ward representation. The important question is whether there will be a change in policies if a city moves to ward representation. Will log-rolling result in more spending in a ward city? Will management be less interested in fiscal performance?

¹³While it is true that taxes are often collected on incomes or sales or some other basis different from property value, it is nonetheless the case that the *burden* will be felt on property values. This is due to the fact that the city is a defined area, including all property therein. Any charge makes the attractiveness of city living fall.

¹⁴Redistribution cannot occur in a situation of Tiebout equilibrium where cities compete with one another. However, that Tiebout effect which eliminates the possibility of redistribution within a city depends upon the existence of a sufficient number of competing independent cities in a region so that a person can choose just that mix of services and taxes desired. In many areas there are relatively few jurisdictional choices which are readily available to the average citizen. Consequently, it generally is the case that some redistribution can occur within a city. Migration is expensive and may well allow such redistribution to occur even where there are several cities available. This will not persist in the long run since newcomers will choose their homes based on services and costs.

¹⁵Lyons (1977) found, as he had expected, that at-large elections resulted in lower spending, but controlled only for having a city-manager form of government.

¹⁶It might be argued that Senators, being elected from a whole state, would be more oriented to the national median than would House Members. However, although that is not tested here, it could be asked whether Senate votes within a state are more homogenous than are House votes within the same state.

expected that spending on the state and federal levels has been increased by the fact that the legislators come from districts rather than being elected at-large.¹⁷ Further, because *all* of the legislators are from districts, the effect may be larger than for local governments where many are elected at-large.

There are only a few cases of empirical testing of at-large versus ward representation. Using the case of a change from at-large to mixed (mostly ward) elections in Raleigh, North Carolina, Clary and Williams (1982) suggest that there were substantial policy changes. Of course, that does not consider the possibility that the changes would have been made whether or not there had been an electoral change; the public may have had changed preferences. There was no consideration of the question of efficiency, but there was an apparent move toward increased spending on parks, street paving, and police patrols. This would imply increased cost levels along with the higher service levels. Morgan and Pelissero (1980) tested city reforms using 11 cities, which usually implied a move from wards to at-large representation, and found little spending effect. Their statistics, however, were very limited. Clark (1968, p. 588) used a multiple regression to find that reform cities (generally at-large, but with other characteristics as well) had higher spending levels.

Dalenberg and Duffy-Deno (1991) argue that local governments with wards will differentially spend on capital than will governments elected at-large. They make this argument on the basis that capital expenditures are more readily observed by the public than are other expenditures. As a result, they expect (and find using a 30 city sample) more capital stock per capita and a higher capital/labor ratio in cities with wards than in those with at-large elections.

Eyestone and Eulan (1968, p. 108) found that ward cities had higher taxes relative to income and higher expenditures relative to income than do at-large cities, simply as an average. This was based on a sample of 200 cities of which 127 were at-large and 73 were ward cities. A similar result was found by Lineberry and Fowler (1967) who simply took correlations. This is consistent with our expectations.¹⁸

There are at least two factors which may affect the way in which the power of the at-large council members works to alter expenditure levels. The first is through an increase in efficiency. Presumably, as discussed earlier, at-large representatives are expected to engage in more general oversight activity. That is modeled in section 2. A second factor may be the log rolling or vote trading which can occur among ward representatives.¹⁹ This is modeled, less formally, in section 3.

¹⁷ Of course, this may have been intended in the set-up of our government. Each legislator is expected to represent his or her constituents.

¹⁸ This paper does not get into such issues of government structure as mayor-council vs. city manager or strong vs. weak mayor forms. Hayes and Chang (1990) found no empirical efficiency differences in the former case, however.

¹⁹ The author served for 20 years as a Councilman in a two of 110,000 people where all council members were elected at large and never observed any vote trading behavior.

The next section, section 4, develops a measure for the power of the at-large council members relative to the ward council members for use in the empirical work. Section 5 then describes the data and its sources. Section 6 gives the results of the empirical analysis. Finally, section 7 draws some conclusions for cities and infers some conclusions about other governments.

2. THE EXPENDITURE MODEL

Let us define the following six variables which are relevant to the local choice.

1. P is the price of local expenditures, the amount which the median voter has to pay for a dollar of expenditure by the local government.
2. S is the level of service provided to each citizen of the community.
3. G is the amount of non-governmental goods and services purchased.
4. E is total per capita expenditure by the city.
5. Y is per capita income of people in the city.
6. X is another factor; in this case it is the power of the at-large council members.

The voter is constrained by income as follows:

$$Y = PE + G \quad (1)$$

That is, income will be equal to spending on local government and on other goods (whose price is assumed to equal 1). There is a production process as well where expenditures are transmuted into services by government.

$$S = S(E, X) \quad (2)$$

The factor X could be either an efficiency altering part of this production process or a mechanism for inducing more/less expenditures. The objective of the (median) voter is to maximize his/her utility:

$$\text{Max } U = U(S, G) \quad (3)$$

From this constrained maximization, it follows that:

$$U_G/U_S = S_E/P \quad (4)$$

Equations (1), (2), and (4) can be used to derive the solution values for S , G , and E . Using equation (1) to eliminate the variable G and using equation (2) to eliminate the variable S , the result is that:

$$PU_G(S[E, X], Y - PE) = S_E[E, X]U_S(S[E, X], Y - PE)$$

This can, in principle, be revised to give the solution:

$$E = E\left(\frac{Y}{P}, X\right) \quad (5)$$

Expanding equation (5) in a first order Taylor's series gives:

$$E = a_0 + a_1X + a_2 \frac{Y}{P} \quad (6)$$

where the a_i are coefficients to be determined. If S_X is positive, then a_1 is negative.

Let X be the relative power of the at-large representatives. Then, if at-large representatives act so as either to improve efficiency or to reduce spending, the value of S_X is positive and expenditures will decrease as their power, X , increases. Equation (6) will be estimated to ascertain whether in fact the at-large effect works this way.

3. THE LOG-ROLLING MODEL

There are at least three ways in which ward council members can induce a change in spending levels. The first is through their interactions with the city's employees; it is argued below that they may have interests which are more likely to be aligned than are the interests of the employees and the at-large council members.

The second effect is the possibility of either deliberate or inadvertent gerrymandering. If the representatives are selected as the median position, the median ward representative may well not be the median of the city population.

Finally, the third argument is that ward council members have different incentives than do at-large council members. Specifically, it is posited that there is an incentive for ward representatives to increase spending with less incentive to be concerned about either city-wide tax levels or efficiency. At-large representatives have to make a more specific tradeoff between desired spending increases and desired lower tax levels.

The permanent personnel of the municipality, the bureaucrats, have a good deal of incentive to act so as to induce increased spending. Not only do they directly benefit but they also are involved in activities in which they believe.²⁰ Naturally, the bureaucrat will endeavor to structure the government, so far as possible, so that it will spend more. Lineberry (1977, Chapter 6) appears to endorse this reasoning. Because the bureaucrats want larger budgets they will work most closely with those legislators who are also interested in budget increases. Ward councilmen probably would best fit this description.

