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Early Impacts of Proposition 2 1/2 on
the Massachusetts State-Local Public Sector*

by
Jerome Rothenberg
Paul Smoke

Working Paper # 317

April, 1983

**massachusetts
institute of
technology**

**50 memorial drive
cambridge, mass. 02139**

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I Introduction

In the November 1980 general election, Massachusetts voters overwhelmingly approved a strict tax limitation measure known as Proposition 2 1/2. This popular initiative, supported by 59 percent of the electorate, was designed primarily to reduce local property tax burdens and to curtail the rate of growth of local government spending. Proposition 2 1/2 was ammended by the Massachusetts State Legislature in December 1981, primarily to allow communities some additional flexibility in overriding the provisions of the limit.

Proposition 2 1/2 represents a sudden, quantum lurch to the public economy of Massachusetts, making it difficult for the limit to be assimilated by state and local governments. The consequences on the performance of the public economy may therefore be considerable. In this paper we examine early impacts of Proposition 2 1/2 for their character, their magnitude and their distribution among communities.

The very features of Proposition 2 1/2 that make adjustment to it so difficult make it easier to examine: there is a specific starting date and designated large changes imposed. So a before-after methodology seems appropriate. But in a deeper sense they also make examination more interesting: they show the federal system forced to respond to a sudden, significant shock. The character of that response can illuminate the working of the federal system of government. Questions about revealed social preferences for different public goods, social priorities, the attempts of public officials to be responsive to perceived wants of the public while

defending their own interests, the use of intergovernmental flows to compensate for or redistribute resources or burdens or opportunities - these and others all seem tied in with the responses to an exogenous discontinuity like Prop. 2 1/2. We address this paper to throw light on both the immediate substantive character of Prop. 2 1/2 consequences and the broader questions of the operation of the federal system under pressure.

Exhibit 1 summarizes the major provisions of Proposition 2 1/2. Although it includes a variety of mandates, the central focus of the limit is on the local property tax. Under Proposition 2 1/2, local governments in Massachusetts may tax property at a rate no greater than 2.5 percent of full and fair market value. (Under a 1974 court ruling, cities and towns in Massachusetts are required to assess at full market value, although more than two-thirds of the communities in the state have not yet complied with this ruling). Communities exceeding that figure at the time the limit went into effect are required to reduce the property tax levy by 15 percent annually until the 2.5 percent limit is met. Communities may not increase their levy by more than 2.5 percent per year. In addition to the restrictions on property taxation, Proposition 2 1/2 limits the amount of revenue a locality may receive from the motor vehicle excise tax to twenty-five dollars per thousand dollars of valuation.

Proposition 2 1/2, as amended by the State Legislature, allows local voters to override the 2.5 percent limit under certain circumstances. Local Selectmen or City Councils may place an override provision on the local ballot at a general or special election with a two-thirds vote. A community required to cut its levy by 15 percent may reduce that cut to 7.5 percent

EXHIBIT I

The Major Provisions of Proposition 2 1/2 *

- Limits the amount communities may tax to no more than 2.5 percent of the total fair cash value of all property,
- Requires communities exceeding that limit to "roll back" the tax levy 15 percent annually until the limit is met.
- Limits increases in the property tax levy to 2.5 percent a year.
- Limits motor vehicle excise taxes to \$25 per thousand dollars of valuation.
- Allows renters to itemize one-half of annual rent as a state income tax deduction up to \$2500.
- Limits outside agency assessments to the community to no more than 2.5 percent a year with the exception of optional services.
- Provides for certain overrides of the levy limit which may be determined by a simple majority or two-thirds vote, depending on the magnitude of the change desired.
- Allows communities to expand levies in proportion to growth in the tax base brought by new construction and renovations.
- Allows communities to exclude from their levy cap either new or pre 2 1/2 debt and interest by a simple majority vote.
- Repeals compulsory and binding arbitration for public employees.
- Prohibits state laws imposing unfunded local costs to be adopted after January 1, 1981.
- Repeals school committee fiscal autonomy, although line item autonomy is retained.

*as ammended by the State Legislature, December 1981.

Source: Impact 2 1/2 Project, based on information supplied by the Massachusetts Municipal Association.

with simple majority approval. A community allowed to increase its levy by 2.5 percent may double that increase to 5.0 percent, also with a simple majority vote. A two-thirds vote is required when a community that must cut its levy desires to reduce the cut to 0 percent, and this vote is only applicable to a single year. A two-thirds vote is also required if a community desires to increase the levy by more than 5 percent, although the total levy may never exceed 2.5 percent of full and fair valuation.

Why has a strict tax limitation become a reality in Massachusetts? A recent study by Bradbury and Ladd (1,2) has attempted to explore this question. They argue that Massachusetts has a very high property tax burden because local governments in Massachusetts are extremely dependent on the property tax relative to most other states. Massachusetts localities have a low utilization of user fees and charges (3), and have historically had lower levels of state aid than the U.S. average. Property tax revenues have continued to grow in recent years (although at a slower rate) despite major increases in state aid. In fiscal year 1980, Massachusetts communities averaged \$550 per capita in local property tax collections compared to the national average of \$290. Furthermore, property taxes averaged 6.2 percent of personal income in Massachusetts, while the national average was 3.4 percent.

. Bradbury and Ladd also demonstrate that local government spending in Massachusetts has grown quite rapidly over the last decade. During the 1970s, local government expenditures in Massachusetts increased at an annual rate of 9.9 percent, a full percentage point greater than the national average. Local spending as a percentage of personal income also increased

faster than the national average during this time period. The growth of school spending has been particularly great, exceeding the national growth rate by over three percentage points. This is important because school spending accounts for about one-half of all local spending in Massachusetts.

The purpose of this study is to analyze the early impacts of Proposition 2 1/2 on a sample of communities in Massachusetts.

We are interested in both the size of the effects and their distribution among communities. We are also interested in the distinction between the impacts mandated by Prop. 2 1/2 and the various accommodations made by both the state government and the localities. The state government augmented its inter-governmental aid to local jurisdictions. The local jurisdictions made a variety of accommodations: 1) the decision by some to undertake mandated full market value assessment revaluation at this time; 2) the decision to raise alternative sources of revenue; 3) the decision to cut expenditure appropriations; 4) a changed dependence on the capital market. We have focused mainly on the character of state aid as an offset to revenue losses, and on the voluntary decisions concerning size and mix of appropriation cuts. These adjustments go beyond this immediate question of Proposition 2 1/2 in Massachusetts. Appropriation cuts illuminate the process of adjustment by localities to sudden, large-scale emergencies, adjustments which reflect both social preferences for different functions and the balance of representative and adversarial roles between politicians and the public. State aid action illuminates compensatory and redistributive balances in the working of a federalistic system. Less attention has been given to use of alternative revenue sources, primarily because of paucity of data. Finally, and also

because of data limitations, we have touched on only one aspect of the relationship to the capital market - the change in bond ratings.

Our data is taken from a database constructed by the Impact: 2 1/2 Project in the Department of Urban Studies and Planning at the Massachusetts Institute of Technology. The Impact: 2 1/2 database contains detailed historical fiscal data for most of the cities and towns in Massachusetts. In order to analyze the impact of Proposition 2 1/2, the project staff assembled a variety of current information for a sample of communities selected to be representative of cities and towns in Massachusetts. Because communities are so diverse, no sample can be representative along all dimensions. The Impact: 2 1/2 sample is, however, fairly representative of the State's municipalities along a variety of dimensions - size (population), income, population growth from 1970 to 1980, percentage of residential property in the tax base, and size of the revenue cuts mandated by Proposition 2 1/2. The current study focuses on a major subset of this sample of communities in an attempt to explore the first year effects of Proposition 2 1/2 on local governments in Massachusetts. Table 1 presents selected characteristics of the forty-one towns included in the sample.

The remainder of this paper is divided into five sections. Section II explores how different types of communities have been differentially impacted by revenue cuts mandated by Proposition 2 1/2. Section III examines the pattern of appropriations cuts implemented by communities in the first year of Proposition 2 1/2. Section IV discusses available evidence concerning revenue diversification in response to Proposition 2 1/2. Section V looks at the change in municipal bond ratings between 1980 and 1982. Finally, Section

Table I: Selected Characteristics of Sample Communities

	pop70	pop80	pppch	pcev80
AMESBURY TOWN	5290.000	13971.000	164.102	10772.314
ARLINGTON TOWN	53524.000	48219.000	-9.911	16277.816
BURLINGTON TOWN	21980.000	23486.000	6.852	24784.978
CAMBRIDGE CITY	100361.000	95322.000	-5.021	13543.558
CHELMSFORD TOWN	31432.000	31174.000	-0.821	17585.167
CHELSEA CITY	30625.000	25431.000	-16.960	6208.958
CLINTON TOWN	13383.000	12771.000	-4.573	10077.519
CONCORD TOWN	16148.000	16293.000	0.898	29030.872
DALTON TOWN	7505.000	7505.000	0.000	13790.806
DARTMOUTH TOWN	18800.000	23956.000	27.479	16869.732
DENNIS TOWN	6454.000	12360.000	91.509	47087.378
DOVER TOWN	4529.000	4703.000	3.842	44333.404
DRACUT TOWN	18214.000	21249.000	16.663	12057.038
EVERETT CITY	42485.000	37195.000	-12.451	23874.177
FOXBOROUGH TOWN	14218.000	14148.000	-0.492	16765.620
FRAMINGHAM TOWN	64048.000	65113.000	1.663	17630.888
GEORGETOWN TOWN	5290.000	5687.000	7.505	16388.254
GLOUCESTER CITY	27941.000	27768.000	-0.619	20055.459
HATFIELD TOWN	2825.000	3045.000	7.788	16492.611
IPSWICH TOWN	10750.000	11158.000	3.795	17386.628
KINGSTON TOWN	5999.000	7362.000	22.720	16979.082
LEICESTER TOWN	9140.000	9446.000	3.348	10544.146
LONGMEADOW TOWN	15630.000	16301.000	4.293	20968.039
LYNNFIELD TOWN	5151.000	5424.000	5.300	33831.121
MARSHFIELD TOWN	15233.000	20916.000	37.307	16934.404
PALMER TOWN	11680.000	11389.000	-2.491	12020.370
PELHAM TOWN	937.000	1112.000	18.677	17967.626
PITTSFIELD CITY	57020.000	51974.000	-8.850	12381.191
QUINCY CITY	87966.000	84743.000	-3.664	13558.642
SALEM CITY	40556.000	38220.000	-5.760	15779.696
SEEKONK TOWN	11116.000	12269.000	10.372	20042.383
SOUTHWICK TOWN	6330.000	7382.000	16.619	14413.438
SPRINGFIELD CITY	163905.000	152319.000	-7.069	8633.197
STURBRIDGE TOWN	4878.000	5976.000	22.509	19293.842
TOWN OF NORWOOD	30815.000	29711.000	-3.583	17835.145
WATERTOWN TOWN	39307.000	34384.000	-12.524	17537.227
WAYLAND TOWN	13461.000	12170.000	-9.591	28405.916
WELLESLEY TOWN	28051.000	27209.000	-3.002	29501.268
WENHAM TOWN	3849.000	3897.000	1.247	20569.659
WHITMAN TOWN	13059.000	13534.000	3.637	11829.466
WORCESTER CITY	176572.000	161799.000	-8.367	8831.946
mean	30157.488	29465.878	8.838	18509.047
stdev	39256.357	35968.063	30.684	8600.528
median	15233.000	16293.000	1.247	16934.404

pop70 = 1970 population

pop80 = 1980 population

pppch = percentage change in population from 1970 to 1980

pcev80 = per capita equalized property valuation, 1980

VI attempts to synthesize the evidence presented in the paper and offers some concluding remarks.

