REPRESENTATIVE VOTER OR BUREAUCRATIC MANIPULATION: AN EXAMINATION OF PUBLIC FINANCES IN CALIFORNIA BEFORE AND AFTER PROPOSITION 13

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I. INTRODUCTION

There are at least two competing models of the determination of public expenditures. The first is the median voter model in which public expenditures are treated as if they were determined by maximizing the utility of the median-income voter subject to its individual budget constraint.[1] The second competing view to the median-voter model is one in which the government bureaucracy uses its power to control the agenda over which the citizens decide to obtain its largest possible budget.[2]

In this paper we attempt to test these competing views by constructing stylized models of both. The median-voter view is presented as the representative voter model in which public expenditures are assumed to be chosen as if they maximized some utility function (not necessarily one that corresponds to a particular citizen) subject to a budget constraint. The second view is presented as the bureaucratic-manipulation model in which public expenditures are chosen as if they maximized the bureaucrats' utility function subject to constraints imposed by the preferences of the electorate. It is shown that the behavior of local public expenditures before and after the passage of the 1978 property tax limitation initiative (Proposition 13) can be used to empirically test these models.

In the subsequent sections of this paper we will try to explain 13 -- both why it happened and its consequences. Section II deals with some of the factual issues preceding

[1] This interpretation, which is correct, is due to Inman (1978).

[2] See, for instance, Romer and Rosenthal (1978); and Denzau, Mackay, and Weaver (1979).

Public Choice 39: 113-142 (1982) 0048-5829/82/0391-0113 $04.50.

13. In it we will point to puzzling features of both public expenditures and voters' opinions concerning them. Section III describes the substantial changes in state and local public finances after the passage of 13. In section IV we develop a model of public expenditure choice which in Section V is applied to a comparison of pre- and post-13 municipal expenditure to test the median-voter model against our version of the model which we call "bureaucratic manipulation."

II. BEFORE 13

On June 6, 1978 the voters of California passed Proposition 13 with a landslide vote of close to 65% in favor. The Proposition amended the State Constitution and substantially changed the rules under which real property can be taxed. It specified that property cannot be taxed at a rate greater than one percent of its assessed value. Assessed value was to be set at 1975 market value plus a growth factor of two percent per year. In the case of property that is sold or constructed after 1975, assessed value is set at market value at the date of sale or construction, and the two percent growth factor is applied from that date. Because property was taxed at about 2.3% of market value before 13, the success of the referendum meant a predicted reduction of 57% in property tax revenues.[3]

Since property taxes were an important source of local public revenues, the voters seemed to be expressing a preference for a substantial reduction in local public expenditures. If this is so, it is certainly a challenge to one important paradigm of public expenditure theory, namely, the median-voter model. For if the bundle of public goods was the median-voter's optimal bundle, this strategically powerful person surely would not have voted to reduce local public expenditures by the amount mandated by the amendment. Nonetheless, if one examines the behavior of government as well as the political environment both before and after 13, he does not find a clear rejection of the median-voter model. In a poll conducted by the University of California Survey Research Center before the June 1978 election and reported by Citrin (1979), the voters sampled appear to express no preference for a substantial reduction in local public expenditures. The results of that poll, presented in Table 2.1, show that with the exception of Welfare (3), Public Housing (12), and General Government (13), the majority favored either maintenance of the status quo or increased expenditures, with the modal choice the status quo. This would be the result one might expect from a median-voter outcome if preferences were distributed approximately symmetrically around the median. The survey results seem to favor the

[3]This was the prediction given in Shapiro and Morgan (1978). In fact, as reported in section III of the paper, there was only a 52% decline in property tax revenues.

Table 2.1

"...[do] you think the amount of tax money for each one [of the following] should be increased, held the same, or cut back?"

	Category	Cut Back	Same	Increase	No Answer
(1)	Higher Education such as university, state and local community colleges	24.5	49.7	21.7	4.0
(2)	Public schools, kindergarten through 12th grade	22.2	48.9	25.0	3.9
(3)	Welfare and public assistance programs	63.6	24.1	7.4	4.9
(4)	Medical care programs such as medi-cal	27.0	46.8	19.7	6.4
(5)	Parks and recreation facilities	22.3	56.2	17.2	4.3
(6)	Police departments and law enforcement	7.9	61.4	27.5	3.2
(7)	Street and highway building and repairs	23.2	55.4	16.8	4.6
(8)	Jail, prisons and other correctional facilities	9.6	42.9	38.3	9.2
(9)	Environmental protection regulations	35.5	35.5	22.0	7.1
(10)	Fire departments	5.9	72.5	18.4	3.2
(11)	Public transportation	23.5	43.2	25.9	7.4
(12)	Government backed public housing projects	42.0	31.1	17.9	9.0
(13)	City and county administrative departments	67.4	24.4	1.9	6.3
(14)	Courts and judges	25.7	51.5	15.7	7.1

Source: University of California, Survey Research Center, *Contextual California Taxing and Spending Data Merge with California Poll 7806* (mimeo)

median-voter view. But if the voters were as happy as the survey indicates, why did they vote for 13?

One explanation suggested by Oakland (1979) and Shapiro, Puryear, and Ross (1979) is that people were happy with the received menu of public goods, but they were unhappy about the means of financing those expenditures. Specifically the Proposition was meant to shift the burden from local property to the broader state tax base. Oakland (1979) noted that there had been a large increase in the value of real property during the 1970s, particularly in the period between 1975 and 1978. But the rates of increases had not been the same for all types of property. Single-family residential property (the value upon which the median tax share is based) had increased in value much faster than commercial and industrial property. This meant that the owners of single-family residences were bearing an increasing proportion of the property tax burden: in 1970 single-family residences were 33.5% of total assessed value; by 1977-78 they were 41.0% of total assessed value.[4]

The median voter seemed to be satisfied with the level of public expenditures but at the same time unhappy about the distribution of the tax burden. The expectation was not that expenditures would be reduced but that they would be maintained with funds from the State. This interpretation of the outcome was plausible because the projected reduction in property tax revenues was approximately the same as the surplus the state had accumulated. Furthermore, the existence of that surplus was a dominant campaign issue.

However, the hypothesis that the resident voter desired to shift the funding responsibility to state tax sources is difficult to defend. Sales and personal income-tax revenues are two-thirds of the state's general revenues. These taxes are borne predominantly by individuals. It is unlikely that the resident-voters' share of state taxes is smaller than their share of the local property tax. Nonetheless, although on the basis of average values the resident voter does not appear to gain from a shift to state financing, such a shift might be advantageous to some groups.