One way in which majority preferences might not be selected due to ward voting is through a gerrymandering process. For example, suppose there are 9 groups of people, each with a range of preferences for some government service. Rank these groups in order of their preferences from 1 to 9. This example is shown graphically in Figure 1. Suppose also that there are three council

²⁰ That is likely to be the reason for choosing the particular line of work. If they are not convinced of the importance of their work, they will not perform as well. The author has observed this belief in numerous department heads.

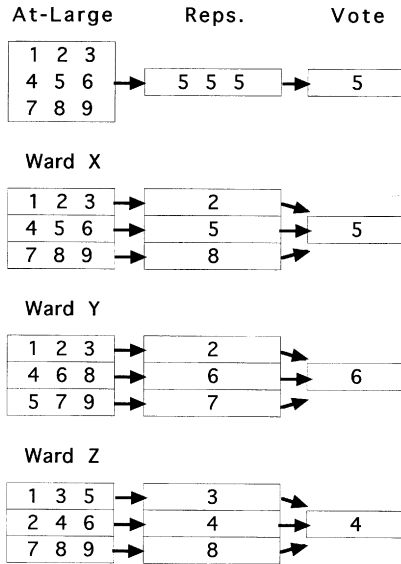


Figure 1. Nine group examples.

members to be elected. If all council members are elected at large with a majority vote,²¹ all those elected will be expected to be from group 5, the median group. This is the top example in Figure 1, where the three representatives are all from the median group, group 5. When they vote, they all have the same preferences and therefore vote for the outcome their group prefers, 5.

Suppose that there are three wards, as in Figure 1 example Ward X. The first ward contains groups 1, 2, and 3 and elects a person from group 2, the median. The second ward has groups 4, 5, and 6 and elects a person from group 5. The third ward has groups 7, 8, and 9 and elects a person from group 8. The three representatives can only get a majority for proposals for group 5 since representative 2 wants more (or less) while representative 8 wants less (or more). The median result is adopted.

However, suppose the three wards are structured as in Figure 1 under Ward Y. The first ward elects a person from group 2, the second ward from group 6, and the third ward from group 7. Those three representatives will only be able to adopt proposals agreeing with group 6. A symmetric result occurs under the Figure 1 Ward Z example where the representatives come from groups 3, 4, and 8 and the outcomes are those of group 4. There are, of course, other examples but only these three outcomes are possible in this use.

²¹In fact, the vote is usually by a plurality. However, the point is that candidates are trying to appeal to a majority. Frequently, several at-large candidates run as a team, emphasizing their homogeneity in preferences but differences in expertise.

In the Figure 1 example, suppose that the three wards are made up randomly such that each contains three of the interest groups. In 4/7 of the cases, the choice by the median representative will be unchanged from the at-large median choice. In 3/14 of the cases, the result will be an increase to the choice of group 6. Finally, in 3/14 of the cases, the result will be a decrease to the choice of group 4.

Suppose the above example is enlarged to the case of 15 interest groups. In the at-large scenario, the elected officials will all be from median group 8. In the situation of either 3 wards containing 5 groups each or 5 wards containing 3 groups each, it is possible to arrange the groups within the wards so as to get the voting outcomes as the choices of groups 6, 7, 8, 9, or 10.²² As the number of wards increases or as the number of different preference groups in each ward increases, it becomes less likely that the ward election result will be the same as the result caused by the at-large election.

Note that the foregoing does not imply in any way that the expenditures will be higher as the result of having ward elections instead of at-large elections. Instead, it simply says that ward elections can result in a variation about the expenditure level which might be expected if all the council members were elected at-large. It could be either higher or lower and one would simply find a distribution of expenditures across cities that would have a higher variance with wards than with at-large elections.²³ We need to look to a different issue to answer the question of how ward elections influence spending.

It is the contention of this paper that ward representatives have different incentives with regard to spending than do at-large representatives. The at-large

²² For 5 wards, choose wards as follows: A includes groups 1, 6, 7; B includes groups 2, 8, 9; C includes 3, 10, 11; D includes 4, 12, 13; and E includes 5, 14, 15. The representatives are from groups 6, 8, 10, 12, 14 and the outcome vote is that of group 10. For 3 wards, choose as follows: A includes groups 1, 2, 3, 4, 5; B includes 6, 8, 10, 12, 14; C includes 7, 9, 11, 13, 15. The representatives are from groups 3, 10, 11 and the outcome vote is that of group 10. Other possibilities are left to the reader.

²³ From the examples it follows that having ward elections as opposed to at-large elections can result in different decisions even if the ward representatives accurately reflect the proportions of groups in the city. It can also be affected if the dominant group does not have cohesive or consistent preferences. In that case, a cohesive minority might well dominate a divided majority. An alternative explanation for the desire to have ward voting might be the presence of more than one minority group in the population. If these minority groups add up to a majority, they could at least occasionally dominate the decision making of a representative body. Of course if the minority groups could get together in the legislature, why could they not get together to elect representatives who would carry out their desired program? One answer is that the coalitions may be temporary and issue specific; should they be unable to form the coalition at election time, they would be shut out from decision making for the terms of office of the representatives. Further, of course, the information cost of bargaining among the limited number of representatives should be less than that of bargaining with larger groups. This argument is, at best, unsatisfactory. The task of finding coalition candidates should be relatively easy since each candidate in a two-party system should be expected to gravitate toward the median position. That should be true for coalitions as well so candidates would reflect coalition positions, even coalitions which change across issues. Candidates should be found who are at each majority coalition's median position on every issue.

council member needs to be at the median position of the constituency with respect to both taxes and spending.²⁴ That means that the full impact of spending votes on required taxing must be taken into account. A ward council member who represents one of N wards, has to consider the total spending and $1/N$ of the resultant taxes.²⁵ Since only a majority of representatives are needed to increase spending, they only have to concern themselves with just over half of the added taxes, that portion paid by their districts. That is, they may be able to exploit the other districts who are not in the majority coalition by adding service not desired by those districts which must still be paid for by those districts.²⁶

Of course, this possibility of one coalition group exploiting others in the city depends on a lack of viable alternatives for those who are exploited. A Tiebout (1956) situation of numerous alternatives (surrounding cities) would tend to reduce the possibility. However, the move to long run equilibrium, adjusting through moves from one city to another, takes a good deal of time since it involves moving capital in the form of buildings and other infrastructure to other municipalities. That implies full depreciation of the existing buildings. Further, the city may have a monopoly on some locational amenities (usually that is the reason for its siting) and if the exploitation is less than the value of these amenities, that would reduce the likelihood of relocation.

4. THE POWER MEASURE

The next step is to quantify the power of at-large council members within the legislative body. It may be expected that, in addition to their individual direct power, there is a tendency for at-large representatives to be unified since they are all trying to appeal to the same median voter. They may perceive the will of their constituents differently and so vote non-unanimously, but that is simply an error and will be corrected, either by the legislators themselves or at the ballot box. On the other hand, the ward council members will better know the attributes and

²⁴ A typical election process for at-large council members, if more than one are to be elected, is either to have voters cast ballots for each of a set of numbered slots and for the candidates to run in a single slot or to have all candidates run together with the voter having the number of votes equal to the number of positions to be filled. In either case the successful candidates will be at the voters' median positions. If each voter had one vote and more than one position were to be filled, the median result would not necessarily occur; the number of such cases is unknown but this voting method does not seem to be common. It is also the case that a multiplicity of parties even where only one seat is contested can result in a non-median outcome (e.g. New York State with the Republican, Democratic, Liberal, and Conservative parties), but this is usually not considered in picking the median as the expected outcome.