II. Revenue Losses

Total revenue losses for localities come from decreased yields of both the real property tax and the motor vehicle excise tax. Two essentially exogenous sources serve as offsets to these losses: statute-mandated revaluation of real property assessments and state aid given to local governments. The revenue loss (or gain) to which localities must adjust behaviorably is that net of state aid and the change in revenues produced by revaluation. We shall examine the impact of all four of these ingredients on net total revenue losses. It is important to note that our failure to account for inflation suggests that our figures understate the real revenue loss suffered by communities due to Proposition 2 1/2. On the other hand, we have also failed to account for the capitalization of lower property tax rates into property values. The effects of capitalization would tend to work in the opposite direction, suggesting that our revenue loss figures overstate the actual loss.

Table II summarizes the four ingredients related to revenue loss: real property tax cuts, motor vehicle tax cuts, revenue change via revaluation, and state aid. We have expressed all revenue loss items in terms both of the total mandated cut and that cut required to be accomplished within the first year. No more than 15% of the total 1981 base period revenues are required to be cut in any year. Mandated cuts in excess of this must be cut over

Table II: Revenue Losses Mandated By Proposition 2 1/2, Fiscal Year 1981-82

	TL	VL	RTL	RYL	MV	RTR	RTR	AT	AY	PRYL	PRTR	PRYR	AL
AMESBURY TOWN	-0.347	-0.150	-0.150	-0.150	-0.078	-0.228	-0.228	-0.413	-0.413	-0.056	-0.134	-0.134	0.094
ARLINGTON TOWN	-0.400	-0.150	-0.400	-0.150	-0.041	-0.441	-0.191	-0.103	-0.239	-0.354	-0.104	-0.395	0.046
BURLINGTON TOWN	-0.300	-0.150	-0.300	-0.150	-0.040	-0.340	-0.190	-0.068	-0.121	-0.277	-0.127	-0.167	0.023
CAMBRIDGE CITY	-0.560	-0.150	-0.560	-0.150	-0.019	-0.579	-0.169	-0.036	-0.125	-0.539	-0.129	-0.558	0.021
CHELMSFORD TOWN	-0.100	-0.150	-0.069	-0.069	-0.056	-0.125	-0.125	-0.485	-0.485	-0.009	-0.009	-0.064	0.061
CHELSEA CITY	-0.720	-0.150	-0.720	-0.150	-0.029	-0.749	-0.179	-0.234	-0.981	-0.545	-0.025	-0.573	0.175
CLINTON TOWN	-0.320	-0.150	-0.320	-0.150	-0.055	-0.375	-0.205	-0.415	-0.760	-0.164	-0.006	-0.219	0.049
CONCORD TOWN	-0.124	-0.124	-0.036	-0.036	-0.037	-0.073	-0.073	-0.272	-0.272	-0.016	-0.016	-0.053	0.020
DALTON TOWN	-0.310	-0.150	-0.310	-0.150	-0.047	-0.357	-0.197	-0.204	-0.370	-0.237	-0.077	-0.284	0.073
DARTMOUTH TOWN	0.025	0.025	0.025	0.025	-0.082	-0.037	-0.037	-2.343	-2.343	0.112	0.112	0.050	0.087
DENNIS TOWN	0.025	0.025	0.025	0.025	-0.066	-0.041	-0.041	-0.954	-0.954	0.064	0.064	0.002	0.039
DOVER TOWN	0.025	0.025	0.025	0.025	-0.054	-0.029	-0.029	-0.257	-0.257	0.032	0.032	-0.022	0.007
DRACUT TOWN	-0.124	-0.124	-0.036	-0.036	-0.062	-0.038	-0.038	-1.011	-1.011	0.063	0.063	0.001	0.099
EVERETT CITY	-0.290	-0.150	-0.290	-0.150	-0.026	-0.316	-0.176	-0.038	-0.065	-0.278	-0.130	-0.305	0.012
FOXBOROUGH TOWN	-0.150	-0.150	-0.048	-0.048	-0.056	-0.102	-0.102	-0.617	-0.617	0.017	0.017	-0.039	0.063
FRAMINGHAM TOWN	-0.150	-0.150	-0.120	-0.120	-0.058	-0.178	-0.178	-0.235	-0.235	-0.078	-0.136	-0.136	0.042
GEORGETOWN TOWN	-0.016	-0.016	0.025	0.025	-0.068	-0.041	-0.041	-0.016	-0.016	0.026	0.026	-0.041	0.001
GLOUCESTER CITY	-0.101	-0.101	-0.011	-0.011	-0.041	-0.052	-0.052	-0.588	-0.588	0.020	0.020	-0.022	0.031
HATFIELD TOWN	-0.150	-0.150	0.025	0.025	-0.070	-0.045	-0.045	-1.399	-1.399	0.087	0.087	0.018	0.062
IPSWICH TOWN	0.025	0.025	0.025	0.025	-0.059	-0.034	-0.034	-1.407	-1.407	0.073	0.073	0.014	0.048
KINGSTON TOWN	-0.150	-0.150	-0.074	-0.074	-0.051	-0.124	-0.124	-0.427	-0.427	-0.021	-0.021	-0.071	0.053
LEICESTER TOWN	0.025	0.025	0.025	0.025	-0.096	-0.071	-0.071	-2.498	-2.498	0.203	0.203	0.107	0.178
LONGNEADOW TOWN	-0.049	-0.049	0.025	0.025	-0.061	-0.036	-0.036	-0.667	-0.667	0.049	0.049	-0.012	0.024
LYNNFIELD TOWN	0.025	0.025	0.025	0.025	-0.065	-0.040	-0.040	-1.039	-1.039	0.066	0.066	0.002	0.041
MARSHFIELD TOWN	-0.150	-0.150	-0.124	-0.124	-0.052	-0.176	-0.176	-0.326	-0.326	-0.057	-0.057	-0.119	0.057
PALMER TOWN	-0.027	-0.027	0.027	0.027	-0.074	-0.100	-0.100	-2.147	-2.147	0.189	0.189	0.115	0.215
PELHAM TOWN	-0.107	-0.107	0.009	0.009	-0.045	-0.036	-0.036	-2.482	-2.482	0.098	0.098	0.053	0.089
PITTSFIELD CITY	-0.410	-0.150	-0.410	-0.150	-0.040	-0.450	-0.190	-0.169	-0.399	-0.334	-0.074	-0.374	0.076
QUINCY CITY	-0.560	-0.150	-0.560	-0.150	-0.020	-0.588	-0.178	-0.094	-0.311	-0.505	-0.095	-0.533	0.055
SALEM CITY	-0.400	-0.150	-0.400	-0.150	-0.035	-0.435	-0.185	-0.117	-0.275	-0.349	-0.099	-0.384	0.051
SEEKONK TOWN	0.025	0.025	0.025	0.025	-0.054	-0.029	-0.029	-1.078	-1.078	0.056	0.056	0.002	0.031
SOUTHWICK TOWN	0.006	0.006	0.025	0.025	-0.064	-0.039	-0.039	-2.120	-2.120	0.108	0.108	0.044	0.083
SPRINGFIELD CITY	-0.490	-0.150	-0.490	-0.150	-0.051	-0.541	-0.201	-0.206	-0.556	-0.378	-0.038	-0.429	0.112
STURBRIDGE TOWN	0.000	0.000	0.025	0.025	-0.057	-0.032	-0.032	-2.695	-2.695	0.111	0.111	0.054	0.086
TOWN OF NORWOOD	-0.033	-0.033	0.025	0.025	-0.062	-0.037	-0.037	-1.147	-1.147	0.068	0.068	0.005	0.043
WATERBURY TOWN	-0.400	-0.150	-0.400	-0.150	-0.035	-0.435	-0.185	-0.036	-0.084	-0.384	-0.134	-0.420	0.106
WAYLAND TOWN	-0.059	-0.059	0.025	0.025	-0.044	-0.019	-0.019	-1.174	-1.174	0.047	0.047	0.003	0.022
WELLESLEY TOWN	-0.046	-0.046	0.025	0.025	-0.045	-0.020	-0.020	-1.378	-1.378	0.053	0.053	0.008	0.028
WENHAM TOWN	0.025	0.025	0.025	0.025	-0.057	-0.032	-0.032	-2.184	-2.184	0.094	0.094	0.037	0.069
WHITMAN TOWN	-0.380	-0.150	-0.410	-0.150	-0.058	-0.468	-0.208	-0.212	-0.476	-0.311	-0.051	-0.369	0.099
WORCESTER CITY	-0.560	-0.150	-0.560	-0.150	-0.043	-0.603	-0.193	-0.014	-0.042	-0.352	-0.142	-0.595	0.185
mean	-0.190	-0.087	-0.156	-0.058	-0.020	-0.209	-0.110	-0.812	-0.812	-0.093	-0.005	-0.145	0.063
median	-0.208	-0.073	-0.222	-0.080	-0.015	-0.212	-0.073	-0.824	-0.824	-0.090	-0.021	-0.080	0.049
median	-0.124	-0.124	-0.036	-0.036	-0.054	-0.100	-0.100	-0.427	-0.588	0.017	0.020	-0.041	0.053

TL = total property tax levy cut without revaluation/1981 levy
 VL = first year property tax levy cut without revaluation/1981 levy
 RTL = total year property tax levy cut after revaluation/1981 levy
 RYL = first year property tax levy cut after revaluation/1981 levy
 MV = motor vehicle excise revenue loss/1981 levy
 RTR = total revenue loss (inc. MV) after revaluation/1981 levy
 RTR = first year revenue loss (inc. MV) after revaluation/1981 levy
 AT = state aid (first year)/RTR
 AY = state aid (first year)/RTR
 PRYL = post-aid first year revenue change/1981 levy
 PRTR = post-aid first year revenue change/1981 levy
 PRYR = post-aid first year revenue change/1981 levy
 AL = state aid (first year)/1981 levy

subsequent years, with the same 15% ceiling operating. All figures are expressed as percentages of total base period 1981 property tax revenues.

