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MINNESOTA'S INTERGOVERNMENTAL FINANCE POLICY:
PROBLEMS AND POSSIBILITIES

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BILITIES

      Following a critical study of Minnesota's tax system by
a state-funded tax study commission, Minnesota's governor proposed
that the 1987 legislative session enact sweeping changes of Min-
nesota's complex tax system. A major thrust of reform was to its
intergovernmental aid policy, a complex system of state payments
to both local governmental units and to their local taxpayers (see
box).   Numerous interest groups also proposed alternative re-
forms. What should be done?

      I argue that Minnesota's current intergovernmental aid
policy has some desirable features, but fails in many ways to meet
two key objectives of such policies. Adopting some key reforms
would yield a simpler policy that could better fulfill these
objectives.

TWO KEY OBJECTIVES OF PUBLIC FINANCE: EQUITY AND EFFICIENCY

      Webster's Dictionary defines equity as "fairness; im-
partiality; justice." Traditionally, this objective has been made
operational in two ways. The first way has been to identify
fairness with the proposition that taxes should be directly re-
lated to the taxpayer's ability to pay, a concept often referred
to as vertical equity. Measuring the taxpayer's ability to pay by
personal income and/or wealth, vertical equity has often been
equated with the adoption of progressive taxes. With progressive
taxes, the tax burden, expressed as a percentage of ability to
pay, progresses (i.e., rises) with the ability to pay. Decreased

reliance on the opposite phenomenon, regressive taxes, has also been equated with vertical equity. The second way has been to identify fairness with the proposition that similar taxpayers in similar circumstances should bear the same burden, a concept dubbed horizontal equity. For example, one might argue that two residents of equal ability to pay, who receive the same level of public services in the cities they respectively live in, should pay the same amount of city taxes. One would then be arguing that it is not horizontally equitable to differentiate tax burdens on the sole basis of the city lived in. Other factors causing differing burdens among those possessing equal ability to pay, and receiving the same public services, could also be identified as sources of horizontal inequity.

The second key objective of public finance is to foster economic efficiency. Both taxes and the public spending made possible by them affect the public in a variety of ways. They have direct effects that are easily visible, e.g., someone pays a large tax bill, and is then treated by a public hospital for her subsequent cardiac arrest. But they also have important indirect effects. These indirect effects include changes in consumption, savings, and investment behavior induced by taxes and spending, and changes in incomes earned due to these behavioral changes. The sum of direct and indirect effects on each party determines whether or not that party is better or worse off as a result of some tax and spending policy. Policymakers often propose new policies making some parties better off and some others worse off, i.e., there are both winners and losers. If that is the best they

can do, i.e., there is no alternative policy making no one a
loser, one says the existing policy is Pareto efficient. More
practically, one may be interested in adopting new policies which
have losers, as long as the winners gain by more than the losers
lose. One then says the new policy is potentially more efficient
than the existing policy, and the winners should theoretically be
more than able to compensate the losers when the new policy is
adopted, if so required. We will use this latter idea as our
concept of efficiency.

The desire to attain a desirable mix of efficiency and
equity creates a rationale for some form of intergovernmental
policy, because a totally decentralized public finance system will
fail to attain it. Unlike Minnesota's current system, the state
government would not pay any subsidies toward the provision of
local services in a totally decentralized system. Nor would the
state make any restrictions on local government tax and spending
policies. Rather, each local governmental unit would freely adopt
its own tax and expenditure policies. Voters would be the main
constraining influence on local government policies. Those dis-
agreeing would be free to move to another locale. Each local
government unit thus would need only worry about the welfare of
its own residents. Because of this narrowness of view, residents
of one governmental unit may bear externalities generated by the
policy of another governmental unit, causing a loss of effi-
ciency. The narrowness of view also may lead to inequities, as
any one governmental unit ignores the distributional consequences
of its policies on the residents of other units. Using optimal

tax theory, Gordon [1983] identified seven likely sources of inefficiency and inequity, created by the taxing and spending of a representative governmental unit in a totally decentralized system. They are:

(1) Nonresidents may pay some of the taxes.

(2) Nonresidents may receive some of the benefits from public services.

(3) Congestion costs faced by nonresidents may change.

(4) Tax revenues received in other communities may change due to the spillover of economic activity.

(5) Resource costs for public services in other communities may change.

(6) Output and factor price changes may favor residents over nonresidents.

(7) Distributional effects among nonresidents would be ignored.