²⁵ Of course, the ward council member will be at the median position in that ward.

²⁶ As an anonymous referee has suggested, because at-large council members have a broader constituency base, they can more easily trade off the competing demands of extreme groups. Because ward council members have more local and homogeneous constituencies, they will be more closely tied to interests of particular groups. Since each has different incentives, the ward-based councils would tend to have higher spending levels.

preferences of their particular wards since that is in their interests. They are less likely to know the rest of the community well.²⁷

In a community with ward council members, there is a possibility of coalitions where some districts may act so as to increase spending on some activity beyond that desired by the city median voter, as noted in the prior section of this paper. There is also the possibility, as noted in the section before that, of a reduction in efficiency since ward council members tend to be less interested in overall efficiency. In either case, the result may be to increase spending. Our concern here, since both effects are in the same direction, is more with the size of the effect, if present, than with its cause.

In order for the ward council members to have such an effect, they need to have sufficient political power to accomplish it. The at-large council members will generally tend to oppose spending beyond the desires of the median voter and will, as well, be concerned with overall city efficiency since they are perceived as responsible for it in a way ward council members are not. It follows that the more power which the at-large representatives have, the less likely it will be that these spending increases will occur. In the model in section 2, this is the variable X . Note that in a city with all at-large representatives, they will have all the power; if all representatives are from wards, they will have all the power. Many cities, however, have both types of representatives, so it is necessary to evaluate the relative amount of power each has.

The actual power of a group in a decision-making body may well not be equivalent to the proportion that group's members bear to the whole membership of the body. In fact, this has been a problem when it has been proposed that a minority have power or representation proportionate to its size in the population. As Nurmi (1987, Chapter 13) has pointed out, the desire to give each group the same proportionate share in decision making as it bears numerically to the total population is not satisfied by giving that group the same proportion of seats in the legislative body if a majoritarian rule is used for decision making. In fact, the minority may have considerably less power than its share of the body. As an extreme example, suppose that the minority has 6 seats on a 15 person city council (40 percent) and the majority has 9 seats (60 percent). If the majority is cohesive, it will win on every issue, so it has 100 percent of the power.

On the other hand, suppose that there are three groups, A, B, and C. If A has 6 seats while B and C have 4 and 5, respectively, A might appear to have greater power. If the preferences of the groups are random with respect to the issues and the group are cohesive in their voting, group A will be in the winning coalition $\frac{3}{4}$ of the time and will be the decisive group $\frac{1}{2}$ of the time. However, groups B and C

²⁷ From observing the City of Buffalo, N.Y. (pop. 300,000), where most of the council members are elected by wards, and comparing it with neighboring Amherst, N.Y. (pop. 110,000), where all council members are elected at-large, it is clear that unanimity is the norm in Amherst and is unusual in Buffalo. While some of this may be due to differing demographics, it is clear that much is due to differing interests from ward to at-large council members.

are also in the winning coalition $\frac{3}{4}$ of the time and are decisive $\frac{1}{2}$ of the time. It follows that B and C have exactly equal power with A.

Grofman and Scarrow (1979) studied the voting schemes, particularly weighted voting, used in a variety of New York State instances where courts had approved or disapproved the methods. Their method of analysis was the Banzhaf Index. The Banzhaf Index calculates the probability that a particular voter will be decisive in a vote and compares that to the corresponding probability for other voters.

A particular example of interest in that paper is the representation of several towns in Nassau County, N.Y. A majority of the people in the county resided in Hempstead with smaller numbers in each of the other two towns and the two cities. A population weighted voting scheme would give the following votes:

Hempstead	18
N. Hempstead	6
Oyster Bay	3
Glen Cove	1
Long Beach	$\frac{1}{29}$

Clearly, Hempstead could make all decisions. The Banzhaf Index for all the other representatives would be zero.²⁸ This is exactly the same result which would occur with at-large voting in the county for all the representatives. The court ultimately approved a weighted voting method which gave approximately the power to each population group's representative as its population share, as measured by the Banzhaf Index.

Our measure of power will be similar to the Banzhaf Index. It will calculate the probability of the at-large council members influencing an outcome relative to the probabilities of all legislators influencing the outcome. We cannot measure the strength of the at-large contingent just by calculating their proportion of the total city council membership. It should be expected that the at-large representatives will be more likely to vote together than will ward representatives whose interests are more likely to conflict with each other. This argument is also made by Grofman and Scarrow (1982, p.458). Ward representatives each represent a different group of people while the at-large legislators all represent exactly the same group of people. Therefore, the at-large council members are more likely to agree among themselves than the ward council members are to agree among themselves.

Because of this difference in voting incentives, the following power analysis takes the two types of representatives separately. First, ward council members

²⁸The actual voting method differed slightly from this and was intended to reduce this power but did so only if the two Hempstead representatives (each other unit had one) voted independently of one another, an unlikely event.

are considered in their possible combinations and then at-large council members are added as a unified group. It is presumed that each representative votes in accord with the interests of his/her constituents. That is, votes will be intended to satisfy more constituents than they dissatisfy. Of course, a council member may make a mistake or misperceive the constituents' desires, but that will be true for both types of council members. If they make too many mistakes, they will be replaced, so their votes should generally be accurate representations of constituent preferences.

To show the relative power of each group, consider an example of 5 ward representatives and 2 at-large representatives. There are 32 possible voting lineups of the 5 ward council members as indicated in Table 1. Under the column Votes are the pro and con possible voting groupings on any issue or proposal. If the votes are randomly determined, the relative frequencies are as indicated in the Frequency column.²⁹

Cases A and F are issues on which all ward representatives agree. Because they all agree, it may be inferred that the majority of voters in each district agree. Consequently, the majority of voters in the city agree and the at-large council members should be expected to go along with the votes of the ward council members. These cases are not, therefore, interesting or relevant. There is no controversy and the entire community, on average, is affected similarly. We will not further consider these cases.

Cases B, C, D, and E are different. There, one part of the community is benefited at the expense of another. In case B, four wards would gain at the expense of the fifth. Of course, this is only an average; it is possible that only a bare majority of voters in each of the four wards will gain while a large majority in the fifth will lose. We cannot say with certainty whether a majority of the

TABLE 1 EFFECTS OF 5 WARD AND 2 AT-LARGE COUNCIL MEMBERS

	Ward Votes	Frequency
A.	5-0	1
B.	4-1	5
C.	3-2	10
D.	2-3	10
E.	1-4	5
F.	0-5	1

²⁹ The frequency of votes will depend on the issues raised. Some issues are raised for show, with the proponent expecting defeat. Other proposals are more serious. However, their likelihood of being raised depends on the proponents' expectations. Since ward council members know their own wards best, while at-large council members know the whole city, it would be expected that at-large council members would have more successful resolutions. However, we cannot know how many of each type of resolution are introduced. Thus, the frequency in Table 1 is based solely on the number of possible combinations.

voters in the city will gain. Therefore, the at-large council members may vote either way, depending on the gain to the majority over the whole city.³⁰

Case E is similar to B except that only one ward gains while 4 would lose from the proposal. Again, we cannot with certainty know how the at-large council members will vote since more voters may gain than lose from the proposal or vice versa. On both cases B and E, the at-large council members are outvoted and cannot be decisive in any coalition. Cases C and D pit three wards against two other wards. Here, the at-large council members' votes are decisive. The at-large council members determine whether the median voter in the whole city is benefited or harmed and vote accordingly. Since both of them are likely to vote the same way, they will decide all of cases C and D with their two votes.