It is clear from Table I that property tax revenue cuts differ widely across localities. The mean pre-state aid total revenue loss (column (6)), including property tax and motor vehicle excise, is 21%. The median loss is only half of this - 10% - indicating that some communities experienced very large cuts. The diversity of experience is borne out by the standard deviation, also 21%,. So the standard deviation is as great as the mean cut, testifying to a very large spread of experience. Thus, at the high end Chelsea sustained a cut of 75%, Worcester 60%, Cambridge 58%, Quincy 59% and Springfield 54%; at the low end Wellesley and Wayland had 2%, and Sturbridge, Seekonk, Ipswich and Dover had 3%. Indeed, as column (1) shows, with regard to the property tax alone, ten of the forty one localities are permitted increased revenues! These are for the most part communities who had effective tax rates at or lower than 2 1/2% and are therefore allowed to increase property tax revenues by as much as 2 1/2%. Revenue losses on property taxes show an even greater dispersion than total revenue loss (mean 15.6%, median 3.6%, standard deviation 22.2%, standard deviation/mean 1.42). All communities, however, sustain losses in motor vehicle excise revenues. These are on the average much smaller in absolute terms than the real property tax losses (mean 5.2%, median 5.4%) and far less varied in absolute terms (standard deviation 1.2%) and in relative terms (standard deviation/mean=.278).

The above figures refer to total revenue losses. For some communities, 17 in our sample, these exceed the amount that is required to be sustained in

any one year (15%). If we look only at the distribution of revenue cuts that must be sustained in the first year (1981-82), (column (7)), the numbers are smaller for these 17 and no different than before for the rest. So the mean first year losses must be both smaller and less dispersed than total losses. The mean first year loss is 11%, median 10% (as before), and standard deviation 7%.

The figures in columns (6) and (7) include the effect of one of the "exogenous" offsets mentioned above, mandated revaluation of real property assessments. While all communities must ultimately move to a current full market value assessment basis, only 18 availed themselves of this option during our observation period (Column (3)) - "availed" because revaluation had the effect of raising total permissible real property tax revenues in 17 of these 18. Moreover, these increased permissible revenues are very substantial, offsetting approximately 55% of the mandated cuts in real property revenues for those communities with cuts required. Interestingly, almost all the revaluating localities had mandated cuts considerably below the one year ceiling.

The other exogenous offset to mandated cuts is the state aid devised partially as an accommodation to mitigate hardship resulting from Prop. 21/2. We shall use regression analysis later to try to explain the distribution of this aid. At this point it suffices to examine the post-aid distribution of revenue cuts. Columns (13) and (14) show post-aid and (post-revaluation) revenue cuts, on both a total and first year basis, respectively. The mean total cut called for is 14.5% (compared with 21% before aid), the median is 4% (compared with 10%), the standard deviation is 21% (compared with 21%).

Thus, state aid has decreased average required cuts, but has not decreased the dispersion of these cuts (hence unchanged standard deviation and median decreased more than mean). This alone suggests that big losers were not proportionately aided but that aid went disproportionately to smaller losers. This will be explicitly examined below.

Communities differ substantially in the size of the before-and-after exogenous offset revenue impacts. We grouped the sample in terms of three criteria - size, wealth and recent decade growth - to examine the distribution of revenue impacts further. Tables III A,B,C show these distributions.

Consider the grouping by population size in Table III-A. The total before aid revenue cut rises monotonically - and dramatically - from 8% for the smallest localities to 15%, 16%, 38% and 58% for the largest. First year loss is, as expected, less radical but essentially rises monotonically also, from 6% to 19%. State aid as a percentage of total revenue cut, quite the contrary, is highest for the smallest localities (139%) and monotonically descends precipitously as size increases (94%, 77%, 12% and 9%). As a result, postaid total revenue cut is even more radically biased in favor of small communities and against larger ones: 1% (!) for the smallest, rising to 7%, 10%, 34% and 53% (!) for the largest.

These means hide substantial variation in smaller communities (standard deviations between 1 and 1 1/2 times the size of the mean for the 2 smallest size groups, and the declining as a % of the mean for groups 3 and 4, and falling to the lowest absolute value of all for the largest communities (where the mean is by far the highest). This is also suggested by medians

Table III-A

Proposition 2 1/2 Revenue Losses for Communities Grouped By Size (1980 Population)

Variable	GROUP 1			GROUP 2			GROUP 3			GROUP 4			GROUP 5		
	--- 11 Communities --- < 9500			--- 2 Communities --- 9500 - 15999			--- 11 Communities --- 16000 - 31999			--- 6 Communities --- 32000 - 79999			--- 4 Communities --- ≥ 80000		
	mean	stddev	median	mean	stddev	median	mean	stddev	median	mean	stddev	median	mean	stddev	median
TL	-0.057	0.109	0.000	-0.134	0.171	-0.059	-0.156	0.205	-0.101	-0.342	0.104	-0.400	-0.543	0.025	-0.560
YL	-0.042	0.079	0.000	-0.060	0.083	-0.039	-0.091	0.050	-0.101	-0.150	0.000	-0.150	-0.150	0.000	-0.150
RYL	-0.016	0.102	0.025	-0.095	0.165	-0.027	-0.109	0.224	-0.036	-0.337	0.115	-0.400	-0.543	0.035	-0.560
MV	-0.001	0.057	0.025	-0.047	0.081	-0.027	-0.043	0.071	-0.036	-0.145	0.012	-0.150	-0.150	0.000	-0.150
RTR	0.061	0.014	0.057	0.060	0.011	0.058	0.050	0.012	0.032	0.039	0.011	0.038	0.035	0.014	0.036
RVR	-0.077	0.097	-0.040	-0.159	0.166	-0.100	-0.159	0.216	-0.073	-0.376	0.109	-0.435	-0.570	0.027	-0.593
AT	-0.082	0.053	0.040	-0.107	0.085	-0.100	-0.093	0.064	-0.073	-0.104	0.000	-0.105	-0.105	0.014	-0.106
AY	-1.393	1.045	-1.399	-0.935	0.606	-0.954	-0.774	0.653	-0.580	-0.116	0.077	-0.110	-0.080	0.006	-0.065
PRYL	-1.406	1.027	-1.399	-1.003	0.541	-0.954	-0.847	0.634	-0.687	-0.210	0.125	-0.237	-0.258	0.228	-0.210
PRYL	0.052	0.112	0.067	-0.009	0.149	0.047	-0.050	0.194	0.020	-0.298	0.112	-0.342	-0.493	0.079	-0.522
PRTR	-0.009	0.075	0.087	0.038	0.074	0.047	0.015	0.068	0.025	-0.105	0.027	-0.102	-0.101	0.046	-0.112
PRVR	0.005	0.104	0.018	-0.070	0.147	-0.002	-0.100	0.105	-0.022	-0.336	0.105	-0.379	-0.529	0.071	-0.645
AL	0.008	0.047	0.069	-0.022	0.073	-0.002	-0.034	0.063	-0.012	-0.144	0.021	-0.141	-0.136	0.040	-0.133
				0.005	0.064	0.063	0.059	0.047	0.043	0.040	0.024	0.044	0.049	0.046	0.030

TL = total property tax levy cut without revaluation/1981 levy
 YL = first year property tax levy cut without revaluation/1981 levy
 RYL = total levy cut after revaluation/1981 levy
 MV = motor vehicle excise revenue loss/1981 levy
 RTR = total revenue loss (inc. MV) after revaluation/1981 levy
 RVR = first year revenue loss (inc. MV) after revaluation/1981 levy
 AT = state aid (first year)/RTR
 AY = state aid (first year)/RVR
 PRYL = post-aid total levy change/1981 levy
 PRYL = post-aid first year levy change/1981 levy
 PRTR = post-aid total revenue change/1981 levy
 PRVR = post-aid first year revenue change/1981 levy
 AL = state aid (first year)/1981 levy

being small percentages of their respective means for the smallest three groups but actually greater than the mean for the two largest groups. Thus, revenue cut burdens grow larger with city size and became increasingly more uniform.

Table III-B shows the distribution of impacts based on wealth (measured as per capita equalized property valuation in 1980). Once again there is a clear pattern. Revenue loss before aid varies strongly and inversely to wealth: percentage loss is greatest for the poorest localities and falls monotonically and considerably as wealth rises (37%, 25%, 13%, 9%). This pattern is displayed even more dramatically by the respective medians: 41%, 15%, 4%, 4%. Once again the interpretation of this is implemented by a distinct pattern in the dispersion of burdens. For the two poorest groups the standard deviation is quite high in absolute terms, and is nearly as great as the mean burden. The dispersion declines appreciably for the two richest groups in absolute terms, but falls slower than the mean burden, so that relative dispersion is slightly higher than for the poorest group. In sum, therefore, the initial revenue losses are highly regressive, falling much more heavily on poorer than on richer jurisdictions.