A previous study[5] suggests that those with income under $12,000 would substantially benefit from a larger dependence on state financing. Those people with incomes between $14,000 and $20,000 would either benefit little or lose little from a change. Those with incomes greater than $20,000 would be worse off by a shift in financial responsibility. This assessment of the relative desirability of state versus local financing depends upon the belief that the success of a Proposition 13 would not change appreciably the rules governing state taxation.

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[4]Oakland (1979).

[5]Shapiro (1981).

If the assessment is correct, and if Proposition 13 was merely the expression of a demand to shift the financial responsibility for public expenditures to the state, then support for 13 should have been inversely related to income. The problem with testing this hypothesis using voting data is that it would be difficult to distinguish between a vote for 13 motivated by a desire to reduce public expenditures and the same vote motivated by a desire to shift the financial responsibility to state taxes. In order to isolate the possible desire for a tax shift, we were able to obtain the original data used by Citrin (1979) in his study. From these data, it was possible to isolate the Proposition 13 choices of those who wanted no reduction in local public goods. It was then possible to separate the desire for reductions in expenditures from a preference for a tax shift.

A detailed examination shows, first, that 78.8% of the voters wanted to reduce expenditures on one or more local public services. Six of the public expenditures' categories--Public School; Parks and Recreation; Police; Fire; Public Transportation; and Local Administration--were classified as local. Among the 1202 people who gave definite opinions on all the local public expenditure categories (115 responded with no opinion about at least one of the seven expenditures), only 219 (18.2%) were satisfied with existing levels of expenditures or wanted those levels increased on all local public services. Of those voters who did not want a reduction of any local public expenditures, 57.5% voted against 13.

If it were true that, among the satisfied groups, those who voted in favor of Proposition 13 were voting for greater state financing, the percentage of voters favoring Proposition 13 should decline with income. Tables 2.2 and 2.3 report the response of the satisfied group stratified by income class. Table 2.2 has the responses of all satisfied voters (both homeowners and renters) and Table 2.3 gives the response of the satisfied homeowners only. Although it should be expected that property owners might respond differently to the Proposition than renters, Tables 2.2 and 2.3 give little indication of this. Furthermore, on the basis of these data, we must reject the hypothesis that people were voting for state financing. The Tables provide little support for the view that voting responses varied with income. On the basis of the Chi-squared test for independence, it is not possible to reject the hypothesis that preference for Proposition 13 is independent of income. This finding is consistent with Citrin's (1979) probit analysis of opinions on 13 in which he found income to be an insignificant explanatory variable. It appears, therefore, that the success of 13 was not motivated by a desire to shift the financial responsibility to the state.

In searching for alternative explanations we chose to examine whether or not public expenditures exceeded the median-voter's desires. By using a method suggested by Borcherding (1977), Shapiro (1981) calculated the desired rate of growth in public expendi-

Table 2.2

Income and Votes on Proposition 13 of Those People
Who Wanted to Maintain or Increase the Level of Expenditures
on All Local Public Goods

	Vote on Proposition 13	
Income	No	Yes
Total	57.5	42.5
0 - $15,000	26.4* / 57.3**	19.7* / 42.7**
$15,000 - $20,000	7.8* / 60.0**	5.2* / 40.0**
$20,000 -	23.8* / 58.2**	17.1* / 41.8**

*Entries above the diagonal lines are the joint (sample) probabilities of vote and income.
**Entries below the diagonal lines are the (sample) probabilities of a particular vote conditioned on the income level.

Table 2.3

Income and Votes on Proposition 13 of Homeowners Who
Wanted to Maintain or Increase the Level of Expenditures on All Public Goods

	Vote on Proposition 13	
Income	No	Yes
Total	54.7	45.3
0 - $15,000	16.8* / 50.0**	16.8* / 50.0**
$15,000 - $20,000	7.6* / 60.0**	5.0* / 40.0**
$20,000 -	28.6* / 55.7**	22.7* / 44.3**

*Entries above the diagonal lines are the joint (sample) probabilities of vote and income.
**Entries below the diagonal lines are the (sample) probabilities of a particular vote conditional on the income level.

tures implied by the median-voter models. Assume that the median-voter's demand for public goods can be written

$$\log(E/q) = A + b_1 \log(y/p) + b_2 \log(q/p) + \Sigma c_i \log x_i$$

where E is nominal expenditures on public goods; q is the price of public goods; p is the price of a numeraire market good; y is income; the x_i's are factors other than price and income that affect demand; and t is the median-voter's tax share of total public expenditures. If we knew the value of the parameters of this equation, it would be possible to calculate the desired rates of growth of various public expenditures over any arbitrary time period if expenditures were at their desired level at the beginning of the period. To see this, take the time derivative of the demand function above which yields

$$E^* = b_1 y^* + b_2 t^* - (b_1 + b_2) p^* + (1 + b_2) q^* + \Sigma c_i x_i^*$$

where the * indicates the percentage rate of change. This equation indicates the rate of change in equilibrium expenditure values. However, if, at the beginning of the period over which the rate of growth is to be measured, the actual supply of public goods is smaller than the desired level observed, changes may be adjustments towards equilibrium as well as changes in the equilibrium value.

It is impossible to know whether or not public expenditures were at their equilibrium value at the beginning of the period to be examined (the early 1970s until 1978). However, during the first years of the decade at least three tax or expenditure limitation initiatives were defeated–two to modify the property tax and one (the Reagan Initiative) in 1973 to limit the real level of per capita government expenditures. While the three defeats are not conclusive evidence of an expenditure equilibrium in 1973, such an equilibrium is assumed in the following analysis.

Using the parameter values reported in Inman's (1978) study of educational demand in New York, the desired rate of growth in educational expenditures was found to be 8.5% per year, with an approximate standard error of 1.2, over the period from 1974 to 1978. The actual rate of growth was 11.3% per year. It appears that the average rate of growth in educational expenditures was somewhere between 1.6% and 4.0% faster than desired. Had these expenditures grown at the desired rate they would have been $1,624 per student in 1977-78 rather than the $1,754 which was spent.[6] Thus, actual expenditures were about

[6]The details of these calculations can be found in Shapiro (1981). The estimates of desired rates of growth must be treated with some care because the parameters were estimated on New York data. Institutional differences between New York and California might suggest that the California parameters are much different from those estimated by Inman.