The at-large council members' votes are decisive in 20 of the 30 cases in Table 1. In just 8 of the 30 cases in Table 1, a single ward representative will provide the decisive vote, either pro or con. Thus, the 5 ward council members have an aggregate of 5 times 8 or 40 units of power. The total power is therefore 40 for the ward council members and 20 for the at-large council members. This implies that $\frac{1}{3}$ of the total power accrues to the at-large representatives and $\frac{2}{3}$ of the power is with the ward representatives (see Table 2). The at-large council members have 33 percent of the power even though they have only 29 percent of the votes.

The total number of possible combinations of the n ward council members is 2^n . The two unanimous decisions are deleted,³¹ so the net number of interesting combinations is $2^n - 2$.

Usually a city council has an odd number of council members, but there is a substantial minority of cities which have an even number. The odd number prevents tied votes if all council members cast votes and the even number obeys the rule that a tie represents a defeat for the motion. The power of at-large council members lies in their capacity either to swing the vote one way or the other or to make a tie and thereby defeat a motion which would otherwise pass.

Table 2 presents a matrix of possible combinations of at-large and ward council members which may be expected to exist as well as some other larger number combinations which have actually been found to exist in U.S. cities. For each of these combinations, the power of the at-large council members is calculated under this modified Banzhaf method.³² It is assumed that the at-large council members vote as a bloc because their interests are identical and correspond with the median voter in the city. As a result of this assumption and the earlier assumption that the case where the ward council members are in

³⁰ It would require knowledge of the specific preference distribution functions in each of the wards to give a more exact probability estimate of the voting by each council member.

³¹ It can also be argued that most proposals which receive unanimous approval are innocuous or devoid of content. Those decisions which involve gains to all wards are likely to have already been made; they are not of substantive interest here. Rather, the concern is with those decisions which involve conflict across wards, where gains to one group may only come at the expense of another group.

³² See Chapter 5 in Brams (1975) for good descriptions and comparisons of the Banzhaf and Shapley-Shubik indexes.

TABLE 2 POWER OF AT-LARGE COUNCILMEN RELATIVE TO WARD COUNCILMEN BASED ON A MODIFIED BANZHAF INDEX

Number of wards	Number of at-large								
	1	2	3	4	5	6	7	8	9
2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3	0.2500	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
4	0.2000	0.5000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
5	0.1667	0.3333	0.5556	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6	0.1429	0.2800	0.4545	0.6512	1.0000	1.0000	1.0000	1.0000	1.0000
7	0.1250	0.2500	0.3824	0.5714	0.7234	1.0000	1.0000	1.0000	1.0000
8	0.1111	0.2195	0.3514	0.4839	0.6800	0.8146	1.0000	1.0000	1.0000
9	0.1000	0.2000	0.3077	0.4545	0.5846	0.7736	0.8675	1.0000	1.0000
10	0.0909	0.1803	0.2857	0.3976	0.5588	0.6802	0.8477	0.9183	1.0000
Wards	At-large								
12	1				0.0769				
12	3				0.2405				
12	8				0.8347				
14	1				0.0666				
14	7				0.6455				
18	1				0.0526				
19	7				0.4735				

unanimous agreement is not of interest, the values in Table 2 do not correspond exactly either to the Shapley-Shubik or Banzhaf values.³³

From Table 2, it can be seen that at-large council members have all of the power whenever their number is equal to or greater than one less than the number of wards. For example, with 6 wards and 5 at-large council members, the at-large council members are always in control of all relevant votes; the ward representatives are simply window-dressing. It will also be noted from Table 2 that a single at-large council member has only the same amount of power as an individual ward council member if there is only one at-large council member. The increase in the power of at-large council members when there are more than one comes about because of their incentive to vote as a bloc.

The at-large power index used is defined as follows. All at-large members are assumed to vote as a bloc, but randomly pro or con. Ward members are assumed to vote randomly pro or con on an individual basis. The possible combinations

³³ Straffin (1978) argues for a power index somewhere between those of Shapley-Shubik and Banzhaf, depending on one's assumptions about the probability of voters voting together. He concludes (p. 506) that "the Banzhaf index should be used for situations in which voters vote completely independently, the Shapley-Shubik index for situations in which a common set of values tends to influence the choices of all voters". Other authors are not in agreement as to which is to be preferred. However, the independence of the legislators (from each other) argues for the Banzhaf Index. It appears unlikely that our results will be much affected by the relatively minor differences we would see in this variable.

of votes are enumerated, leaving out unanimous decisions. The number of times any ward member is the swing vote is tabulated. This is multiplied by the number of ward members to obtain a power value for all ward members. The number of times the at-large members act as the swing vote is tabulated as the power value for at-large members. Then the Power Index equals the power value for at-large members divided by the sum of the power value for at-large members and the power value for ward members.

5. DATA AND REGRESSIONS

There are a number of possible dependent variables against which the question of effects of at-large power can be tested. We shall use four of these major expenditure categories³⁴ including the three specific categories of Police, Fire, and Sewer expenditures. For most cities, these are the largest single expenditure items. The fourth variable is total spending. Two other variables, Debt and Taxes, are also checked. Debt, measured as total per capita debt, may be a measure of recent capital accumulation. It may also be a more long-term effect than would show up in one year's current spending. Taxes are defined in this paper as the total revenues per capita from local sources. This is not strictly a correct definition of taxes. However, the effect of local revenue raising acts much like a tax in shifting the demand curve for property to the left. Fees do act to shift the land/capital ratio, but that will be ignored here. The measure of this variable is the total burden on local residents after subsidies from the state and federal governments are netted out. Most of the money raised is in taxes of one form or another. All of these dependent variable measures are computed on a per capita basis.

On the independent variable side of the equation, there is the major variable of concern, the power of the at-large council members. The measure for each city council is given in Table 2. The number given is the ratio of the number of times the at-large council members, voting as a bloc, will be decisive to the number of times anyone will be decisive. Thus, this is the *relative* power of the at-large council members. In addition, it should be expected, as noted earlier, that income relative to price (Y/P) will have an effect on expenditures. The income measure will be per capita personal income while the price will be the proportion of local current expenditures which is raised in revenue from local sources.

Because a number of other variables are likely to influence the dependent variables, they are also included to ensure that their effects are not confounded with that of Power. The general equation is:

³⁴Education is not included for two reasons. First, the structure of government often makes another agency than the city government responsible for this function and, second, the data were not readily available in a comparable form.

$$\begin{aligned} \text{Expenditure} = & a_0 + a_1 \text{ Power} + a_2 \text{ Y/P} + a_3 \text{ Term} + a_4 \text{ Pop.} \\ & + a_5 \text{ Growth} + a_6 \text{ Area} + a_7 \% > \text{HS} + a_8 \% \text{OwnOcc} \\ & + a_9 \% \text{White} + a_{10} \text{ Veto} + a_{11} \text{ Init.} + a_{12} \text{ Refer} + a_{13} \text{ Recall} \end{aligned}$$

This equation includes a number of variables which either have been shown by other researchers to affect expenditures or are likely to do so.