These problems are best illustrated by a single, albeit somewhat contrived, example. Suppose a city council decides to build a convention center, financed by a sales tax levied on bar and restaurant sales within the city. Nonresidents who entertain in the city will indeed pay some of these taxes (1). The city council argues that this is not so bad, because nonresidents have long benefited from the fine city parks maintained by city residents' taxes (2). After the convention center is built, heavy conventioneer traffic between the airport and the center causes traffic congestion and noise, harming nonresidents (3). But some nonresidents, who formerly used to travel to the city to enter-

tain, now avoid the traffic and the new sales tax by doing so in their home towns, thus stimulating the growth of those units' commercial tax revenues (4). Of course, this new wining and dining near home creates a need for a few more police near the busier bistros (5). The convention center creates a heavy demand for low skilled, part-time workers, slightly driving up wages paid to all similar workers, most of whom live in the city (6). Because nonresident drinkers tend to possess lower than average incomes, the city sales tax on bars regressively taxes nonresidents (7).

So, we have seen that there are at least seven problems arising from a totally decentralized system of local governments. In the above case, the decentralized decision to adopt an additional local selective sales tax won't be optimal, unless the above seven effects on the well-being of both residents and nonresidents sum to zero. This is quite unlikely. So some intergovernmental policy, perhaps prohibiting the adoption of this selective sales tax, is in order. But the existence of the above seven problems doesn't justify any arbitrary intergovernmental aid system one could concoct. To be an improvement, an intergovernmental aid system would have to remedy some of the above seven problems, while not introducing more serious inequities and/or inefficiencies of its own. As we will now establish, the current Minnesota intergovernmental aid system has helped remedy some inequities and inefficiencies, but has added some others of its own.

MINNESOTA'S INTERGOVERNMENTAL AID POLICY: MOTIVATED MOSTLY BY
PERCEIVED INEQUITIES

Over the past twenty years, many changes have been made
in Minnesota's complex intergovernmental aid policy, each moti-
vated mainly by feelings that the status quo was inequitable in
some way. Some of these changes involved direct state appropria-
tions to remedy some perceived inequity, while others did not.

One of the earliest major, costly measures was the
institution of the homestead credit, in 1967. Via this credit,
the state paid a fixed percentage of a homeowner's property tax
bill (up to a ceiling), prior to the homeowner receiving the
bill. The credit is paid directly to local governments after
gross bills are determined, and is used to lower the net bill
mailed. As such, the property taxpayer cannot convert the credit
into cash. By attempting to substitute progressive state income
tax revenue and mildly regressive state sales tax revenue for the
(presumed) sharply regressive local property tax,[1] the state hoped
to improve the vertical equity of the tax system.[2] Both the
percentage of property taxes paid and the ceiling amount were
raised several times prior to 1984, when the percentage was
slightly lowered. The homestead credit cost the state over $580
million dollars in 1986.

Since 1967, eight other property tax credits have been
adopted. Like the homestead credit, all of these are also paid
directly to local governments in an attempt to lower some groups'
net payments. Taxpayers cannot convert these into cash, either.
For example, the costliest of these additional credits is the

state school agricultural credit, eligible to farmers and owners of private vacation cabins. It is intended to remedy a perceived inequity that these groups pay more than their fair share of school costs. While the latter group's inequity is an example of Gordon's problem #1 above, the farmers' situation isn't one of those problems.[3] This credit cost the state over $126 million in 1986.

An even costlier measure than credits is state categorical aid to local education, which received its major impetus in 1971. Then, the state started paying a big share of local school district costs. As in the case of credits, this was partly motivated to substitute relatively more progressive state taxes for local property taxes. But perhaps more importantly, the state aids were an attempt to remedy a perceived horizontal inequity of a totally decentralized system. In that system, students living in school districts with relatively low property tax bases and voter incomes might be provided with a less costly, and presumably worse, education than students living in other districts. These other districts, of course, don't worry about the distribution of spending outside their own boundaries (see Gordon's reason #7 above).[4] The state aid to education attempts to help equalize educational spending by providing more aid to the former, needier school districts. Finally, state aids to education may also be viewed as an attempt to remedy inefficiency. Once educated, students are free to move anywhere they want, including areas outside their school district. Nonresidents may thus benefit from the presence of people educated in a different school district,

which nevertheless would bear the full cost of education in a totally decentralized system (see Gordon's reason #2 above). Residents may have an incentive to move to communities with lower education taxes, thereby becoming nonresidents who can reap the above benefits (see Gordon's problem #4 above). The likely result of total decentralization would be lower school spending than is efficient. In 1986, state aids to local school districts totalled over $1.1 billion, making it the most costly single intergovernmental program.