State aid is intended partially as an offset to ameliorate Prop. 21/2 revenue burdens. Such aid did not, however, decrease the regressivity of such burdens. State aid as a percentage of revenue loss is lower for the two poorest groups than for the richest two (73% and 65%, as against 121% and 81%). The dispersion of aid is quite high for all groups, and especially in relative terms. Median impacts therefore show an even more striking version of this pattern: 32% and 27% for the two poorest groups, as against 115% and

Proposition 2 1/2 Revenue Losses for Communities Grouped By Wealth (1980 Per Capita Equalized Valuation)

Variable	GROUP 1			GROUP 2			GROUP 3			GROUP 4		
	10 Communities < \$13500			12 Communities \$13500 - \$16999			17 Communities \$17000 - \$19999			12 Communities ≥ \$20000		
	mean	stdev	median	mean	stdev	median	mean	stdev	median	mean	stdev	median
TL	-0.335	0.236	-0.364	-0.235	0.208	-0.150	-0.109	0.143	-0.100	-0.070	0.117	-0.047
YL	-0.118	0.063	-0.150	-0.111	0.071	-0.150	-0.074	0.071	-0.100	-0.046	0.071	-0.047
RTL	-0.310	0.253	-0.365	-0.190	0.233	-0.099	-0.072	0.155	0.009	-0.036	0.122	0.025
RYL	-0.109	0.068	-0.150	-0.075	0.081	-0.099	-0.036	0.076	0.009	-0.012	0.067	0.025
MV	0.059	0.020	0.056	0.049	0.016	0.051	0.053	0.010	0.057	0.049	0.012	0.050
RIR	-0.368	0.235	-0.412	-0.247	0.218	-0.150	-0.125	0.148	-0.037	-0.066	0.114	-0.038
RVR	-0.167	0.055	-0.192	-0.124	0.067	-0.147	-0.090	0.071	-0.037	-0.061	0.059	-0.038
AT	-0.732	0.884	-0.323	-0.650	0.832	-0.265	-1.212	1.058	-1.147	-0.808	0.625	-0.011
AV	-0.928	0.793	-0.658	-0.714	0.791	-0.348	-1.219	1.049	-1.147	-0.815	0.617	-0.011
PHIL	-0.109	0.281	-0.238	-0.143	0.241	-0.044	-0.017	0.175	0.068	-0.007	0.129	0.048
PRYL	0.012	0.112	-0.016	-0.020	0.088	-0.044	0.018	0.093	0.068	0.017	0.075	0.048
PRIR	-0.247	0.263	-0.294	-0.193	0.226	-0.095	-0.071	0.168	0.005	-0.057	0.121	-0.007
PRVR	-0.046	0.101	-0.069	-0.069	0.074	-0.095	-0.035	0.090	0.005	-0.033	0.066	-0.007
AL	0.121	0.060	0.105	0.054	0.024	0.056	0.053	0.026	0.048	0.029	0.016	0.026

TL = total property tax levy cut without revaluation/1981 levy

YL = first year property tax levy cut without revaluation/1981 levy

RTL = total levy cut after revaluation/1981 levy

RYL = first year levy cut after revaluation/1981 levy

MV = motor vehicle excise revenue loss/1981 levy

RIR = total revenue loss (inc. MV) after revaluation/1981 levy

RVR = first year revenue loss (inc. MV) after revaluation/1981 levy

AT = state aid (first year)/RTR

AV = state aid (first year)/RVR

PHIL = post-aid total levy change/1981 levy

PRYL = post-aid first year levy change/1981 levy

PRIR = post-aid total revenue change/1981 levy

PRVR = post-aid first year revenue change/1981 levy

AL = state aid (first year)/1981 levy

81%! The result of this an exacerbated relative regressivity of impact on post-aid burdens: 25%, 19%, 7% and 6% for poorest to richest group.

Finally we turn to a tabulation of revenue burdens in terms of jurisdiction growth, in Table III-C. Growth is a potentially important characteristic of jurisdictions with respect to fiscal strength and public service needs. On the one hand high growth may signify a strong, attractive resource base for economic activity; on the other it may reflect growing - possibly as yet unmet - needs for public infrastructure. Absolute decline may well possess special adjustment problems for local government because of adverse demographic, business selection and fixed cost constraints.

A distinct pattern emerges on this dimension as well. Burdens are monotonically inverse with growth; but the more striking pattern is that the group of localities experiencing absolute decline in population has a much higher revenue loss (38%) than all other groups (hovering between 13% and 9%). The difference in burdens between decline and no-growth is much greater than that between no-growth and growth, or slight growth and heavy growth. If population decline does not significantly free public resources because of fixed capacity constraints, as has often been aversed, then this pattern of revenue losses would represent an additional difficult problem for declining jurisdictions.

. Once again the dispersion of impacts is greater for the high burden groups than for low burden groups. Taking some account of this by looking at medians, the pattern is somewhat different. The decline group now shows an even greater burden (44%) and all of the growth groups a much lower burden

Table III-C

Proposition 2 1/2 Revenue Losses for Communities Grouped By Growth (Percentage Change in Population, 1970 to 1980)

Variable	GROUP 1			GROUP 2			GROUP 3			GROUP 4			GROUP 5		
	---15 Communities--- ≤ - 2.0%			-7---Communities--- - 2.0% to 2.0%			-15 Communities--- > 2.0 but < 5.0%			5 Communities--- 5.0% to 14.9%			9 Communities--- ≥ 15%		
	mean	stdev	median	mean	stdev	median	mean	stdev	median	mean	stdev	median	mean	stdev	median
TL	-0.352	0.221	-0.400	-0.130	0.099	-0.124	-0.071	0.176	0.029	-0.003	0.141	-0.016	-0.091	0.122	-0.107
YL	-0.121	0.050	-0.150	-0.107	0.062	-0.124	-0.025	0.077	0.025	-0.053	0.090	-0.016	-0.069	0.091	-0.107
RTL	-0.337	0.243	-0.400	-0.081	0.111	-0.046	-0.062	0.195	0.025	-0.040	0.145	0.025	-0.031	0.070	0.009
RVL	-0.107	0.075	-0.150	-0.056	0.061	-0.046	-0.010	0.076	0.025	-0.010	0.070	0.025	-0.031	0.070	0.009
MV	-0.042	0.014	-0.041	0.050	0.000	0.056	0.066	0.017	0.059	-0.010	0.012	0.065	-0.031	0.070	0.009
RVR	-0.379	0.234	-0.435	-0.131	0.111	-0.102	-0.120	0.191	-0.036	-0.099	0.135	-0.041	-0.060	0.100	0.062
AT	-0.149	0.068	-0.179	-0.106	0.082	-0.102	-0.076	0.076	-0.038	-0.069	0.068	-0.041	-0.090	0.072	-0.041
AY	-0.407	0.634	-0.169	-0.653	0.695	-0.405	-1.008	0.961	-0.667	-0.720	0.635	-1.039	-1.419	0.900	-1.011
PNL	-0.646	0.611	-0.399	-0.679	0.600	-0.485	-1.061	0.912	-0.667	-0.731	0.622	-1.039	-1.419	0.900	-1.011
PNVL	-0.268	0.249	-0.349	-0.030	0.105	-0.009	0.009	0.191	0.049	-0.006	0.152	0.056	0.046	0.074	0.064
PNR	-0.038	0.098	-0.074	-0.007	0.060	-0.009	0.061	0.092	0.049	-0.022	0.066	0.056	0.046	0.074	0.064
PNR	-0.310	0.236	-0.384	-0.080	0.104	-0.053	-0.056	0.162	-0.012	-0.067	0.141	0.002	-0.014	0.076	0.001
PNR	-0.080	0.080	-0.114	-0.057	0.060	-0.053	-0.004	0.077	-0.012	-0.037	0.076	0.002	-0.014	0.076	0.001
AL	-0.069	0.065	0.040	0.031	0.020	0.061	0.071	0.069	0.046	0.037	0.023	0.031	0.070	0.021	0.066

TL = total property tax levy cut without revaluation/1981 levy
 YL = first year property tax levy cut without revaluation/1981 levy
 RTL = total levy cut after revaluation/1981 levy
 RVL = first year levy cut after revaluation/1981 levy
 MV = motor vehicle excise revenue loss/1981 levy
 RVR = total revenue loss (inc. MV) after revaluation/1981 levy
 AT = first year revenue loss (inc. MV) after revaluation/1981 levy
 AY = state aid (first year)/RVR
 PNL = post-aid total levy change/1981 levy
 PNVL = post-aid first year levy change/1981 levy
 PNR = post-aid total revenue change/1981 levy
 PNRL = post-aid first year revenue change/1981 levy
 AL = state aid (first year)/1981 levy

(4% for all). But now the zero growth group shows a much higher burden than all the growth groups (10%).

State aid once again does not moderate the extreme pattern. Much larger percentages of revenue loss occur for low loss groups than for high: 49% and 66% for decline and zero growth groups, as against 101%, 72% and 142%(!!) for the growth groups. Again, adjusting somewhat for the extreme values characteristic of substantial variance in aid, the pattern of median impacts is even more decisive: 17%, 49% for decline and no-growth groups, as against 67%, 104% and 101% for the increasingly growing groups. The result is to exacerbate relative post-aid burden mean (median) differentials: 31% (38%), 8% (5%), 6%(1%), 7%(0%), 1%(0%). Thus, growing communities essentially avoid any revenue loss, no growth communities bear a modest loss, but declining communities sustain losses, massive in absolute terms and enormous in relative terms.

To summarize these grouped impacts, Prop. 2 1/2 imposed widely differing revenue losses, but which bore enormously harder on localities generally presumed to be less able to cope with such losses: larger, poorer, declining. Smaller, wealthier, and high growth communities generally bore insignificant losses. It should not be thought that the three axes along which we have traced impacts are in reality one, or even two - so that large jurisdictions are poor and declining or no growth. In fact, the three dimensions are only slightly related for this sample of communities - the correlation coefficients are: -0.334 for size and wealth, -0.236 for size and growth, 0.150 for wealth and growth.

Since the three dimensions are only slightly related to one another, it is appropriate to examine the separate influence they have on revenue loss burdens. We regressed revenue losses (as a percentage of the 1981 levy) before aid (both for total and first year magnitudes) linearly on 1980 population (S), per capita 1980 equalized property valuation (W), and population growth, 1970-80 (G). The results are:

$$(1) \quad \text{TRC} = 26.451 + 0.313 \text{ S} - 0.776 \text{ W} - 0.049 \text{ G}$$

$$(3.791) \quad (4.310) \quad (2.600) \quad (0.621)$$

$$R^2 = 0.521 \quad \bar{R}^2 = 0.482 \quad F = 13.417$$

$$(2) \quad \text{YRC} = 14.708 + 0.081 \text{ S} - 0.346 \text{ W} + 0.040 \text{ G}$$

$$(5.547) \quad (2.926) \quad (3.055) \quad (1.298)$$

$$R^2 = .412 \quad \bar{R}^2 = 0.365 \quad F = 8.651$$

where TRC is total per-aid revenue loss as a percentage of 1981 levy

YRC is first year pre-aid revenue loss as a percentge of 1981 levy

Total revenue cuts are more systematically related to the three classifying variables than first year revenue cuts, but the differences are not important. One half of the variance of total cuts is "explained" by the 3 way classification, slightly more than one third of first year cuts. The purely mechanical truncation of impacts due to the one year ceilings (15%) lessen the relationship. In both regressions size and wealth are significant influences, size increasing burdens and wealth decreasing them, the more significant variable. The apparent effects of growth are actually due to the relationship with size and wealth.