8% higher than desired. If the demand parameters are accurate, the median voter wanted a substantial decrease in the level of primary and secondary educational expenditures.

A similar analysis was performed for county and municipal expenditures using the Bergstrom and Goodman (1973) California parameter estimates. It was found that the desired rate of growth of municipalities was 7.8% per year, with an approximate standard error of 2.1, while actual rate was 10.2% per year. It is interesting that counties, the governmental units that are most reliant on the property tax, displayed the smallest difference between desired and actual rates of growth. The desired rate was 7.8% per year, while the actual rate was 8.5% per year.

These calculations establish that local public expenditures were rising faster during the 1970s than would have been predicted by the median-voter demand model. It is debatable whether or not this indicates that the level of expenditure was too high in 1978. But, if they were too high, it is still puzzling why Proposition 13 passed so easily. In fact estimates derived here suggest that school and county expenditures (the ones claiming the largest proportion of the property tax) were seven or eight percent too high in 1978; and Proposition 13 mandated a reduction in revenues for schools and counties of about 25%.

III. AFTER 13

Within three weeks after the passage of Proposition 13, the state legislature made the important decisions implementing that Proposition for fiscal year 1978-79. It determined how remaining property-tax revenues were to be distributed and how the state surplus, then estimated at nearly $4 billion, was to be used to offset the loss in property-tax revenues. Subsequent legislation, principally Assembly Bill 8 (AB 8) passed in 1979, determined the long-run implementation of Proposition 13. In this section, we review both the short-run and long-run "bailouts" and discuss their impact on the revenues of local governments.

As Table 3.1 indicates, property-tax revenue declined by more than $5 billion in the year following the passage of Proposition 13. Under the provisions of the bailout for that fiscal year, each county was required to levy the maximum property-tax rate of 1%, and those revenues were shared by all jurisdictions within a county on a pro-rata basis. The property-tax revenues were supplemented by over $4 billion of additional state aid. This aid, together with a $1 billion increase in local revenues from other sources, was nearly enough to offset the loss in property-tax revenue. For the most part, bailout aid came in the form of block grants. The major exception to that was the state assumption of shares of various health and welfare programs previously financed by the counties. The "buyout"

Table 3.1

All Local Revenue except Community Colleges[a]
(dollars in millions)

	Actual 1977-78	Actual 1978-79	Percent Increase	Projected 1979-80	Percent Increase
Property Taxes	$10,859	$ 5,201	-52%	$ 5,757	11%
State Aid	5,159	9,336	80	10,173	9%
Other Revenue	12,628	13,654	8	14,617	7%
Total Revenue	$28,646	$28,191	-2%	$30,547	8%

Community College Revenue[b]

	Actual 1977-78	Actual 1978-79	Percent Increase	Projected 1979-80	Percent Increase
Property Tax	745	327	-56%	n/a	n/a
State Aid	473	797	68	n/a	n/a
Other Revenue	103	119	16%	n/a	n/a
Total Revenue	$ 1,321	$ 1,243	-6%	n/a	n/a

[a]Source: Letter from Legislative Analyst to Senate Committee on Education, November 7, 1980.

[b]Source: Legislative Analyst, An Analysis of the Effect of Proposition 13 on Local Governments, October 1979.

of health and welfare programs amounted to approximately $1 billion. Counties also received block grants of $436 million, which were distributed among counties in relation to their property-tax losses net of the state buyout of health and welfare programs. As Table 3.2 shows, this aid did not completely offset the property-tax loss; counties incurred a 7% nominal decline in revenues in 1978-79. As a point of reference, the GNP deflator for state and local governments increased by 8.6% in 1978-79 so that counties sustained a real loss in revenues of more than 15%.

Cities' revenues did not decline so severely because they did not rely as heavily on property-tax revenue before 13. Revenue from other sources such as the sales tax, service charges, and licenses increased by 12% in 1978-79. Also, cities received $250 million in block grants from the state, allocated according to their property-tax losses. As can be seen in Table 3.3, total revenues for cities increased by 2%. While this amounts to a real decline of more than 6% in revenues, those revenues were about 8% in excess of expenditures in 1977-78. In aggregate, therefore, city expenditures were not significantly constrained by the passage of 13. School districts were heavily dependent on the property tax (see Table 3.4), and they lost more than $2.5 billion of property-tax revenue as a result of Proposition 13. Block grants of over $2 billion were allocated to schools to offset this loss. These grants were not distributed solely to equalize property-tax losses as in the case of cities and counties, however, but also to equalize expenditures per pupil as mandated by the Serrano decision. For the state as a whole, school-district revenues rose by 1%, although it is important to note that average daily attendance fell by more than 8% from 1977-78 to 1978-79. This was due principally to reductions in summer school and adult education classes.

Because of their diversity, special districts presented a difficult problem for the Legislature. The distribution of block grants by formula as was done for cities, counties, and school districts was not thought to be flexible enough for special districts. Therefore, bailout money for special districts was funneled through the counties and allocated among districts at the discretion of each county. A total of $190 million was allocated in this manner. Revenues for special districts are shown in Table 3.5.

The first year bailout was emergency legislation and was not intended to be a long-term policy. Its most obvious deficiency was in the way it distributed property-tax revenue among jurisdictions. Under that formula, the growth in property-tax revenue in any one jurisdiction would be shared by all jurisdictions in that county in proportion to their 1977-78 tax receipts. This formula worked to the disadvantage of jurisdictions that were rapidly growing in population and housing. Assembly Bill 8 sought to deal with this problem. Each jurisdiction now receives in property-tax revenue the amount it received in the prior year in addition to its share of any growth in property tax within its boundaries. A jurisdiction's

Table 3.2

County Revenue[a]
(dollars in millions)

	Actual 1977-78	Actual 1978-79	Percent Increase	Projected 1979-80	Percent Increase
Property Taxes	$ 3,349	$ 1,448	-57%	$ 1,949	34%
State Aid	1,749	2,972	70	2,612	-12
Other Revenue	3,969	3,972	0	4,396	11
Total Revenues	$ 9,067	$ 8,392	-7%	$ 8,957	7%

[a]Source: Letter from Legislative Analyst to Senate Committee on Education, November 7, 1980.

Table 3.3

City Revenue[a]
(dollars in millions)

	Actual 1977-78	Actual 1978-79	Percent Increase	Projected 1979-80	Percent Increase
Property Taxes	$ 1,147	$ 522	-54%	$ 780	49%
State Aid	514	786	53	633	-19
Other Revenue	3,595	4,037	12	4,393	9
Total Revenue	$ 5,256	$ 5,345	2%	$ 5,806	9%

[a]Source: Letter from Legislative Analyst to Senate Committee on Education, November 7, 1980.