With the exception of Gordon's problem #2, all the problems with totally decentralized public education can be marshalled to support categorical aids for the local provision of public health and welfare programs, such as medical assistance and income maintenance for the poor. The state paid over $630 million to county governments in 1986 to assist these programs.

In addition to state aid for school districts and counties, municipal governments (and to a much smaller extent, counties) also receive lump sum appropriations. Their main appropriation, termed local government aid, is a formula-based revenue sharing system from the state to its city governments. First instituted in 1971, the formula has been changed three times, so it is hard to say exactly what the intent of the program has been. But two reasons for it are often given. One reason is the aforementioned attempt to relieve local property taxes, by substituting more progressive state revenue sources. The second reason is to help prevent the type of horizontal inequity described as a rationale for school aids. The inequity arises due to the geo-

graphic dispersion of business property. Cities containing lots of business property can spread the property tax burden more thinly over their residents than other cities can. In a totally decentralized system, then, residents of different cities may bear different tax burdens, even when their personal incomes, wealth, and public service use are the same. This so-called "fiscal disparity"[5] has been invoked to justify "equalizing" local government aid formulae, which are tailored to this issue.

While all the above credits and aids are paid to local governmental units, there is one much smaller program that pays funds directly to residents. That program is dubbed the circuit breaker refund, and is paid to renters and homeowners possessing relatively little income and wealth. Payments are made via a formula based on the recipient's income and property tax bill. The latter is strongly correlated with the homeowner's property value, and is imputed for renters from landlords' tax bills. The circuit breaker cost the state around $160 million in 1986.

Finally, there is one major component of intergovernmental policy, termed property tax classification, which does not require any direct outlay of state revenues. By changing the classification ratio of property, i.e., the ratio of property's assessed (i.e., taxable) value to its market value, its owners can be made to pay either higher or lower property tax rates. As of 1980, Minnesota was one of only 14 states which used classification (Gold [1981]). Over the years, the Minnesota legislature has adopted changes in classification which have raised the property tax rates paid by owners of commercial, industrial, and

rental properties relative to the rates paid by farmers and home-
owners (see appendix 2). This policy was partly motivated by the
belief that shareholders and landlords bear the burden of property
taxes levied on their property, and generally possess higher
incomes than do homeowners and farmers. As such, it was believed
that these changes improved vertical equity. Because homeowners
and farmers comprise a large and active share of the voting popu-
lation, these changes in classification undoubtedly lessened voter
pressure for local spending cuts, and as such, should be thought
of as intergovernmental policy.

In summarizing the main features of Minnesota's inter-
governmental policy, a consultant to the state's own tax study
commission indicated that at most only five other states had
relatively bigger intergovernmental systems. The exact number
depends on how "bigness" is measured (Bell [1986], p. 335).
Because of its large size, it is imperative that Minnesota mini-
mize the undesirable side effects stemming from it, which are
elaborated below.

BUT MINNESOTA'S INTERGOVERNMENTAL POLICY HAS SOME UNDESIRABLE SIDE
EFFECTS

One major side effect of Minnesota's heavy reliance on
credits and aids paid to local governments is to enable higher
local government spending than would occur in a totally decen-
tralized system. In other words, credits and aids do not relieve
local taxes by an amount equal to their cost, and may actually
cause increased local taxes in some instances. To help see how
this might happen, suppose you were invited by a total stranger to

a posh French restaurant for lunch. After being seated at Monsieur Kelly's, the stranger insists on paying for your lunch, no matter what it costs--as long as you agree to pay for hers! Not wanting to go hungry, you agree to the terms, and decide to order a more desirable, expensive lunch than you would have otherwise. After all, you reason, the stranger is paying for it, and will probably do the same thing because you are paying for her lunch. If you fail to order a more desirable, expensive lunch, you run the risk that the stranger will anyway, and you will have paid for more than you got. Neither person wants to run that risk. So, the total bill for the two persons exceeds what it would have been had they gone "Dutch." In a system heavily dependent on intergovernmental aid, each taxpayer pays for only a small share of her own local government "lunch," i.e., the local services provided. But in return for this, each taxpayer must pay for a share of the services provided to other local governments' taxpayers. The former payment is collected by local tax levies, while the latter is collected by state tax levies. As suggested above, the system creates incentives for higher local tax levies than would occur otherwise, i.e., in a totally decentralized system.