Term is the length of legislative terms in years. The shorter the time to the next election, the less the legislator is likely to focus on longer term fiscal considerations. Pop(ulation), measured in thousands of people, may relate to the city's environment or to economies or diseconomies of scale. Growth (percentage of population increase over 4 years) may either be costly or may reduce average fixed costs of any program.

Area (in square miles)³⁵ may have a direct effect on costs in either direction. The % > HS variable is the percent of adults who have more than a high school diploma. The larger this is, the more legislators may be presumed to be under the control of their constituents, although it is unclear how this would affect spending. Clark (1968, p.588) found that the percentage who are college educated had a positive effect on expenditures. The percent of dwellings occupied by owners, %OwnOcc, is likely to affect the monitoring of elected officials since the property owner has capital which is at stake as well as current tax costs. The %White variable has no obvious connection with spending but race is frequently included as a variable.³⁶

The additional political variables included are the existence of a mayoral veto (Veto), whether public initiatives are allowed (Init), whether referenda are available to the public (Refer), and whether legislators can be recalled (Recall). The veto allows more power to an at-large (usually) official relative to the city council and therefore should correlate more closely with the effects of at-large power. The other variables are tools by which the public can more readily exercise monitoring power over the city council. All are zero if unavailable in the city and one if present there.

The data sources are various issues of *The Municipal Year Book*, published annually by the International City Management Association. The basic data items, the source, and the number of cities used are listed in Table 3 for each variable. All of the cities in the *1987 Year Book* which had numbers of at-large and ward council members (or for which these numbers could be inferred) were included in the data set. Of the 2622 cities in the yearbook (of over 10,000 population), only 1812 satisfied this criterion.

The meanings of some of the variable descriptions in Table 3 need little elaboration; they are intuitively obvious. Others, however, need some

³⁵ Area, education, owner occupancy, and race were suggested by anonymous referees.

³⁶ Clark (1994, Chapter 2) found that cities with more non-white residents have a higher desired level of spending but that could well be due to their having a lower level of income. Miranda and Walzer (1994, p.157) do not find a significant effect. An earlier stratified sampling (Clark and Ferguson, 1983, p. 128) found some differences in preferences even holding income relatively constant.

TABLE 3 DATA SOURCES FOR STUDY

Variable	Symbol	For year	Yearbook	No. of cities
Political				
No. At-Large Council Members	Large	1986	1987	1812
No. Ward Council Members	Ward	1986	1987	1727
Term-At-Large	TLarge	1986	1987	1812
Term Ward	TWard	1986	1987	1812
Mayor Veto (1/0)	Veto	1986	1987	1618
Initiative (1/0)	Init	1986	1987	1584
Referendum (1/0)	Ref	1986	1987	1659
Recall (1/0)	Rec	1986	1987	1553
Fiscal/Social				
Debt (\$ mill.)	Debt	1982	1984	1755
General Revenues (\$ mill.)	Rev	1984	1987	1612
% Own Sources	RevOwn	1984	1987	1612
Population (000)	Pop	1984	1987	1809
Growth Percentage	Grow	1980-84	1987	1809
Per Capita Income (\$000)	Y	1985	1988	1371
Police Exp. per Capita (\$)	Police	1983	1985	1753
Fire Exp. per Capita (\$)	Fire	1983	1985	1753
Sewer Exp. per Capita (\$)	Sewer	1983	1985	1753
General Expenditures (\$ mill.)	Gen	1982	1984	1758
Area of City (sq. mi.)	Area	1974	1976	1625
% More Than High School Educ.	% > HS	1980	1984	1762
%Homes Owner Occupied	%OwnOcc	1980	1983	1771
% White	%White	1980	1982	1773

explanation. The numbers of each type of council member, at-large or ward, are simply the number of positions available. The terms for each type are in numbers of years. The veto, initiative, referendum, and recall variables are 1 if they apply and 0 if not. Debt, general revenues, and general expenditures³⁷ are in millions of dollars for the given year. The variable Percent Own Sources describes the percentage of revenues which are raised from the local citizenry; it equals 100 minus the percentage from other governments. Population is in thousands while Growth is the percentage change in population between 1980 and 1984. Per capita income is in thousands of dollars. Police, Fire, and Sewer expenditures are in dollars per capita. The Area of the city is in square miles. The Education variable is the percentage of the population which has at least some schooling beyond high school. Both White and Owner Occupancy are in percentages.

Several new variables created from those in Table 3 are listed in Table 4. Not all of the data are from a single year. This was necessitated by the availability of

³⁷This is total spending rather than general fund spending; it will also include special district spending.

TABLE 4 CONSTRUCTED VARIABLES

Variable	Symbol	How created	No. observations
Per Capita Debt	D/P	Debt/Pop.	1754
Income/Local Cost	Y/P	Y/RevOwn	1254
Gen. Exp. Per Capita	Exp	Gen/Pop.	1757
Average Term	Term	$((Large*TLarge)+(Ward*TWard))/$ $(Large+Ward)$	1606
Per Capita Local Tax	Tax	$10*Rev*RevOwn/Pop.$	1612
At-Large Power Index	Power	As discussed earlier; uses Large & Ward	1812

data and should make no systematic difference in our results, since all of the years are close together and changes in the structures of municipalities usually take place at a relatively slow pace. The first of these calculated variables is Debt per Capita, the total debt outstanding divided by the population. This is a better measure than the alternative, long-term debt per capita, since the choice of debt term is a financing rather than a spending decision. That is, short-term debt may be just the result of current projects which are not yet bonded for their full term. Per Capita Income divided by Local Cost is the Y/P variable in equation (6). General Expenses per Capita is the ratio of total general expenditures to population. The Average Term is the weighted average of the at-large terms and the ward terms. The Per Capita Local Tax is the total general revenues multiplied by the percentage that is locally raised and divided by the population. Finally, the power index of the at-large representatives was discussed earlier.

The characteristics of the variables used in the regressions are given in Table 5. Note that all are independent of city population. The variables are categorized as independent or causal variables and dependent or outcome variables. We are primarily concerned, of course, with the effect of the power variable on the various expenditure and other decision variables of the community which are listed first. The power variable ranges from zero (all ward council members) to one (all at-large council members). Veto, Initiative, Referendum, and Recall are dichotomous.