Table 3.4

School District Revenue[a]
(dollars in millions)

	Actual 1977-78	Actual 1978-79	Percent Increase	Projected 1979-80	Percent Increase
Property Taxes	$ 5,245	$ 2,578	-51%	$ 2,175	-16%
State Aid	2,703	5,306	96	6,802	28
Other Revenue	1,394	1,535	10	1,530	0
Total Revenues	$ 9,342	$ 9,419	1%	$10,507	12%

[a]Source: Letter from Legislative Analyst to Senate Committee on Education, November 7, 1980.

Table 3.5

Enterprise Special District Revenue[a]
(dollars in millions)

	Actual 1977-78	Actual 1978-79	Percent Increase	Projected 1979-80	Percent Increase
Property Taxes	$ 665	$ 451	-32%	$ 491	9%
State Aid	158	76	-52	67	-12
Other Revenue	3,178	3,539	11	,691	4
Total Revenue	$ 4,001	$ 4,066	2%	$ 4,249	5%

Nonenterprise Special District Revenue[a]
(dollars in millions)

	Actual 1977-78	Actual 1978-79	Percent Increase	Projected 1979-80	Percent Increase
Property Taxes	$ 453	$ 202	-55%	$ 362	79%
State Aid	35	196	460	59	-70%
Other Revenue	492	571	16	607	6%
Total Revenue	$ 980	$ 969	-1%	$ 1,028	6%

[a]Source: Letter from Legislative Analyst to Senate Committee on Education, November 7, 1980.

share for any area is its share of the property-tax revenue collected in that area in the previous year.

AB 8 also reallocated property-tax revenues from the simple pro rata distribution of 1978-79. Block grants to cities, counties, and special districts were removed; and their shares of property tax revenue were increased. The total amount of property-tax revenue added for cities, counties, and special districts within a county was taken from the property-tax revenue previously received by school districts in that county. State aid to school districts was then increased.

As Tables 3.2-3.5 indicate, the net effect of this was to transfer $400 million of property-tax revenue from schools to cities, counties, and special districts. State aid to those jurisdictions was then reduced by over $600 million, while state aid to schools was increased by $1.5 billion. Cities are now in much the same position as before 13 with about 10% of their revenue coming from the state. Counties now receive about $1 billion more in state aid than before 13, principally because of the state buyout of health and welfare programs. School districts, on the other hand, have undergone a major restructuring in their finance. In 1979-80, state aid constituted over 64% of school-district revenue as opposed to 30% before Proposition 13. Furthermore, that aid is allocated in a way designed to equalize expenditures per pupil throughout the state. It is now estimated that by 1983-84, 89% of the school children in unified school districts will be located in districts having a variation in expenditures per pupil of $100 or less.

In drafting the long-term bailout legislation, the Legislature had to deal with the certainty that the state surplus would be eventually used up. AB 8 has an automatic mechanism, which is called the "Deflator," to reduce state aid to local governments in that event. If the sum of estimated revenues and beginning-year surplus for the state should fall short of a target specified in the law, state aid would be reduced by the difference. The target level at which this reduction would take place is $23.7 billion for 1981-82. The Legislative Analyst estimates 1981-82 state revenues at about $21.5 billion. Thus, unless the state surplus is about $2 billion in June, 1981, the Deflator will be activated.

Table 3.6 gives the Legislative Analyst's estimate of annual and year-end surpluses for the State of California. Notice that a string of four consecutive annual surpluses from 1974-75 to 1977-78 had accumulated to a $3.7 billion year-end surplus in June, 1978. Since 1978, the state bailout has turned these annual surpluses into deficits of approximately $1 billion per year. It is estimated that the accumulated surplus will be approximately $36 million in June, 1981. Thus, the Deflator will require a reduction of more than $2 billion in state aid to local governments.

However, it is doubtful that such a large reduction will be needed. The Legislative Analyst projects that the annual deficit for 1981-82 will be on the order of $1 billion,

Table 3.6

General Fund Surplus[a]
(dollars in millions)

		Annual Surplus	Year-End Surplus
1973-74		$- 443.5	$ 180.1
1974-75		349.9	554.7
1975-76		141.1	731.8
1976-77		885.5	1,713.1
1977-78		1,913.6	3,686.1
1978-79		-1,056.8	2,680.2
1979-80	(Estimated)	- 720.3	1,874.6
1980-81	(Estimated)	-1,221.2	36.0
1981-82	(Projected)	- 895.6	- 859.6

[a]Legislative Analyst, "The State's Fiscal Picture," Statement to the Assembly Ways and Means Committee, October 9, 1980.

assuming budget growth of 9.5%. Thus, the $2 billion reduction in state aid to local governments called for by the Deflator would leave the state with a $1 billion surplus. It is likely, therefore, that the legislature will deactivate the Deflator for 1981-82, and the reduction in state aid will be $1 billion or less. This is less than 10% of state aid to local governments and less than 4% of all local revenues.

There is no doubt that the budgets of local governments in California have been squeezed by Proposition 13, and there is no doubt that they will be squeezed more in the future. On the other hand, fears that a drastic reduction would result when the state surplus ran out appear groundless. The state surplus will run out this fiscal year, undoubtedly state and local government expenditures will be reduced, but no drastic reduction in expenditures is iminent. In fact, the real effect of Proposition 13 may not be its reduction in the growth of government spending in California so much as its fundamental restructuring of the state's public finance.

Certain elements of that restructuring are obvious. The principal responsibility for the financing of elementary and secondary education has been shifted to the state. This may have happened anyway as a result of Serrano; Proposition 13 surely hastened the process. The state has also assumed a larger responsibility for health and welfare programs, a reform that most students of fiscal federalism would applaud. In our view, however, the most significant restructuring has been the elimination of the property tax as a discretionary revenue source. It is true that the property tax remains an important source of revenue, but it is now essentially a nondiscretionary source, like the sales tax, with a rate determined outside the community. For cities and counties, the only discretionary sources of revenue are now user charges.

The revocation of the power to set property-tax rates may be a rational response to local government's abuse of that power in the past. Nonetheless, we believe that the removal of that power may have important consequences for the way in which the preferences of voter-taxpayers are translated into the menu of public goods offered in a community. In the next section, we set out our views on that subject.