To what extent is state aid related to the size of the revenue losses and to our classifying variables? Equations 3-8 show the appropriate regressions.

$$\begin{aligned} (3) \quad A &= 445,861.137 + 0.185 \text{ YR} \\ &\quad (2.174) \quad (4.411) \\ R^2 &= 0.313 \quad \bar{R}^2 = 0.316 \quad F = 19.461 \end{aligned}$$

where A is total dollar value of state aid

YR is dollar value of first year revenue loss

$$\begin{aligned} (4) \quad A &= 853,150.672 + 23.204 \text{ S} - 38.468 \text{ W} + 13,992.538 \text{ G} \\ &\quad (2.032) \quad (5.308) \quad (2.141) \quad (2.864) \\ R^2 &= 0.552 \quad \bar{R}^2 = 0.516 \quad F = 15.222 \end{aligned}$$

$$\begin{aligned} (5) \quad A &= 569,659.094 + 0.307 \text{ YR} + 49,336.259 \text{ S} \\ &\quad (1.600) \quad (4.170) \quad (6.808) \\ &\quad - 34,017.574 \text{ W} + 13,506.757 \text{ F} \\ &\quad (2.269) \quad (3.320) \\ R^2 &= 0.698 \quad \bar{R}^2 = 0.665 \quad F = 20.820 \end{aligned}$$

These regressions show that state aid does have an absolute responsiveness to size of revenue loss. In a single correlation (3), about one third of the variance of aid represents a response to the size of the first year revenue loss. Aid is also dependably related to our three

classifying variables: (4) shows all three variables significant, with size most significant. Contrary to the impression gained from our grouped data patterns, aid is positively associated with size and negatively with wealth. Consistent with the grouped data impressions it is positively associated with growth. This means that the aid formula does have a gross ameliorative (equalizing) intent. But further analysis shows that this intent is weak.

Equations (6) - (8) analyze normalized measures of aid.

$$\begin{aligned} (6) \quad \text{ATR} &= 131.748 - 1.050 \text{ S} - 1.091 \text{ W} + 0.068 \text{ G} \\ &\quad (3.745) \quad (2.865) \quad (0.725) \quad (0.167) \\ R^2 &= 0.193 \quad \bar{R}^2 = 0.128 \quad F = 2.955 \end{aligned}$$

$$\begin{aligned} (7) \quad \text{AYR} &= 149.741 - 1.007 \text{ S} - 1.713 \text{ W} - 0.020 \text{ G} \\ &\quad (4.469) \quad (2.885) \quad (1.195) \quad (0.055) \\ R^2 &= 0.190 \quad \bar{R}^2 = 0.124 \quad F = 2.889 \end{aligned}$$

$$\begin{aligned} (8) \quad \text{AP} &= 14.372 + 0.046 \text{ S} - 0.368 \text{ W} + 0.012 \text{ G} \\ &\quad (7.923) \quad (2.410) \quad (4.736) \quad (0.566) \\ R^2 &= 0.389 \quad \bar{R}^2 = 0.340 \quad F = 7.866 \end{aligned}$$

where ATR is aid as a percentage of total revenue cut

AYR is aid as a percentage of first year revenue cut

AP is aid as a percentage of 1981 property tax revenues.

Aid as a percentage of total revenue cut is related only - and quite weakly overall - to size, where larger size leads to a decrease in the

percentage of both total and first year loss made up by aid. So in relative terms aid is biased against size, contrary to the positive gross responsiveness of aid to size (eq. 4). In general, relative offset through aid is not dependably related to our classifying variables, as the low $\bar{R}^2$ and F values show.

The story is different for aid as a percentage of base period property tax revenues. Here our classifying variables explain a larger part of the variance (1/3) and both size and wealth have explanatory power. Again size has a negative influence, but now so too does wealth. Thus, as a percentage of initial revenues aid is biased against both size and wealth. It is thus less explicitly regressive than heretofore suggested.

In sum, therefore, aid is modestly responsive to revenue losses and modestly progressive with respect to wealth. The consequences of this offset is shown in equations (11) and (12), where post-aid revenue losses (both total and first year) are regressed in our classifying variables.

$$(9) \quad \text{TLA} = 12.078 + 0.358 S - 0.409 W - 0.061 G$$

$$(1.717) (4.888) (1.357) (0.746)$$

$$\bar{R}^2 = 0.507 \quad \bar{R}^2 = 0.467 \quad F = 12,686$$

$$(10) \quad \text{YLA} = 0.336 + 0.126S + 0.021 W + 0.28 G$$

$$(0.105) (3.786) (0.155) (0.754)$$

$$\bar{R}^2 = 0.293 \quad \bar{R}^2 = 0.238 \quad F = 5.172$$

where TLA is postaid total revenue cut as a percentage of 1981 property tax revenues.

where YLA is postaid first year revenue cut as a percentage of 1981 property tax revenues.

Total percentage postaid revenue loss is more closely related to our classifying variables than first year percentage postaid loss. Only size is a significant variable here, positively related to the percentage loss.

Let us compare the pre-aid with post-aid results (eqs. (1)-(2) vs. (9)-(10)). For both, total cuts are better explained than first year cuts; the overall fit for the former is about the same in pre-aid and post-aid regressions. For first year cuts the overall fit is better for pre-aid than post-aid. All variables have the same sign in the four regressions, but while the pre-aid regressions showed both size and wealth significant the significance of wealth is wiped out in the post-aid regressions. This is due to the fact that the mild progressivity of aid offsets the initial strong bias against poorer jurisdictions in terms of revenue loss. Size retains about the same magnitude (as well as sign) of impact in pre-aid and post-aid situations. In terms of size of remaining revenue loss, our earlier descriptive analysis from Tables I and II showed that aid decreased absolute losses and loss differences but widened relative loss differences.

III Expenditure Appropriations Adjustments

Faced with post-aid revenue cuts, localities can cope in a number of ways: (1) seek additional revenues from other revenue sources, (2) cut expenditures, (3) increase borrowing. We shall discuss each of these, starting with expenditure adjustments.

Table IV shows changes in appropriations between 1981 and 82 expressed as a percentage of 1981 appropriations, for our 41 town and city sample. Changes in seven component expenditure categories are listed, as well as

Table IV: Appropriation Changes By Category, 1981-82

		Percentage of Total Appropriations Cut							
		MEAN	STANDARD DEVIATION	MEDIAN	MINIMUM	MAXIMUM			
<u>SCHOOLS</u>	<u>AC</u>	-6.5	5.8	-6.2	-20.3	5.0			
	<u>TR</u>	10.8	11.5	8.4	-10.1	57.3	161.4	334.1	73.3
<u>POLICE</u>	<u>AC</u>	-0.5	18.1	1.5	-94.7	40.8	-28.0	166.3	0.4
	<u>TR</u>	11.5	7.8	9.2	1.7	45.4			
<u>FIRE</u>	<u>AC</u>	-4.2	15.3	0.7	-68.0	10.0	-3.1	54.2	0.2
	<u>TR</u>	15.9	21.2	10.0	-0.3	106.1			
<u>STREETS</u>	<u>AC</u>	-10.6	20.7	-8.0	-85.5	20.0	14.8	57.2	6.8
	<u>TR</u>	14.2	23.9	8.8	-4.6	149.6			
<u>PARKS</u>	<u>AC</u>	-22.9	25.1	-12.0	-99.8	3.4	-0.5	27.1	1.7
	<u>TR</u>	21.2	25.9	15.5	-32.9	91.8			
<u>SANITATION</u>	<u>AC</u>	-4.2	37.3	0.0	-100.0	69.0	3.5	17.8	0.6
	<u>TR</u>	41.6	142.9	5.9	-17.9	740.9			
<u>LIBRARIES</u>	<u>AC</u>	-10.1	13.7	-6.4	-76.5	4.2	0.9	11.3	1.2
	<u>TR</u>	11.9	17.4	8.8	-20.7	83.6			
<u>TOTAL</u>	<u>AC</u>	-5.6	7.7	-4.1	-35.2 ¹	6.5			
	<u>TR</u>	10.8	10.4	8.0	-3.5	50.9			

AC = Percentage appropriations change, 1981-82
TR = 5 year trend (mean annual percentage change, 1976-80)

¹Hospital and junior college budgets were removed from Quincy's municipal budget.

total appropriations. While these seven do not completely exhaust local spending, they are close to being comprehensive. For each category, including "Total", AC designates the percentage change in that category between 1981 and '82, and TR designates the average annual percentage change in that category for the period 1976-'80 (it's short-run "trend" value). To facilitate understanding the distribution of these changes we have included columns for mean, standard deviation, median, maximum and minimum. Note that the appropriations and expenditures figures presented here are totals, including capital outlays. Thus, they might be expected to demonstrate greater fluctuation than would be the case of only current outlays were being considered.

Distribution is important here. We emphasized above how much variety there was in the distribution of revenue losses. Those losses were in large measure imposed on the localities. Appropriations changes, on the other hand, represent voluntary decisions by the local government, where there are a number of options for adjusting to revenue losses. We are especially interested in how communities will have decided to adjust to this large, one-time discontinuity. Understanding their voluntary responses may throw unusual light on public perceptions of relative values or preferences or strategies about present vs. future, or may illuminate a political dance between politicians and the public, as actors from each group attempt to use the sudden stringency of the moment to score points against the other actors from both groups.

Total appropriations fell 5.6%, a clear turnaround from the annual 10.8% rise in the period 1976-80. Appropriations certainly do seem in the

aggregate to have responded to the Prop. 2 1/2 generated revenue decreases. The dispersion of response, however, is quite high, 7.7%, exceeding the mean decline by some 40%. The dispersion is relatively greater than the dispersion of earlier growth (although smaller in absolute terms). The median decline is less than the mean (4.1%), but this supports a range from a 35% cut (misleadingly high, since this case represents a withdrawal of a hospital and junior college from the municipal budget) to a 6.5% increase! In all these measures there is a clear turning point discontinuity between the preceeding trend and the 1981-82 appropriation change.

To test the responsiveness of appropriations to mandated revenue cuts on an individual locality basis we regressed the percentage change in total appropriations on both the total and first year post-aid revenue losses as a percentage of 1981 property tax levies (the property tax losses being more important and more dispersed than the motor vehicle tax revenues). Equations (11) and (12) show the results.

$$\begin{array}{rcll}
 (11) & XC = -3.986 & - & 0.111 \text{ TLA} \\
 & (2.757) & & (1.952) \\
 & R^2 = 0.093 & & \bar{R}^2 = 0.069 & F = 3.809
 \end{array}$$

$$\begin{array}{rcll}
 (12) & XC = -4.076 & - & 0.323 \text{ YLA} \\
 & (2.019) & & (2.204) \\
 & R^2 = 0.116 & & \bar{R}^2 = 0.092
 \end{array}$$

where XC is percentage appropriations change TLA, YLA are total and first year post-aid revenue cuts as percentage of 1981 property tax levies.