The correlations among the independent variables and among the dependent variables are given, respectively, in Table 6 and Table 7. In Table 6, a potential concern is for possible multicollinearities if the independent variables are highly correlated. While the result would simply be to increase the standard errors, the major result to be found is the significance of particular coefficients and multicollinearity could affect that outcome. It is noteworthy that the Power variable is essentially uncorrelated with all variables except Term and is not highly correlated

TABLE 5 CHARACTERISTICS OF VARIABLES

Variable	Mean	Std.Dev.	Min.	Max	No. cases
Dependent					
Police	57.88	24.32	0.00	309.00	1753
Fire	33.25	25.79	0.00	386.00	1753
Sewer	40.78	33.12	0.00	781.00	1753
Debt	0.40	0.97	0.00	30.19	1754
Total exp.	0.43	0.29	0.03	2.69	1757
Tax	384.33	254.99	23.10	3054.00	1612
Independent					
Power	0.74	0.41	0.00	1.00	1812
Y/P	0.16	0.14	0.05	4.67	1254
Term	3.40	0.92	1.00	7.00	1606
Pop.	45.33	111.49	10.00	3097.00	1809
Grow.	4.19	8.95	-10.70	95.10	1809
Area	19.62	83.07	0.80	3108.00	1625
% > HS	35.52	13.63	8.00	83.00	1762
%OwnOcc	60.57	13.39	12.00	96.00	1771
%White	87.74	14.08	5.00	100.00	1773
Veto	0.32	0.47	0.00	1.00	1618
Init.	0.63	0.48	0.00	1.00	1584
Refer.	0.84	0.37	0.00	1.00	1659
Recall	0.67	0.47	0.00	1.00	1553

with that.³⁸ The only correlations which may be high enough to result in multicollinearity are among % > HS, %OwnOcc, and %White. Even these should not cause much of a problem.³⁹

The dependent variables are more highly correlated.⁴⁰ That may be due to demand characteristics or to complementarities among them. However, because of their importance, all six will continue to be included.⁴¹

³⁸ Johnston (1984, p. 248) notes that multicollinearity effects are small for independent variables which are, as in this case, essentially orthogonal to the other independent variables even if there are multicollinearity problems among other independent variables.

³⁹ Interestingly, the Power Index is almost uncorrelated with city size (Pop.). The correlation is -0.08. This suggests that larger cities are *not* much more likely to have a city council with more ward council members.

⁴⁰ These are probably demand related; a community in which people want higher levels of service in one area is often a community in which people want higher levels of service in other areas as well.

⁴¹ The debt, total expenditure, and tax variables are inclusive. To at least some extent, the effects of differing functional responsibilities across cities, if they are correlated with the power index, may have an effect here. See, for example, Clark and Ferguson (1983, appendix 4), or Clark, Ferguson and Shapiro (1982). However, the use of state dummy variables will reduce if not eliminate any such effect since responsibilities are often assigned by states. Further, if the cities choose to assume extra responsibilities as a result of having more ward council members, that would be confirmation of the theory.

TABLE 6 CORRELATIONS AMONG INDEPENDENT VARIABLES

	Power	Y/P	Term	Pop.	Grow.	Area	% > HS	%OwnOcc	%White	Veto	Init.	Refer.
Y/P	0.04											
Term	0.38	0.01										
Pop.	-0.08	0.06	0.01									
Grow.	-0.00	0.07	-0.01	0.35								
Area	-0.04	0.11	0.02	0.14	-0.04							
% > HS	-0.03	0.05	-0.01	0.06	0.06	0.28						
%OwnOcc	-0.02	0.02	-0.01	0.04	0.07	0.32	0.90					
%White	-0.00	0.02	-0.01	0.04	0.07	0.29	0.85	0.92				
Veto	0.03	-0.05	0.06	0.02	-0.01	0.02	-0.04	-0.05	-0.04			
Init.	0.06	0.01	0.04	0.03	-0.01	0.01	0.02	0.01	0.01	0.08		
Refer.	0.03	-0.02	0.05	0.02	-0.01	0.01	-0.01	-0.02	-0.02	0.04	0.56	
Recall.	0.04	0.00	0.05	0.05	0.03	0.02	0.01	-0.00	0.00	0.08	0.67	0.52

TABLE 7 CORRELATIONS AMONG DEPENDENT VARIABLES

	Police	Fire	Sewer	D/P	Exp
Fire	0.99				
Sewer	0.98	0.98			
D/P	0.74	0.74	0.73		
Exp.	0.74	0.74	0.74	0.95	
Tax	0.19	0.20	0.19	0.17	0.16

6. RESULTS

The regressions were run in two sets.⁴² The first used the maximum number of observations for which data were complete for each regression. The second set used a common set of 637 observations which have complete data for all of the variables used.

6.1. *Maximum Data*

The results of the first set of regressions are reported in Table 8. In each of these regressions, there are dummy variables for the states which are not reported.⁴³ Beyond the variables used in the regressions, there are still differences across states in how the cities are treated from both a regulatory and a facilitative perspective; thus, these dummies are necessary. Table 8 reports only the coefficient of the at-large Power variable. In addition, it gives the standard error of the coefficient, the number of observations, and the significance (2-tail) of the coefficient.

Along the left hand side of Table 8 are the six dependent variables which have been used to measure the city's costs to its citizens. The first column of results is the coefficient of the Power variable when that is the only independent variable in the regression (other than the state dummies). The second column adds Y/P (Per Capita Income/Local Portion of Cost) and the Average (length of council) Term as independent variables; only the coefficient of the Power variable is reported, however. The third column of results adds two more independent variables to those of the second column. These are Population and Growth. The fourth column of results adds four more independent variables, the Area of the city, the % > HS which is the percentage of people with at least some college level schooling, %OwnOcc which is the percent of homes which are owner occupied, and %White. Finally, the fifth column of results adds the four remaining political independent variables, Mayoral Veto, Citizen

⁴² LIMDEP was the computer program used.

⁴³ A random effects model which requires GLS estimation was also tested. Generally, even if the Hausman test (see Judge et al., 1985, p. 528) suggested that model, the results were very similar to the fixed effects model, both as to the coefficients and as to their significance. Since the latter model is simpler, being OLS with state dummies, it was used.

TABLE 8 REGRESSION RESULTS – HIGH N: COEFFICIENT ON INDEPENDENT VARIABLE-POWER INDEX*

Independent Variables:					
Dep Var	Only Power	Add Y/P & Term	Add Pop. & Grow.	Add Area, % > HS, %Own Occ, & %White	Add Veto, Init., Refer., & Recall
Police [Coef.]	-4.67	-6.45	-3.86	-2.69	-3.91
[t-statistic]	(-3.4)	(-2.9)	(-1.8)	(-1.2)	(-1.5)
[N]	1673	933	933	866	642
[Sig]	0.00	0.00	0.07	0.21	0.13
Fire	-4.82	-10.09	-8.06	-5.81	-6.38
	(-3.1)	(-3.7)	(-3.0)	(-2.2)	(-2.0)
	1673	933	933	866	642
	0.00	0.00	0.00	0.03	0.05
Sewer	-3.76	-6.96	-5.68	-4.73	-6.18
	(-2.4)	(-2.7)	(-2.2)	(-1.8)	(-1.9)
	1673	933	933	866	642
	0.02	0.01	0.03	0.06	0.05
Debt	-0.0923	-0.2247	-0.2263	-0.2288	-0.2970
	(-1.6)	(-2.2)	(-2.2)	(-2.1)	(-2.0)
	1676	934	934	866	643
	0.10	0.03	0.03	0.03	0.04
Expend.	-0.0502	-0.0678	-0.0466	-0.0307	-0.0441
	(-3.0)	(-3.0)	(-2.1)	(-1.4)	(-1.8)
	1678	935	935	867	642
	0.00	0.00	0.03	0.16	0.08
Taxes	-43.54	-122.37	-36.30	-32.14	-50.19
	(-1.5)	(-2.3)	(-1.6)	(-1.4)	(-1.9)
	1538	962	962	874	648
	0.14	0.02	0.10	0.15	0.06

*All equations include dummy variables for states.