IV. THE REPRESENTATIVE VOTER AND THE BUREAUCRAT: THE THEORY

A community faces two types of budgetary decisions. It must determine the size of its budget, and it must determine how that budget is allocated among different expenditure categories. There are two general approaches to modelling this decision process. In the perfectly competitive models such as Borcherding and Deacon (1972) and Bergstrom and

Goodman (1973), the preferences of voters are translated directly into budgetary decisions. In the imperfectly competitive models such as Romer and Rosenthal (1978) and Denzau, Mackay, and Weaver (1979), one group may use its control of the political agenda to extract some surplus from those decisions. In what follows, we wish to contrast these two approaches to budgetary decision-making and to suggest their different implications. In particular, we intend to show that the imposition of a Proposition 13-type property tax constraint may have quite different implications for expenditure patterns in the two models. We may then use data on expenditure patterns before and after 13 to test these two competing approaches.

The median-voter model may not have an equilibrium when more than two goods are financed from the same tax source and voters have different preferences for those two goods. We will sidestep this issue in what follows by assuming that community preferences can be represented by one utility function–the utility function of the representative voter. Therefore, the median-voter model will have a unique equilibrium: the public-sector budget that maximizes the utility of a representative voter. We will contrast that with the equilibrium budget under a model of bureaucratic manipulation.

The community is assumed to provide n goods, quantities of which are denoted by $Z = (Z_1,...,Z_n)$. The price of good i is q_i so that the community's budget is $B \equiv \Sigma q_i Z_i$. That budget is assumed to be financed through nondiscretionary revenue, R, and property-tax revenue, T. The amount of nondiscretionary revenue a community receives is beyond its control. It includes sales taxes and state block grants, for example. In contrast, the community may set its own property-tax rate, and thus property-tax revenues are discretionary. Let t be the representative voter's tax-price for property-tax revenue.

The representative voter has preferences over the n public goods and a numeraire private commodity, quantities of which are denoted by x. Those preferenced can be represented by a utility function $u(x, Z_1,...,Z_n)$. The voter seeks to maximize that utility, and we view that maximization in two steps. In the first step, suppose that the share of the budget devoted to each expenditure category is fixed, and the voter chooses the size of the budget. Then the voter will choose a budget, B, to maximize

$$u(y-t(B-R), \frac{s_1}{q_1}B,...,\frac{s_n}{q_n}B)$$

where y is his income and s_i is the share of the budget devoted to public good i. The first-order condition for this problem can be reduced to

$$t = \Sigma_{i=1}^{n} \frac{s_i}{q_i} \frac{u_i}{u_x} \tag{4.1}$$

where $u_i = \frac{\partial u}{\partial Z_i}$ and $u_x = \frac{\partial u}{\partial x}$.

The interpretation of this condition is that the tax-price must equal the weighted sum of the marginal willingness to pay for each public good where the weight for a good is the increase in the units of that good resulting from a \$1 increase in the budget. Let $B(s)$ be the budget that maximizes utility where $s = (s_1,...,s_n)$. The optimal budget is also a function of $t, q_1,...,q_n, y$, and R; but we suppress that notation in what follows.

This first-step budget choice is represented in Figure 1 with $n = 2$. The circular contours, u^0 and u^1, are the voter's indifference curves for the two public goods. Utility along u^0 is higher than along u^1. A ray from the origin (see Figure 1) such as R^0 represents

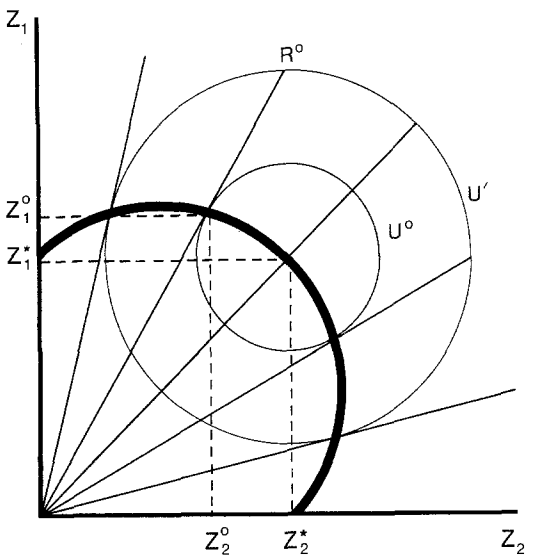

FIGURE 1

a locus of public-goods pairs with a constant budget share devoted to each good. The first step maximization is the choice of a pair (Z_1, Z_2) that maximizes utility along a specified ray. The pair (Z_1^0, Z_2^0) is a maximum for the shares implied by the ray R^0. The family of such utility-maximizing choices is represented by the curve $Z_1^* - Z_2^*$.

The second step of the voter's utility maximization is the choice of an optimal set of budget shares. This is the choice of a vector $s = (s_1,...,s_n)$ to maximize

$$u(y\text{-}t\,(B(s)\text{-}R), \frac{s_1}{q_1}\,B(s),...,\frac{s_n}{q_n}\,B(s))$$

The first order conditions for this maximization problem can be reduced to

$$\frac{u_i}{u_1} = \frac{q_i}{q_1} \qquad i = 2,...,n. \tag{4.2}$$

Thus, as expected, at the optimal shares, the marginal rates of substitution between public goods equal the ratio of prices among those goods. This optimal choice is represented by the pair (Z^*_1, Z^*_2) in Figure 1.[7]

In a representative-voter model, this outcome would be a stable equilibrium. Budgets would be proposed and put to a vote. Any budget that was an increase in utility for the representative voter would be unanimously approved (under our assumption of identical voters). The budget would, therefore, tend towards the optimum.

We wish to contrast this model with one in which one group (call them bureaucrats) exercises some control over the proposals that are put to a vote. This model, which we call the bureaucratic manipulation model, is clearly motivated by Denzau, Mackay, and Weaver (1979). We suppose that the bureaucrats have the power to determine the share of the budget devoted to each public good but that the voters determine the total size of the budget. Our rationalization for this assumption is that the bureaucrats must have the approval of the voters to raise tax rates above the status quo, and thus the voters ultimately control the size of the budget. The allocation decision is too complicated to be put to a vote, however, and thus it tends to be controlled by the bureaucrats. In voting on tax rate increases, voters assume that the budget shares will remain the same when the budget is increased. In determining the allocation of the budget among different categories, the bureaucrats must, therefore, consider the effect that such decisions will have on the total budget.