These are surprising and potentially important results. While the revenue loss percentage is a significant explanatory variable for

appropriation change, its overall explanatory power is trivial. This is true for both total and first year revenue loss. An attendant implication stems from the slightly stronger influence of first year revenue loss over total revenue loss. The reverse of this would imply that jurisdictions paid attention to future needs for additional expenditure restraint by cutting today beyond today's immediate constraints. Instead, the greater explanatory force of first year revenue cuts suggests that jurisdictions delay adjusting to the future, adjust at best to immediate felt needs. Indeed, the weak appropriations response suggests lagged responses even to immediate needs.

We tested to see whether the relationship might be masked by the systematic variation of revenue loss with our locality attributes - size, wealth, growth. Regressing appropriations change on these variables, we obtained an even smaller total explanatory power, and no attribute was even close to being significant.

Finally, regressing appropriations change on all these variables, as expected, did no better. Equations (13) and (14) show this.

$$\begin{aligned} (13) \quad & XC = -5.451 + 15.422 \text{ TLA} + 0.50 \text{ S} + 0.014 \text{ W} \\ & \quad (1.479) \quad (1.876) \quad (1.086) \quad (0.089) \\ & \quad + 0.040 \text{ G} \\ & \quad (0.998) \end{aligned}$$

$$R^2 = 0.144 \quad \bar{R}^2 = 0.043 \quad F = 1.426$$

$$\begin{aligned} (14) \quad & XC = -7.226 + 42.285 \text{ YLA} + 0.048 \text{ S} + 0.087 \text{ W} \\ & \quad (2.109) \quad (2.438) \quad (1.181) \quad (0.601) \\ & \quad + 0.061 \text{ G} \\ & \quad (1.556) \end{aligned}$$

$$R^2 = 0.196 \quad \bar{R}^2 = 0.101 \quad F = 2.068$$

As before, revenue loss is the only significant explanatory variable, but its overall power is puny. As in the previous regressions, first year revenue cuts has a stronger explanatory power than total, and here that difference is marked.

We turn now to examination of sectoral pattern of appropriation cuts. Table IV shows the information. All categories show a mean decline in appropriations, and these represent a dramatic reversal of the previous 5 year strong growth trend. Four expenditures categories were cut percentagewise more than total appropriations (5.6%): schools 6.5%, streets 10.6%, parks 22.9%, libraries 10.1%. Three categories were cut less: police 0.5%, fire 4.2% and sanitation 4.2%. But these figures tell only one part of the story.

The dispersion of total appropriation's cut is large relatively, but not very much so absolutely. Only the schools category is similar in magnitude. But the other six categories have dispersion extremely high in absolute terms and, for police, fire and sanitation, enormous in relative terms. Indeed, high dispersion seems to be a consistent aspect of expenditure change over time. The stereotypical picture of local expenditures rising smoothly and uniformly over time - a supposed sign of their being out of control - is belied by the high dispersion among sectoral trend growth rates 1976-80, and by the exceptionally high but differing standard deviations within each sector during that period. Localities clearly differed greatly among one another, and their sectoral growth patterns differed.

The upshot of this diversity of experience is shown by the median figures. While mean policy appropriations fell by .5%, median appropriations actually rose by 1.5%! Possibly even more striking, a 4.2% decline in mean fire appropriations was accompanied by a median increase of .7%! The 4.2% mean decrease in sanitation appropriations accompanied an essentially zero median change. Clearly, some jurisdictions made very large negative adjustments in these categories, considerably deviating from the adjustments in other jurisdictions not only in magnitude but in direction as well. The medians in the other categories show cuts, but much less than the means.

This emphasis on diversity of response - in magnitude and even direction - is borne out by the range of responses, from minimum to maximum. In every category huge negative responses exist side by side with non-trivial, even very large positive responses. Yet this is not unique to the post-Prop 2 1/2 period. As indicated above, the dispersion of the 1976-80 trend is every bit as great as the dispersions of 1981-82 appropriation changes; moreover, while the median trends are highly bunched across categories, the ranges for the different categories are enormous, higher than 1981-82, and similarly embrace negative and positive growth.

The foregoing implies that adjustment to Prop. 2 1/2 has not consisted in a uniform, rule-of-thumb decrease across expenditures categories. Categories clearly differ in vulnerability to cuts, and different communities adopt different strategies of adjustment mix across categories.

Three categories seem sheltered - police, fire and sanitation - and of these police seems most favored, receiving non-trivial increases against the retrenchment tide. At the other extreme, parks, streets, and possibly

libraries appear most expendable - but they display high dispersion and their ranges show widely divergent treatment by different jurisdictions. The schools category seems to have experienced only moderately greater cuts than total appropriations, and to have one of the smallest ranges of diversity. This hides the extraordinary salience of this category however.

If we examine not the percentage change of each category but for how much of the total appropriations cut its change was responsible, an entirely different picture emerges. Cuts in the especially vulnerable categories - parks, streets and libraries - together accounted for only 15% of total appropriations cuts. One category - schools - alone accounted for 161% of total mean appropriations cuts! Schools comprises the largest single expenditure category (about 1/2), so its greater than average cut represented the overwhelming source of appropriations adjustment. Indeed, the savings made on school cuts permitted communities to raise their appropriations in the police and fire categories on the average, and permitted many individual communities to raise appropriations in any of the other categories. The dependence on school cuts was not uniform, though. Quite the contrary: the standard deviation of share of overall cuts is huge in absolute terms (although the smallest among categories in relative terms).

What accounts for these diverse expenditure adjustments? Are they specific to the inherent character of the sectors, or do they stem from different degrees of balance and adjustment to past circumstances? In the former case they reveal something about long-standing social preferences (or needs or priorities), in the latter they reveal something about the process

of adjustment in the public sector to changing situations: lags, uncertainties, capacity inflexibilities and lumpiness.

We attempted modest tests of these issues. They are reported in equations (15)-(18). The first two regressions attempt to explain % change in each category, the second two to explain the share of total appropriation change made by each category. The regressions pool across the seven appropriation categories for the 41 localities.

The first regression considers whether the cut in a given category is influenced by the quantitative importance of the category in overall appropriations, or by some temporal adjustment imbalances (lags, capacity constraints, etc.), as reflected by the strength of recent growth in the sector. Accordingly, % sector cut for 1981-82 is regressed on the size of that sector as a percentage of total appropriations on 1981, and in the mean annual percentage change in expenditures for that category in 1976-80.

$$(15) \quad ACC = -9.839 - 0.001 T + 0.097 M$$

$$(2.453) \quad (0.148) \quad (1.149)$$

$$\bar{R}^2 = 0.044$$

where ACC is category appropriation change, 1981-82

T is trend (mean annual % change in category expenditures, 1976-80)

M is importance (category appropriation 1981/total approp. 1981).

It is obvious that % cuts in categories are not influenced by either growth or the importance of the sector.

The second regression examines whether sector cuts reflect instead social preferences, where such preferences are influenced by community

characteristics. We regress ACC on two of our familiar classifying attributes: size and wealth.

$$\begin{aligned}
 (16) \quad \text{ACC} &= -6.925 - 0.011 S - 0.044 W \\
 &\quad (1.871) \quad (0.300) \quad (0.274) \\
 \bar{R}^2 &= 0.007
 \end{aligned}$$

It is just as obvious that preference factors influenced by community size and wealth do not affect sector cuts.

While adjustment process and community size/wealth characteristics do not influence the % change in sector appropriations, it is possible that they may affect the share of each sector change in total appropriations change. Accordingly we regress sector appropriation change 1981-82 as a percentage of total 1981-82 appropriation change first on the first pair of factors and then on the second.

$$\begin{aligned}
 (17) \quad \text{CST} &= -16.803 + 0.031T + 3.459 M \\
 &\quad (1.257) \quad (0.437) \quad (2.689) \\
 \bar{R}^2 &= 0.178
 \end{aligned}$$

Where CST is sector share of total appropriations change, 1981-82.

The overall explanatory power is still very low in absolute terms, but much larger than in the ACC regressions. The reason for the greater power is the strong significance of the importance variable. To put the result into perspective, consider the following regression.

$$\begin{aligned}
 (18) \quad \text{CST} &= 34.673 - 0.296 S - 0.309W \\
 &\quad (1.335) \quad (1.110) \quad (0.277) \\
 \bar{R}^2 &= 0.003
 \end{aligned}$$

Community size and wealth do not influence category share of total

appropriations change.

The sole explanatory power of category importance suggests some ingredients of a possible rationalization of the political decision in question. First to consider is that we are examining decisions about cutting expenditures, not raising them. There may well be political asymmetries between the two, especially where an electorate mandates revenue cuts under the apparent belief that this can lead primarily to a decrease in waste rather than in public service levels. In such a situation politicians who believe that Prop. 2 1/2 cannot be soon reversed will attempt to make budget cuts for which little disturbance in services levels will be noticed by voters. This can be achieved in three ways.

- 1) Cut actual waste,

- 2) Cut programs which are large and various enough so that minimum efficiency levels will not be approached by the cuts, and/or where cuts can take the form of decreasing variety or specialized forms of the basic services instead of overly decreasing service levels.

- 3) Cut programs where changing circumstances - e.g. migration or demographic changes - have left excess capacity, an excess which would be politically difficult to remove in "normal" times but is excusable in periods of acknowledged stringency.

In effect, Prop. 2 1/2 would here serve as an excuse or trigger to make downward adjustments that were previously wanted but were politically too dangerous to undertake without special need.

These three considerations are in fact versions of a scale factor: they suggest that large programs may skim off large absolute amounts of expenditures and disguise the effect so that little basic service level decline is obvious to voters. The relative unmanageability of large, intricate programs either in the public or private sectors suggests that waste is greater in such programs. Absolute waste, absolute scale are abetted where recent community changes have led to outright excess capacity.

All three considerations point to education as an obvious source of potentially large absolute savings. In addition to scale considerations, significant decreases in the school age population have created significant redundancies in the school establishment. This, together with only a loose perceived relationship between sheer number of school inputs and size of the "outputs" of schooling, make possible considerable budget cuts in this category, when politically protected by a universally perceived period of sharp stringency. For these reasons such cuts can be made despite the avowed social importance of education.

Inherent social importance of the service, in the absence of these impact "disguise" factors, can protect an expenditure category against cuts, even in an emergency. Thus, median police budgets actually rose, given the increase in perceived need due to a sharply rising crime rate, and a supposedly more apparent input-output connection. The rise in median fire protection budgets also probably stems from the combination of higher fire risks (the growing arson-for-profit industry) and direct input-output connections. Sanitation, too, by its relative homogeneity of services, could not easily disguise the impact of budget cuts on service levels. Park and

library programs are small enough for cuts to have serious impacts on service levels, but this is disguisable because of the variety and subtle quality variations possible with the programs. In addition, social priorities may well establish these as "fringe" or elite benefits, quite appropriate to trimming in times of emergency. The category that does not easily fit into this scheme is streets. Cuts here are hard to disguise, and the intense, widespread American concern with auto transportation would suggest a protected status for this category. Yet it is subject to a percentage cut roughly twice as great as for total appropriations, and this results in 15% of total appropriations cuts attributable to this category, the second largest in the group. A possible explanation is the high importance of capital outlays relative to current expenses: cuts may largely take the form of postponing capital outlays while keeping current maintenance outlays high. This would "disguise" budget cuts effectively.