Initiative, Referendum, and Recall; it therefore has all of the independent variables in it.

Despite the stated prior belief that the coefficient on the Power Index should be negative, the significance reported is based on a two-tailed test. Of the 30 estimates of this coefficient in Table 8, 19 are significant in the expected direction at the 5 percent level or better. Even those coefficients which do not pass the 5 percent cutoff have a best estimate which is negative. The greater the power of at-large council members, the lower the city's costs.

If we average these estimates of the coefficient on power, we can compute the average effect of shifting from an all-ward city council to one which is entirely at-large. For police, the result is a 7.5 percent drop in expenditures. For Fire, the drop is 21.1 percent. For Sewers, the drop is 13.4 percent. Per capita Debt averages 53.5 percent lower in all at-large cities than in those with all wards.

Total expenditures are 11.1 percent lower. Finally, the per capita tax levy is 14.8 percent less. These are rather substantial effects.⁴⁴

6.2. Common Data

The second set of tests are run on a set of 637 cities which are in 32 states. This is all of the cities which have complete data available for all of the variables used. There are two equations estimated for each of the six dependent variables. In each case, state dummy variables are included in the regression but are not reported.

The first of these equations includes only the Power variable as an independent variable. The second equation includes all of the significant independent variables. The procedure for finding this set of variables was backward elimination.⁴⁵ Below each of the coefficients in the following equations is the t-statistic (in parentheses) and the two-tail significance level. The adjusted r^2 values are also given although not too much weight should be attached to this since the state dummy variables are included in it; in each case the Power variable alone accounted for less than two percent of the variance in the dependent variable.⁴⁶

The results for the Police expenditure per capita are given in equations (7), (the C in each equation refers to the state dummies):

$$\begin{array}{l} \text{Police} = C - 7.06 \text{ Power} ; r_A^2 = 0.208 \\ \quad (-2.7) \\ \quad 0.01 \end{array} \quad (7a)$$

$$\begin{array}{l} \text{Police} = C - 3.48 \text{ Power} + 19.08 \text{ Y/P} + 0.0248 \text{ Pop.} \\ \quad (-1.4) \quad \quad (4.3) \quad \quad (4.6) \\ \quad 0.16 \quad \quad 0.00 \quad \quad 0.00 \\ \quad -0.511 \text{ Grow.} \quad -0.325 \text{ \%OwnOcc} ; r_A^2 = 0.307 \\ \quad (-3.3) \quad \quad (-5.0) \\ \quad 0.00 \quad \quad 0.00 \end{array} \quad (7b)$$

The effect of the Power variable is that a city of all at-large council members will reduce Police per capita expenditures by some 5.6 to 11.4 percent as compared to

⁴⁴ It has to be kept in mind, of course, that these are *average* effects; there is a substantial variance in the outcomes.

⁴⁵ This procedure is described by Maddala (1977, p. 125). It was then extended to delete non-significant variables because, as Judge et al. (1988, p. 850) note, the R_A^2 rule tends to include too many variables.

⁴⁶ White's correction for heteroscedasticity (see Judge et al., 1985, p. 426) was used to check on these regressions. Because the program used, LIMDEP, does not allow for the correction in panel data analyses, the regressions were run without the state dummies. The results with and without the correction were too similar to indicate the presence of a problem. The coefficients, of course, are the same and the standard errors were as often lower as greater. Thus, this correction was not further pursued.

a city of all ward councilmen. The Income/Local Share variable is, as expected, positive and indicates an income elasticity on expenditures of +0.05. Population, as might be expected, has a positive effect; the larger the city, the more expenditure on police. The elasticity is +0.02. Growth reduces per capita costs with an elasticity of -0.03. Finally %OwnerOccupied has a negative effect on expenditure; it may be conjectured that property owners, who have capital at stake as well as current expenditures, monitor city councils more closely than do renters.⁴⁷ The elasticity is -0.31.

Equations (8) are done similarly for per capita Fire expenditures:

$$\begin{array}{l} \text{Fire} = C - 9.51 \text{ Power} ; r_A^2 = 0.067 \\ \quad (-2.9) \\ \quad 0.00 \end{array} \quad (8a)$$

$$\begin{array}{l} \text{Fire} = C - 7.70 \text{ Power} + 11.17 \text{ Y/P} - 0.603 \text{ \%OwnOcc} \\ \quad (-2.5) \quad (2.0) \quad (-7.5) \\ \quad 0.01 \quad 0.04 \quad 0.00 \\ \quad \quad \quad r_A^2 = 0.147 \end{array} \quad (8b)$$

The result of an all at-large council would be to reduce per capita Fire expenditures by 20.9 to 25.8 percent. These are strongly significant results. The income elasticity is +0.05, about the same as for Police. The elasticity of %OwnerOccupancy is -0.96, showing a strong effect.

Next, in equations (9), regressions are computed for per capita Sewer expenditures:

$$\begin{array}{l} \text{Sewer} = C - 6.54 \text{ Power} ; r_A^2 = 0.141 \\ \quad (-2.1) \\ \quad 0.03 \end{array} \quad (9a)$$

$$\begin{array}{l} \text{Sewer} = C - 5.64 \text{ Power} + 0.0251 \text{ Pop.} - 0.111 \text{ Area} \\ \quad (-1.8) \quad (1.8) \quad (-1.7) \\ \quad 0.07 \quad 0.06 \quad 0.09 \\ \quad -0.187 \text{ \%OwnOcc} ; r_A^2 = 0.152 \\ \quad (-2.3) \\ \quad 0.02 \end{array} \quad (9b)$$

The result for an all at-large council would be an expenditure level 13.6 to 15.8 percent lower than that for an all ward council. Population and Area seem to work in the opposite directions from what might be expected. Population has an

⁴⁷ Of course, renters may be ignorant of the costs, although the evidence does not generally support such an assumption.

elasticity of +0.04 and Area has an elasticity of -0.05 . Apparently an increase in population density increases rather than reduces costs. There appear to be no or small economies of scale since increasing both population and area by some percentage would still result in nearly the same per capita costs. The effect of %OwnerOccupancy is an elasticity of -0.26 , again a strong effect.

Equations (10) relate Per Capita Debt to the Power and other variables:

$$\begin{aligned} \text{Debt} = & C - 0.292 \text{ Power} ; r_A^2 = 0.126 \\ & (-2.1) \\ & 0.04 \end{aligned} \quad (10a)$$

$$\begin{aligned} \text{Debt} = & C - 0.290 \text{ Power} - 0.225 \text{ Recall} ; r_A^2 = 0.128 \\ & (-2.1) \quad (-1.7) \\ & 0.04 \quad 0.09 \end{aligned} \quad (10b)$$

The results for the Power of at-large council members are almost the same in these two equations. The effect of an all at-large council would be a reduction of 68.5 percent from that which would result from an all ward council. The only other significant variable is the Recall opportunity; having Recall results in 53.0 percent less debt. It appears to exert some control over the debt-incurring behavior of elected officials.