Assume that the bureaucrats' preferences over the n public good are represented by a utility function $W(Z_1,...,Z_n)$. The budget for these n goods will depend on how the budget is allocated. We represent this tradeoff by a budget function which is defined as

[7] In Figure 1, the induced preferences for public-sector goods are represented by circular indifference curves. The shape was chosen because it is the easiest closed figure to draw. The shape depends upon the full preference structure and is not necessarily circular. For a discussion of induced public-sector preferences, see Denzau and Parks (1977 and 1979).

$$\bar{B}(Z_1,\ldots,Z_n) = B\left(\frac{q_1 Z_1}{\Sigma q_i Z_i},\ldots,\frac{q_n z_n}{\Sigma q_i Z_i}\right).$$

All feasible choices of $Z = (Z_1,\ldots,Z_n)$ must satisfy

$$F(Z) \equiv \sum_i q_i Z_i - \bar{B}(Z) = 0. \tag{4.3}$$

Therefore, the bureaucrats' problem is to choose Z to maximize $W(Z)$ subject to $F(Z) = 0$. The first-order conditions for this maximum problem may be written as

$$\frac{W_i}{W_1} = \frac{F_i}{F_1} = \frac{q_i - B_i}{q_1 - B_1} \qquad i = 2,\ldots,n). \tag{4.4}$$

For the bureaucrat, the opportunity cost of increasing expenditures on good i is not just the prices of i, q_i, but also the change in the overall budget as a result of that increase, $-B_i$. There is very little that can be said about the relationship between the equilibria in the median-voter model and those in the bureaucratic-manipulation model, except that they may differ. Nevertheless, it is interesting to compare the budget constraints of the bureaucrat with that of the median voter. Let us restrict our attention to the case where $n = 2$. Consider the representative-voter's optimum (Z^*_1, Z^*_2). Through a straightforward calculation, it can be shown that the slope of the bureaucrats' budget constraint at that point is

$$\frac{\partial F_2}{\partial F_1} = \frac{q_2}{q_1} \quad \frac{\frac{s_1}{s_2}\, e_{12} - e_{11}}{\frac{s_2}{s_1}\, e_{21} - e_{22}}$$

where e_{ij} is the elasticity of demand for good i with respect to the price of good j. Suppose that the cross-price elasticities are zero and the own-price elasticity of good 1 is higher (in absolute value) than the own-price elasticity of good 2. Then, the relative price of good 2 to the bureaucrats is higher than its relative monetary price. This is relfected in Figure 2 by the fact that the bureaucrats' constraint $F(Z)$ is steeper through (Z^*_1, Z^*_2) than the median-voter's constraint.

Bureaucrats solely interested in increasing the budget would tend to provide more of the elastic good, good 1, then desired by the representative voter. The budget-maximizing choice is (Z''_1, Z''_2) in Figure 2. That is not to suggest that bureaucrats seek only to maximize their budgets. In general, they may have preferences over the composition of that budget as well. It does suggest a rationale for some of the public-opinion surveys cited in section 2, how-

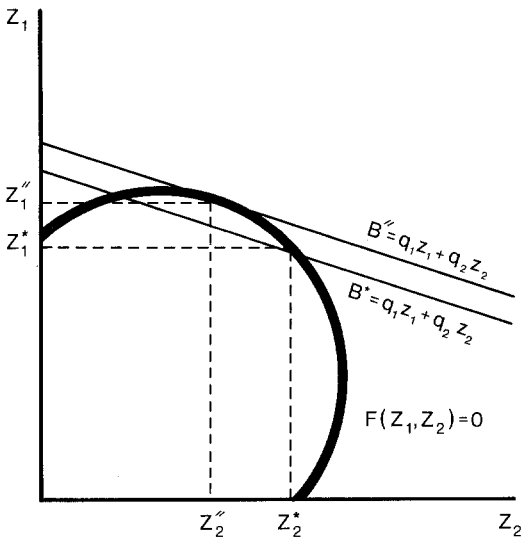

FIGURE 2

ever. Those surveys found that voters were generally satisfied with the level of government expenditures but were unhappy with the share of those expenditures devoted to different public services. For local governments, voters seemed to prefer more expenditures on police and fire protection and less on local administration. While such evidence can hardly be taken as proof of this theory of bureaucratic manipulation, it is certainly consistent with that theory.

If local governments were systematically providing a different budgetary mix from that desired by the representative voter, then Proposition 13 would certainly change that mix (although not necessarily in the direction desired by the representative voter). The effect of Proposition 13 is to change the property tax from a discretionary source of revenue to a nondiscretionary source. In fact, most local governments have been left without any significant source of discretionary revenue. In terms of our model of bureaucratic manipulation, this implies that public-goods prices faced by bureaucrats have changed from $q_i - B_i$ to q_i, and we should, therefore, expect the bureaucratic equilibrium to change as well.

Suppose, for example, that we observe the difference in expenditures in various categories that results from different tax-prices between communities. The effect of a lower tax-price is to increase the representative voter's optimal consumption of all public

goods and thus to shift out the bureaucrats' budget constraint. This is represented in Figure 3 by the budget constraints F_1^0 and F_2^0. The curve E^0 is the budgetary expansion path connecting bureaucratic optima for different budget constraints. After 13, the opportunity cost of each public good is simply its price, and the budget constraint for the bureaucrats is represented by lines B_1^1 and B_2^1. The curve E^1 is the budgetary expansion path for after 13.

If our model of bureaucratic behavior is correct, we ought to observe different budgetary expansion paths before and after 13, as Figure 3 demonstrates. In contrast, if the median-voter model is the appropriate model, we ought to observe the same expansion paths before and after 13. This suggests that a test of the median-voter model (and indirectly of the bureaucratic-manipulation model) is to test for the equality of expansion paths before and after 13. In the next section, we describe such a test.