The education category is so central to both the overall size of the appropriations cut and its mix that it is useful to examine it more closely. First we wished to test the possibility that educational outlays were largely responsive to important internal changes rather than to the external pressure of Proposition 2 1/2. It is well known that schoolage population has been declining in the state, and many communities find themselves with excess capacity in terms of both buildings and personnel. Regressing percentage change in school appropriations on the 1976-1980 trend, we found no relationship. On the other hand, a moderate direct relationship was discovered between the percentage change in school appropriations and the

size of the Proposition 2 1/2 inspired revenue losses. Equations (19) and (20) show this:

$$(19) \quad \begin{aligned} \text{ECP} &= -4.373 + 0.147 \text{ TLA} \\ &\quad (4.640) \quad (3.962) \end{aligned}$$

$$R^2 = 0.287 \quad \bar{R}^2 = 0.269 \quad F = 15.695$$

$$(20) \quad \begin{aligned} \text{ECP} &= -4.455 + 0.437 \text{ YLA} \\ &\quad (5.267) \quad (4.765) \end{aligned}$$

$$R^2 = 0.368 \quad \bar{R}^2 = 0.352 \quad F = 22.707$$

Where ECP is the percentage of school appropriations cut.

The revenue loss clearly influences the size of the cut in educational budgets. As with total appropriations, the first year revenue loss has a stronger and larger effect than total revenue loss, strengthening the impression that localities may not plan ahead with a comprehensive adjustment strategy, but rather adjust at best on an ad hoc basis. Our earlier finding that the size of total appropriations cuts was only slightly--although positively--related to the size of the revenue losses also suggests absence of a relatively uniform systematic adjustment strategy involving expenditure levels.

Since we earlier found a relationship between revenue loss and community characteristics it is instructive to relate school cuts with these to see whether it is in fact this underlying link that is responsible for the school cuts. Equation (21) shows the results.

$$(21) \quad \begin{aligned} \text{ECP} &= -5.460 - 0.046 \text{ S} + 0.015 \text{ W} + 0.003 \text{ G} \\ &\quad (2.078) \quad (1.675) \quad (0.134) \quad (0.084) \\ R^2 &= 0.088 \quad \bar{R}^2 = 0.014 \quad F = 1.189 \end{aligned}$$

Community characteristics obviously are not solely responsible for school cuts, although size has a slight relationship. Equations (22) - (23) lump all variables together to show the net strength of the different influences.

$$(22) \quad \begin{aligned} \text{ECP} &= -4.074 + 0.185 \text{ TLA} + 0.0222 \text{ S} - 0.089 \text{ W} - 0.002 \text{ G} + 0.071 \\ &\quad (1.605) \quad (3.400) \quad (0.699) \quad (0.583) \quad (0.055) \quad (0.973) \\ R^2 &= 0.324 \quad \bar{R}^2 = 0.228 \end{aligned}$$

$$(23) \quad \begin{aligned} \text{ECP} &= -5.903 + 0.459 \text{ YLA} + 0.0135 + 0.025 \text{ W} + 0.021 \text{ G} + 0.050 \text{ T} \\ &\quad (2.494) \quad (4.032) \quad (0.482) \quad (0.268) \quad (0.764) \quad (0.760) \\ R^2 &= 0.386 \quad \bar{R}^2 = 0.298 \quad F = 4.403 \end{aligned}$$

Clearly it is not community characteristics or past trends that is responsible for the relationship between school cuts and revenue losses. The latter retains its direct influence in unchanged size and degree. Indeed, the apparent weak link between locality size and school cuts is seen here to be an artifact of the true link between revenue loss and school cuts. Here too first year revenue loss has the same stronger and larger effect on school cuts than total revenue loss.

As a check on this pattern of findings we performed the same analysis using changes in per capita school appropriations as the dependent variable instead of percentage change in such appropriations. The relationship between the revenue losses and school cuts is the same as before, although somewhat weaker, and it is not explained by community characteristics or trend. Again also, first year loss is a better predictor than total loss,

but the difference in strength and size is greater than for percentage school cuts.

Our analysis suggests that school appropriations were cut in direct response to the revenue effects of Proposition 2 1/2, not in response to internal educational considerations. But why did such a large part of the overall appropriation response to Proposition 2 1/2 rest on education, a percentage far in excess of its proportion of total expenditures? The immense American concern with public education scarcely intimates that education is considered an unimportant, or fringe, or elitist value, that has low social priority. Our surmise rather is that a combination of trend factors, scale considerations and--paradoxically--the very importance of education as a social value, is responsible for the heavy burden on this sector. The population of school age children has been declining in most communities for some years. Yet cutting basic capacity in accordance with this trend is made difficult by the lumpiness involved in closing schools and the industrial relations frictions with teachers' unions in dismissing teachers. Overall this is the public's deep commitment to education and alertness in defending it politically. So educational expenditures continued to grow through 1980. Quite possibly therefore an accumulating overcapacity was felt to exist by politicians, along with a political inability to deal with it resolutely. The very extremeness and publicness of the revenue constraint imposed by Proposition 2 1/2 could have acted as a trigger for the politicians to justify significant cuts they might have wanted to make earlier. Once basic capacity cuts became politically safe, the various sectoral scale factors discussed above could make it politically attractive

to go beyond this into cuts involving qualitative issues--variety, special programs, etc. The size and complexity of the educational system would disguise the loss of genuine educational quality and the cuts could be publicly viewed as simply scaling down redundancy. This is only speculative, but it would explain why education has been accorded the dubious role of overwhelmingly supporting a public response to Proposition 2 1/2.

IV. Alternative Revenue Sources

We have seen that many communities in Massachusetts were severely affected by property tax and motor vehicle excise tax revenue losses in fiscal year 1982. Although state aid has helped somewhat to offset these losses, it is clear that many of the more severely impacted towns were left with a significantly smaller volume of revenue even after aid. Yet our analysis of appropriations suggests that the percentage change in total appropriations is only slightly related to the post-state-aid percentage of revenue lost due to Proposition 2 1/2. The ability of local governments to tap alternative sources of revenue is obviously a crucial issue here. Unfortunately, we have little current data to help us understand what has happened with user charges and federal aid in the first year of Proposition 2 1/2.

A series of case studies conducted by the Impact: 2 1/2 project does provide some information on user charges in fiscal year 1982 for ten of the sample communities. (4) This sample was not chosen with any prior information about supplementary revenue sources, but on other grounds entirely. Table V summarizes the revenue losses and charges in appropriations for these ten communities, and also provides information on

Table V
User Fee Response in Selected Communities

<u>Community</u>	<u>Total Rev. Loss (%)¹</u>	<u>1st Year Loss (%)¹</u>	<u>1st Year Change in Approp. (%)</u>	<u>Increased Existing Fee</u>	<u>New Fees</u>
Springfield	-42.9	-8.9	+1.6	School Lunches Adult Education Fees Public Works Services	
Framingham	-13.6	-13.6	-9.5	School Lunches Sewer Service Town Licenses Liquor Licenses	Athletic Activities
Arlington	-39.5	-14.5	-5.5	Water Service Sewer Service	
Chelsea	-59.3	-0.3	-1.5	Oil Storage Fees Water Service Sewer Service	
Quincy	-53.3	-12.3	-35.2 ²	Public Works Services City Services Fees City Licenses Police Permits Parking Fines Hospital Services Water Service	Athletic Activities
Salem	-38.4	-13.4	-9.1	City Permits City Licenses Water Service	Subdivision Permits Wetland Permits Zoning Hearing Charges
Wayland	+0.3	+0.3	-6.1	Town Clerk Fees Parks & Recreation Services School Lunches	
Marshfield	-11.9	-11.9	-8.2		Beach Parking Fees
Cambridge	-55.9	-14.8	-1.6	Water Service Sewer Service Parking Fines Sports Fees Golf Course Fees	Emergency Rescue
Amesbury	-13.4	-13.4	+3.5	School Lunches	

¹ after first year aid

² Hospital and Junior college budgets were removed from the municipal budget.

Source: Cynthia Horan and Lawrence Susskind. "Understanding the Impact of Massachusetts' Proposition 2 1/2, Year 1," Cambridge, MA: Impact 2 1/2 Project, Department of Urban Studies and Planning, MIT, 1982.

increases in existing charges and implementation of new charges in fiscal year 1982. It seems likely that most of the fees and charges listed in this table will not be major sources of revenue. For example, increases in parks and recreation fees in Cambridge make up only 0.3 percent of the post-aid first year revenue loss. The exceptions would be sewer fees, water service fees, and public works fees, all of which have the potential to raise substantial revenue. These last 3 types of fees, indeed, do seem to have been increased in some of the cities for which the difference between revenue losses and changes in appropriations is greatest: Springfield, Arlington, Chelsea, Quincy, Salem and Cambridge. These towns do appear to be attempting to tap user charges as a major offset to the Proposition 2 1/2 revenue losses so as to avoid putting a greater adjustment burden on the expenditure side.

There is little information on the size of the revenue potential of increased reliance on user charges; what we have is only available for few of these ten cities (5). In Springfield, officials expected water and sewer charges to provide an additional \$10 million (179 percent of the post-aid first year revenue loss) in revenue in fiscal year 1982. This explains why Springfield could increase appropriations by 1.6 percent with a post-aid first year revenue loss of 8.9 percent. Water and sewer charges are estimated to provide \$750,000 (16 percent of post-aid first year revenue loss) in new revenues for the town of Arlington. Total user charge increases in Chelsea are expected to raise an additional \$500,000 (994% of the post-aid first year revenue loss), while revenue from fees and charges increased from \$23.6 million in fiscal year 1981 to \$30.7 million in fiscal year 1982 in

Cambridge to make up 60 percent of the first year post-aid revenue loss. Thus, user fees and charges have very significant potential to raise substantial amounts of revenue, at least in some of the cities and towns in Massachusetts. Although most types of user charges are not likely to generate much revenue, certain types have the productivity potential to constitute a serious offset to Proposition 2 1/2 revenue losses.