Next, the results for total per capita Expenditures are given in equations (11):

$$\begin{aligned} \text{Expend.} = & C - 0.0812 \text{ Power} ; r_A^2 = 0.412 \\ & (-3.2) \\ & 0.00 \end{aligned} \quad (11a)$$

$$\begin{aligned} \text{Expend.} = & C - 0.0549 \text{ Power} + 0.000118 \text{ Pop.} - 0.00310 \text{ Grow.} \\ & (-2.3) \quad (2.2) \quad (-2.1) \\ & 0.02 \quad 0.03 \quad 0.04 \\ & + 0.00123 \% > \text{HS} - 0.00357 \% \text{OwnOcc} - 0.00212 \% \text{White} \\ & (1.9) \quad (-5.3) \quad (-2.8) \\ & 0.06 \quad 0.00 \quad 0.01 \\ & + 0.0417 \text{ Init.} ; r_A^2 = 0.477 \\ & (2.0) \\ & 0.04 \end{aligned} \quad (11b)$$

Again, the result is a significant effect for the Power variable. The all at-large council would spend 11.9 to 17.6 percent less than the all ward council. These are strongly significant coefficients. Population causes an increase in expenses, with an elasticity of +0.01. Growth reduces per capita expenses, with an elasticity of

-0.03. Several demographic variables are significant as well. More education apparently results in more spending, with an elasticity of +0.10. As in the previous equations, %OwnerOccupancy is a significant reducing factor with an elasticity of -0.45. The percentage of the populace that is White is also a significant factor reducing expenditures, with an elasticity of -0.40. Finally, having Initiative available to voters increases, just as one might expect, the level of expenditures by some 9.0 percent.

The final set of equations is for the Tax level. This is measured as the amount of money raised locally to support local spending and so includes fees as well as direct taxes.⁴⁸ The results are given in equations (12):

$$\begin{array}{l} \text{Tax} = C - 63.88 \text{ Power} ; r_A^2 = 0.212 \\ \quad (-2.4) \\ \quad 0.01 \end{array} \quad (12a)$$

$$\begin{array}{l} \text{Tax} = C - 52.68 \text{ Power} - 126.09 \text{ Y/P} + 0.138 \text{ Pop.} \\ \quad (-2.1) \quad \quad (-2.7) \quad \quad (2.5) \\ \quad 0.04 \quad \quad 0.01 \quad \quad 0.01 \\ + 3.07 \% > \text{HS} - 2.42 \% \text{OwnOcc} ; r_A^2 = 0.262 \\ \quad (4.5) \quad \quad (-3.6) \\ \quad 0.00 \quad \quad 0.00 \end{array} \quad (12b)$$

The effect of having an all at-large council as compared to an all ward council would be a reduction in the per capita taxes of 13.4 to 16.3 percent. Again, the results are highly significant. The Income elasticity is -0.05 which is interesting but does not have clear implications. The elasticity with respect to Population is +0.02 which seems reasonable; larger cities will tend to have higher taxes. Education also has a strong positive effect, with an elasticity of +0.28. Finally, %OwnerOccupancy has its usual strong negative effect, with an elasticity of -0.36.

7. CONCLUSIONS

After testing the effects of the power of at-large city council members relative to the power of ward council members on various measures of spending and on taxes, it seems clear that at-large representatives act so as to reduce both spending and taxes as compared to what ward representatives do. The ward representatives act in a more "pork barrel" framework which results in more spending. Two sets of regressions were run, with similar results. Estimated reductions in spending ranges from 6 to 25 percent, depending on the spending

⁴⁸ It also includes the opportunity cost of surplus funds which generate investment income for the city to the extent that the interest received by the city is the same as that which would be received by the taxpayer.

category, for an all at-large council as opposed to an all ward council. Taxes were reduced by about 15 percent and the debt load was reduced by about 60 percent. These results are not only significant; they are substantial.⁴⁹

While not reported above, a simpler version of the Power index variable was also tested for equations (7) through (12). That version was the simple ratio of at-large council members to the total number of council members. The results were almost identical to those reported above for the Power index as a modified Banzhaf index. It would seem that the more appropriate index is the one used, since it is based on the council member's individual incentives and calculates the relative power for at-large council members acting as a bloc.

In addition to simply spending more, it appears that at least some of the additional spending for ward cities is financed by debt. While both total spending and locally generated revenues rise by about 15 percent with an all ward city council, that same rate of increase in receipts from non-local sources is not likely to occur. As a result, debt increases substantially over a period of time.

A natural extension of the result that ward council members spend more freely than at-large representatives would be to apply it to other governments. The U.S. Congress, both the House of Representatives and the Senate, are entirely elected from wards, whether these wards are defined as districts or states. So, too, are legislators in all of the state legislatures. Generally, so, too, are representatives in county governments. In all of these cases, it may be reasonably inferred that expenditures are higher than they would be if the legislators were elected at-large.

It should also be noted that the larger the level of government, the more it can engage in redistributive activities. (In the context of this paper, redistribution is accomplished by extra spending because taxes are related to wealth while services are presumed equal.) Some of the motivation for the extra spending in this paper is, it has been argued, the capability and desire of ward council members to redistribute wealth or income within a city. That tendency is likely to be greater at both state and federal levels since the capability for redistribution is greater at those levels of government. Certainly it is more difficult to escape a state's taxation and even more difficult to escape a country's taxation if one does not like its redistributive behavior. Consequently, it is even more likely that there is an increased spending effect at those levels of government. We can go a step farther in this by noting that the larger levels of government are always composed of representatives of districts while city governments are more likely to include at-large representatives. This would suggest that if it is desired that government be somewhat smaller, it would be appropriate to remove functions from those more encompassing governments such as the federal and state governments, and have those functions taken over

⁴⁹It is possible that the causality works in the opposite direction; cities have wards because they want more spending. See Fowler and Lineberry (1975) for this argument. Our results cannot, at present, give the direction of causation.

by local governments which would have less redistributive capability and, consequently, a lower spending level. This conclusion, of course, depends on whether one thinks a lower spending level is to be preferred. However, it has to be noted that the mechanism here enunciated is one which has some groups effectively exploited by others. Further, there is posited to be a negative net overall benefit in the case of some of the extra spending. On the other hand, if more redistribution is desired, more functions should be transferred from local to non-local governments.

The results also serve to answer the question raised earlier of why people expend resources trying to get a change from council members at-large to ward council members. It is not entirely for the purpose of having each little enclave represented by its own council member so that every minority may thus have a member of that minority on the council. Instead it is for the purpose of increasing spending levels, presumably to the benefit of those minorities which are underrepresented. As will be recalled, it was argued earlier that a minority in the city which was unable to elect any of its representatives and was represented entirely by at-large council members would be in the same position if its minority representatives were in the minority of the city council. However, that appears empirically not to be the case because a coalition of minorities can get together to expand spending and effectively to transfer resources to itself.

The resultant greater spending is beyond the median position and, so, effectively transfers more resources from the well-off to others. In addition, there is a higher overall level of services provided as a result of wards. Socially, it would appear that the benefits of this higher level of services are outweighed by the increased costs, at least as perceived by the median voter, so the net benefit of the government to the public is lower if there are more ward representatives. That is, the level of services is beyond that desired by the median person so the costs outweigh the benefits at the margin.

Extending the results to more encompassing governments indicates a likelihood of even greater over-spending and over-incurrence of debt since there is less competition there than there is among cities so there is more opportunity for redistribution.

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