V. THE REPRESENTATIVE VOTER AND THE BUREAUCRAT : THE TEST

Development of the test starts with the assumption that the representative-voter's preferences for private and public goods are separable.[8] It follows that the expenditure

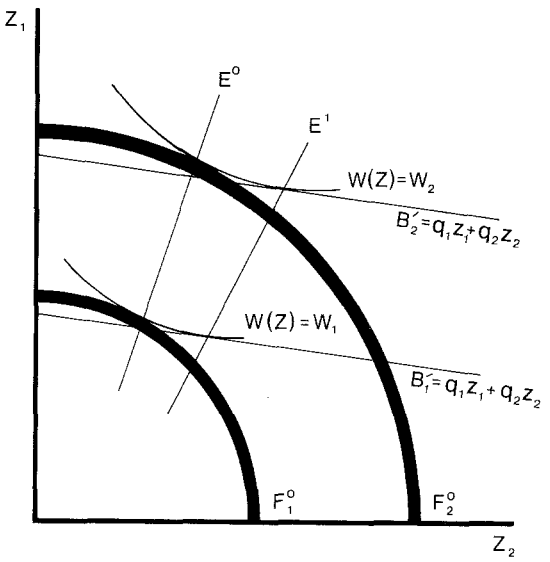

FIGURE 3

[8]This assumption implies that the marginal rates of substitution among public goods are independent of the level of private goods. An example of such preferences is one that can be represented by a Cobb-Douglas utility function.

decision can be viewed as a two-part process: the first part is the budget allocation between the two sectors and the second part is the choice of the optimal consumption bundles within each sector subject to the sectoral budget allocation.

Municipal expenditure data for 1977-78 (the fiscal year immediately before 13) and 1978-79 (the fiscal year immediately after 13) are used for the test. Two consecutive years were chosen in order to be reasonably confident that the relative prices of public goods were unchanged between the two years. If the relative prices remained the same, the representative voter's post-13 public budget constraint is parallel to the pre-13 constraint. If the representative-voter's preferences are not only separable but also translated homothetic,[9] then the public-goods demand is part of the linear expenditure system:

$$Z_i = A_i(q) + \Pi_i(q)B \tag{5.1}$$

where Z_i is the per capita expenditure on the i'th public good and B is the per capita size of the public budget.

For the representative voter only the value of B was changed by Proposition 13. Since the relative prices were unchanged, the before- and after-13 expenditure relation should appear as different points on the same Engel curve. Therefore, if the representative-voter model is correct, the functions $A(q)$ and $\Pi(q)$ should be unchanged between 1977-78 and 1978-79. The between-period equality of these functions can be tested as a set of restrictions as part of simple linear regressions.

In section 4 it was shown why the bureaucrat's constraint changed in a more fundamental way than it did for the representative voter. Before 13, the bureaucrat would optimize by equalizing its marginal rate of substitution with the ratio of the differences in price and the derivative of the budget function

$$\frac{W_i}{W_j} = \frac{q_i - B_i}{q_j - B_j}. \tag{5.2}$$

After 13 the same bureaucrat would equate marginal rates of substitution with the ratio of prices

$$\frac{W_i}{W_j} = \frac{q_i}{q_j}. \tag{5.3}$$

It is unlikely--although not impossible--that the right sides of the two equations are the

[9] All bundles of goods for which the marginal rates of substitution are the same lie on a straight line (not necessarily through the origin). In other words, income-consumption paths are straight lines.

Table 5.1

Regression Results

	Bureaucratic Manipulation								Representative Voter			
	Before 13				After 13							
	General Gov't	Police	Fire	Parks	General Gov't	Police	Fire	Parks	General Gov't	Police	Fire	Parks
Intercept	-28.90	-13.94	10.92	24.77	-79.30	35.85	22.56	13.2	-59.49	16.0	16.93	18.53
	(18.33)[a]	(17.50)	(8.94)	(7.44)	(15.93)	(6.70)	(8.90)	(6.64)	(12.18)	(9.27)	(6.25)	(4.90)
B	0.52	0.33	0.13	0.008	0.76	0.08	0.098	0.04	0.67	0.18	0.11	0.026
	(0.06)	(0.06)	(0.03)	(0.025)	(0.05)	(0.02)	(0.027)	(0.02)	(0.04)	(0.03)	(0.02)	(0.015)
SER	-0.46	7.58	-5.18	-0.91	10.63	2.45	-9.88	-1.47	4.69	4.85	-7.12	-1.13
	(3.86)	(3.69)	(1.88)	(1.57)	(4.20)	(1.77)	(2.34)	(1.75)	(2.88)	(2.19)	(1.48)	(1.16)
RET	1.09	1.29	1.44	-3.44	4.24	-2.48	0.52	-0.80	3.40	-1.36	0.91	-2.08
	(3.59)	(3.43)	(1.75)	(1.46)	(3.45)	(1.45)	(1.93)	(1.44)	(2.52)	(1.92)	(1.29)	(1.01)
SER * *B*	-0.008	-0.014	0.02	0.001	-0.03	-0.001	0.03	0.003	-0.02	-0.007	0.024	0.002
	(0.007)	(0.007)	(0.004)	(0.003)	(0.008)	(0.003)	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)	(0.0021)
RET * *B*	-0.001	-0.01	-0.01	0.02	-0.02	0.008	-0.008	0.1	-0.013	0.001	-0.009	0.015
	(0.011)	(0.01)	(0.005)	(0.004)	(0.01)	(0.004)	(0.005)	(0.004)	(0.007)	(0.006)	(0.004)	(0.003)
R^2	0.67	0.37	0.66	0.56	0.79	0.63	0.67	0.73	0.73	0.37	0.66	0.54
SSE	155523.5	141798.7	36980.3	25643.88	141196.5	24939.32	44085.61	24524.59	314878.2	182309	82858.49	50945.04

[a]Standard errors in parentheses.

same.[10] The implication is that the bureaucratic expansion path was different before 13 than it is after 13.

Here it is assumed that the bureaucratic expansion path, as well as the representative voter's, is linear.[11] This means that the cross-sectional representation of the bureaucrat's demand function is the same as the one for the representative voter (5.1). The difference between them is that the values of the bureaucrat's $A(\ )$ and $\Pi(\ )$ change between the pre- and post-13 periods. This is the test of the representative-voter model versus the bureaucratic-manipulation model: representative voter predicts $A(\ )$ and $\Pi(\ )$ constant and bureaucratic manipulation predicts that they change.