The other major source of local government revenues in Massachusetts is federal aid. To what extent might federal aid have helped to offset revenue losses during the first year of Proposition 2 1/2? Unfortunately, there is currently no information available concerning the magnitude of federal aid for our sample communities in fiscal year 1982. There is, however, strong evidence that there was a substantial decline in reliance on federal aid in Massachusetts communities in the period 1976-1980. (6) The decline occurred across most types of communities, but was particularly high in low income communities and, to a lesser extent, in those communities most severely impacted by Proposition 2 1/2. Lower income communities lost an average of \$19.91 in real per capita federal aid from 1976 to 1980, while high income municipalities gained an average of \$2.36. During the same time period, communities severely impacted by Proposition 2 1/2 experienced an average decrease in real per capita federal aid of \$17.84, while those communities suffering no revenue loss from Proposition 2 1/2 lost an average of \$9.95. Furthermore, it is evident that further decreases in federal aid are the intention of the Reagan administration. It therefore seems unlikely that Massachusetts communities can expect to receive much Proposition 2 1/2 relief from the federal government.

Recent estimates obtained from the Office of General Revenue Sharing in fact indicate that the allocation of general revenue funds to Massachusetts is expected to decline in the next entitlement period (October 1, 1982 to September 30, 1982) by 2.4 percent. This decrease is due to two factors in the distribution formula. First of all, Massachusetts 1980 urbanized population increased by only 2.55 percent from 1970 to 1980, compared to a U.S. average increase of 15.34 percent. Second, the general tax effort factor computed by the Office of General Revenue Sharing declined by 4.83 percent, while the U.S. average was a decrease of 2.58 percent. Indeed, the tax limitation provisions of Proposition 2 1/2 may themselves serve to exacerbate this decrease in the tax effort factor used to calculate allocations of revenue sharing to Massachusetts in future entitlement periods!

Although the potential of federal aid as an offset to revenue loss is in general limited, it is significant that some of the more severely impacted communities have been able to gain substantial offsets to revenue losses by increasing certain types of user fees and charges. Communities able to tap public works fees as a revenue offset are especially fortunate. These fees are available primarily to larger cities, and it is precisely in these cities that the impact of Proposition 2 1/2 has been most severe. Thus, user fees and charges may be an important ingredient in the overall adjustment to Proposition 2 1/2 in special cases.

For the bulk of communities, most fees and charges can be expected to have only limited potential. In the face of expected further declines in federal aid, a more carefully compensatory state aid formula and/or access to

novel alternative revenue sources (some perhaps not even presently permitted by the state to localities) are required if even greater undesirable burden is not to fall on the provision of local services.

VI. Changes in Municipal Bond Ratings

Debt is another source of revenue to which impacted communities might turn in order to offset revenue losses mandated by Proposition 2 1/2. Unfortunately, there is little information available regarding debt levels for our sample municipalities in fiscal year 1982, and we do not even know which of them have issued debt during this year. We cannot, therefore, analyze the change in debt levels that occurred in the first year of Proposition 2 1/2. An alternative approach is to examine changes in the credit-worthiness of municipalities, i.e., in their ability to go to the bond market for funding should the need arise. In order to do this, we obtained Moody's municipal bond ratings for our sample of municipalities for pre-and post 2 1/2 years.

Table VI presents 1980 and 1982 bond ratings for the forty-one sample cities and towns. It is clear that bond ratings either increased slightly or remained unchanged over this time period in most of the localities being considered. (Note that A1 is a rating recently instituted by Moody's to designate superior members of the A classification). Only in the large cities did the ratings actually decline, from Aa to Baa in Cambridge, from Aa to A1 in Springfield, from Aa to A in Pittsfield, Salem and Watertown, from Baa to Ba in Quincy, and from A to Baa in Worcester. Thus, some of communities most severely impacted by Proposition 2 1/2 have lost some of their credibility in the municipal bond market.

Table VI: Municipal Bond Ratings, 1980 and 1982

moody82
moody80

AMESBURY TOWN	Baa	A
ARLINGTON TOWN	Aa	Aa
BURLINGTON TOWN	Baa	A
CAMBRIDGE CITY	Aa	Baa
CHELMSFORD TOWN	A	A1
CHELSEA CITY	B	Baa
CLINTON TOWN	Baa	A
CONCORD TOWN	Aa	Aa
DALTON TOWN	Baa	A
DARTMOUTH TOWN	Baa	A
DENNIS TOWN	A	A1
DOVER TOWN	*	*
DRACUT TOWN	Baa	A
EVERETT CITY	Aa	Aa
FOXBOROUGH TOWN	A	A1
FRAMINGHAM TOWN	Aa	Aa
GEORGETOWN TOWN	Baa	A
GLOUCESTER CITY	A	A1
HATFIELD TOWN	Baa	A
IPSWICH TOWN	A	A1
KINGSTON TOWN	Baa	A
LEICESTER TOWN	Baa	A
LONGMEADOW TOWN	Aa	Aa
LYNNFIELD TOWN	Baa	A
MARSHFIELD TOWN	Baa	A
PALMER TOWN	Aa	Aa
PELHAM TOWN	*	*
PITTSFIELD CITY	Aa	A
QUINCY CITY	Baa	Ba
SALEM CITY	Aa	A
SEEKONK TOWN	Baa	A
SOUTHWICK TOWN	Baa	A
SPRINGFIELD CITY	Aa	A1
STURBRIDGE TOWN	Baa	A
TOWN OF NORWOOD	Aa	Aa
WATERTOWN TOWN	Aa	A
WAYLAND TOWN	A	A1
WELLESLEY TOWN	Aaa	Aaa
WENHAM TOWN	A	A1
WHITMAN TOWN	Baa	A
WORCESTER CITY	A	Baa

moody80 = Moody's bond rating, 1980

moody82 = Moody's bond rating, 1982

Source: Moody's Investors Service, Inc.

In order to test the strength of this result and further to understand the character of the localities that experienced a change in their bond ratings, we numerically coded the ratings and ran several regressions. The results of these regressions are presented in equation (24) and (25).

$$(24) \quad CB = 0.596 + 0.017 YLA'$$

$$(5.275) \quad (5.806)$$

$$R^2 = 0.477 \quad \bar{R}^2 = 0.463 \quad F = 33.711$$

$$(25) \quad CB = 1.176 + 0.010 YLA' - 0.008 S$$

$$(4.008) \quad (1.767) \quad (1.434)$$

$$- 0.028 W + 0.004 G$$

$$(2.113) \quad (1.335)$$

$$R^2 = 0.565 \quad \bar{R}^2 = 0.514 \quad F = 11.058$$

where YLA' = dollar value of first year post-aid revenue cut.

The simple correlation in equation (24) suggests that changes in bond ratings in our sample from 1980 to 1982 move in the same direction as first year revenue losses. Thus, high loss towns were more likely to experience lower bond ratings after Proposition 2 1/2 than were low loss towns. When size, wealth, and growth are used along with first year revenue loss in regression (25), only wealth is a significant variable. High wealth appears to offset Proposition 2 1/2 induced rating declines, low wealth to augment them.

These results, however, mark the great importance of population and revenue loss. These two variables are not significant in this regression because they are highly collinear, but they do exert a significant influence

on bond rating changes, as the respectable size of $\bar{R}^2$ indicates. Bond ratings clearly were more likely to decline in high loss communities, and these are the larger and poorer cities in the state. It is also interesting to note that bond rating changes are more closely associated with first year rather than total revenue losses. Furthermore, absolute dollar revenue losses explain changes in bond ratings more fully than do revenue losses expressed as a fraction of the 1981 property tax levy, suggesting that absolute scale matters in the effect of borrowing on bond prices.

VI Summary

This concluding section can be brief. We have shown that Proposition 2 1/2 X has mandated considerable revenue losses in localities on the average, but these losses vary very greatly among localities. In general, the losses increase directly with size of jurisdiction and inversely with property wealth and growth. In this regard the initial impacts are distributed dysfunctionally. State aid, including supplements instituted as an offset of Proposition 2 1/2 impacts, only mildly moderated the very large dispersion of ultimate effects and their dysfunctional pattern. Quite considerable net losses had to be coped with by many localities.

Hastening the timing of full value assessment was undertaken by a significant minority of jurisdictions, with considerable offset advantages. But it was not resorted to by communities suffering the largest revenue losses. Appropriations adjustments and an increase in alternative revenue sources constituted the major discretionary adjustments exercised. Changes in appropriations were on average considerable but differed significantly across expenditure categories. Differences among localities in both total

and mix were far greater, and patterns emerged. In general, size of revenue loss only moderately explained size of appropriations cuts. A smattering of information on resort to increasing alternative revenue sources suggests that this was used as a genuine alternative to appropriations cuts. This helps to explain the weak relationship between revenue loss and budget cuts.

The mix of appropriations cuts was anything but uniform across categories. Some categories were definitely protected, or even favored: e.g., police and fire. Others were cut sharply, like parks, libraries and schools. As before, the variations among localities were far greater than variations across categories. What emerged most clearly was that the education category was called upon to bear the overwhelming proportion of total appropriations cuts, in some cases actually being cut more than the total to permit an increase in categories like police and fire.

The relationship of localities to the capital market can be variously affected by Proposition 2 1/2. First, the legal basis of a locality's responsibility for existing as well as future debt obligations may be compromised by the stringent revenue constraints imposed. This would adversely affect its very access to the bond market. Second, present mandated revenue losses and future restrictions may make it more incumbent on communities to depend on borrowing to finance outlays. Early induced issuance of debt could adversely affect the rate that must be paid for borrowing. Even the prospect of increased dependence could adversely affect its credit-worthiness. Early results show that bond ratings have changed in a pattern consistent with both effects: ratings have worsened in direct

relation to the size of the first year revenue losses resulting from Proposition 2 1/2.

So all routes to an "easy" escape from the rigors of Proposition 2 1/2 have been effectively tightened. Since those rigors vary so markedly among communities, is it at all clear that the burdens have been wisely allocated by the electorate, or that provision has been appropriately made for adjusting to them?

As we mentioned in our introduction, examination of the early impacts of Proposition 2 1/2 provides an attractive opportunity to learn something about the way the federal system responds to shock. In the spirit of this challenge, we have occasionally wondered beyond descriptive analysis to try to understand the kinds and sizes of adjustment by the different agents, state and localities, which we discovered. We especially tried to make sense of the provocative pattern of mix in budget cuts, resorting to an analysis in terms of social preferences and priorities, adjustment process lags, and differential political vulnerability among categories in the political interplay between public officials and the electorate. This discussion is not to be interpreted as our version of a definitive explanation for the phenomena, but only as a set of initial surmises in the face of a fascinating and important social experiment. More considered work in this direction is certainly warranted.

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