This test is carried out by fitting the system of equations of the form suggested in (5.1) to pre- and post-13 per capita expenditures from 121 California municipalities. In order to insure a degree of homogeneity in our data, only those communities that provided police, fire, libraries, parks, and general government were included in the sample.[12] Even with this limitation it is still possible that interjurisdictional variation in expenditures may be caused by more than variation in the budget. For instance, cities with large retail sectors may devote a larger share of their budget to police than cities with insignificant retailing merely because the technology of police protection is different in the two cities. Furthermore, the representative voter may be different as well: in a purely residential community the representative voter is a homeowner, but in cities with large commercial sectors, the Chamber of Commerce plays an important political role. In order to allow for this possibility, the parameters A and Π are specified as follows

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[10]However, if the representative-voter's utility function is Cobb-Douglas, the pre- and post-13 marginal rate of substitution conditions are the same. In order to see this consider equation (4.1).

$$t = \Sigma \frac{s_i u_i}{q_i u_i}$$

Multiply both sides of the equation by B and find

$$B = \frac{1}{t} \Sigma Z_i \frac{U_i}{U_x}$$

But the Cobb-Douglas condition implies that

$$\frac{u_i}{u_x} = \gamma_i \frac{x}{Z_i}$$

where γ_i is ratio of the Cobb-Douglas parameter on Z to the parameter on x. If this is so then

$$B_i = 0.$$

[11]This is a very strict and unlikely condition. We feel that there may be reasonable ways to relax this condition in order to give our subsequent results more generality. The bureaucratic Engel curves would be linear if bureaucratic preferences were translated homothetic and in every community the bundle of public goods is chosen in such a way that where a is a constant. Under this condition the bureaucrats' optimization condition is

$$\frac{w_i}{w_j} = \frac{q_1(1-a_i)}{q_j(1-a_j)}$$

[12]A community that had no expenditure on parks might be one that was sufficiently rural that there would be no demand for municipal parks; or it might be able to take advantage of interjurisdictional spillovers and use neighboring communities' parks ;or it might simply dislike parks.

$$A_i = a_{i0} + a_{i1} SER + a_{i2} RET$$

$$\Pi_i = c_{i0} + c_{i1} SER + c_{i2} RET$$

where SER and RET are the per capita receipts of select services and retailing respectively.[13] The resulting estimating equations are of the form

$$Z_i = a_{i0} + a_{i1} SER + a_{i2} RET + c_{i0} B + c_{i1} SER \cdot B + c_{12} RET \cdot B \,. \tag{5.4}$$

In this case the Z's represent the per capita expenditures on general government, police, fire, parks, and libraries. Because the sum of these expenditures is equal to B, there are only four independent equations. Therefore, in the process of estimating the parameters one of the expenditure categories is deleted–in this case, libraries. As with all demand systems, there will be inter-equation error covariance. In this case "Seemingly Unrelated" GLS estimates are efficient. But, because the same independent variables appear in all equations, single equation least squares estimates are the same as GLS estimates.[14]

The hypothesis to be tested is that the parameters of (5.4) for cities before the passage of 13 are the same as those for cities after 13. While this is a test of the representative-voter hypothesis, it may also unintentionally be a test of the specification of (5.4). It is possible that the representative-voter hypothesis is true but that the model (5.4) is misspecified. In that case, equation (5.4) might be viewed as an approximation of the true model. But, the best approximation for one data set is not necessarily the best for another. Thus, we might be led to reject the hypothesis that the parameters of (5.4) are equal before and after 13 even though the parameters of the true model are the same.

If this is a serious problem, it is likely to be revealed by data from cities in the period before the passage of 13. Regardless of whether or not the true model is bureaucratic manipulation or representative voter, the parameters of that model ought to be equal for different years in that period. If we conduct a statistical test of that hypothesis and are forced to reject it, then we must entertain the notion that equation (5.4) is misspecified. In that case, our proposed test of the representative-voter model using pre- and post-13 data would be suspect. Thus, we proceed by first testing equality of parameters for the years 1976-77 and 1977-78, the two years immediately preceding the passage of 13.

The equations were estimated twice on data from the same cities for 1976-77 and 1977-78. In the first regression, the coefficients for the first period were not restricted to equal the coefficients for the second. In the second, the coefficients were restricted to be the

[13] This is similar to the use of adult equivalences in market demand studies. See Barten (1964), Muellbauer (1974), and Shapiro and Braithwait (1979).

[14] See Dhrymes (1970).

same between the two periods. The null hypothesis of equality between the two years can be tested by comparing the sum of squares in the restricted model (SSE_R) with the sum of squares in the unrestricted model (SSE_U). Under that hypothesis, the statistic

$$((SSE_R - SSE_U)/(DOF_R - DOF_U))/(SSE_U/DOF_U)$$

will have the F distribution with (DOF_R - DOF_U) and DOF_U degrees of freedom where DOF_R and DOF_U are the degrees of freedom in the restricted and unrestricted models, respectively. There are 912 degrees of freedom in the restricted model and 920 in the unrestricted model. Thus, the test statistic is $F_{24,920}$ under the null hypothesis. The critical value for rejection of the null is 1.53 at the 5% significance level and 1.81 at the 1% level. The value of the test statistic is 1.68. We conclude that this is weak evidence at most for rejecting the null and that therefore our proposed test of the representative-voter hypothesis using data from before and after 13 is not subject to the misspecification problem raised above.

To conduct that test of the representative-voter hypothesis, equation (5.4) was estimated with data from the same cities for 1977-78 and for 1978-79. The unrestricted model is consistent with the bureaucratic-manipulation hypothesis because that predicts that the parameters of (5.4) will be different before and after 13. The restricted model is consistent with the representative-voter hypothesis because that predicts equality of the parameters between the two periods. The results are presented in Table 5.1. The test of equality of parameters is conducted exactly as the test described above for the two years immediately preceding 13. The test statistic is $F_{24,920}$ under the null hypothesis of equality. The critical value for that statistic is 1.81 at the 1% significance level. The value of that statistic is 2.34, which leads us clearly to reject the representative-voter hypothesis.

VI. SUMMARY AND CONCLUSION

The passage of Proposition 13 offered a rare opportunity to test directly the representative-voter theory of government expenditure against the bureaucratic-manipulation theory. By a constitutional amendment, the local property tax was turned from a totally discretionary source of revenue to a totally nondiscretionary source. For the representative voter this constituted a lump sum change in his public-sector budget, but for the bureaucrat it meant a change in the relative prices of public goods as well. By showing that the under-

lying structure of public-goods demand changed due to 13, the representative-voter hypothesis was rejected.

This tentative acceptance of the bureaucratic-manipulation hypothesis seems to rationalize the voters' behavior. The majority of voters were at least satisfied with the levels of some public expenditures. Only a small minority thought that none of the expenditures should be reduced. One might reasonably speculate that the voters were trying to regain some of the surplus that had been extracted from them by manipulation of the budget shares. It is ironic that the method presented was one that makes it less necessary that the local bureaucrat be responsive to the voters' desires. The bureaucrat now has a fixed budget and can optimize without considering the voters' budget response.

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