Of course, one might find flaws in this lunch club analogy, which was presented for illustrative purposes only. But one needn't buy the analogy in order to swallow its conclusion, for there is a large amount of theoretical and empirical support for it. Minnesota's property tax credits, which pay fixed percentages of property tax bills (up to ceiling amounts), appear

similar to matching grants, which also pay fixed percentages of the costs of lower level government services. As such, economic theory predicts that they will stimulate higher local spending than would occur with either a totally decentralized system, or with lump-sum, revenue sharing aid, or with an equal amount of local taxpayer income growth. In theory, categorical aid to school districts and counties for education, health and welfare should also stimulate higher local spending in the same sense.[6] However, no consensus theory has been devised which predicts that lump sum revenue sharing aid, like Minnesota's Local Government Aid to municipalities should cause higher local spending than would an equal amount of local taxpayer income growth.[7] But an impressive body of empirical evidence, both within Minnesota and out, supports the conclusion that all three types of aid--credits, categorical aids, and lump sum aid--do indeed stimulate more local government spending in the above sense (see appendix 1).

The inducement to higher local government spending inherent in Minnesota's current intergovernmental system is not always bad. As argued earlier, a totally decentralized system would underfund local education, health and welfare programs. So, the incentives for higher spending inherent in credits and aids are not all bad. But services other than the above three, which probably wouldn't be underfunded in a totally decentralized system, are likely to be overfunded in Minnesota's current system--an undesirable side effect of it.

The relatively high spending levels on these services in Minnesota makes it extremely important to address this problem.

Municipalities, and to a lesser extent, counties provide the bulk of these other services, including local public safety, recreation, provision of local streets, sewers, and other infrastructure, and economic development incentives. The most recently available data (ACIR, pp. 199-250) showed that per capita municipal government spending in Minnesota was sixteen percent higher than the national average--an average biased upward by Alaska's massive spending. This made Minnesota the nation's seventh highest ranking state in this statistic, behind Alaska, New York, Massachusetts, Rhode Island, Connecticut, and New Mexico. But education expenses are an important component of the first five states' municipal spending. And counties play a much smaller role in the other state's (New Mexico) local service delivery, leaving New Mexico municipalities with more to do than Minnesota's. Thus, a ranking of Minnesota municipal expenditures for the other local services listed above would most likely place Minnesota third among states, behind Alaska and New York. And this has occurred despite levy limitations placed by the state on Minnesota municipalities.

Partially as a result of this, the most recent available data show that per capita state and local tax revenues were 34.2 percent higher in Minnesota than in the median state. The large intergovernmental programs helped propel per capita individual income tax collections in Minnesota to a level 138 percent higher than the median state. Yet Minnesota's per capita property taxes, which many of the intergovernmental programs were intended to lower, were still 21 percent higher than the median state's.[8]

Furthermore, it is not necessarily true that Minnesota receives services commensurate with its high spending level. Some of the spending may have merely resulted in higher public employment and/or salaries, benefits, and pensions.

In addition to inhibiting property tax relief by enabling higher local spending, Minnesota's current intergovernmental system doesn't cost effectively deliver the amount of relief it does provide. The homestead credit does not directly depend on homeowner income. And the size of the credit rises with home value, until a ceiling is reached. Thus, wealthy homeowners are also provided property tax relief, making vertical equity more costly to attain. One might argue that this is not an undesirable side effect of the homestead credit, asserting that its main purpose is to make owner-occupied housing more affordable. But if that is so, why not make housing more affordable by direct measures to aid home buyers, such as subsidized mortgages to those of modest means? Such measures would be less costly than homestead credits, in which some of the funds go to local governments, and some go to wealthy homeowners who would have bought homes without it. Thus, the homestead credit, and any other Minnesota credits whose sizes are also not directly dependent on income, are not cost effective means to achieve vertical equity.

Changes in classification ratios are cost effective in the above sense, for they require no direct outlays of state revenue. But these changes, in addition to the increased use of credits which have also favored homeowners and farmers, may have had the undesirable side effect of decreasing vertical equity at

times. During the 1970s, both home values and farm values rose much more rapidly than did business property values. Because increasingly valuable homes and farms comprised a growing share of Minnesota's total property wealth, their owners would have, and should have, paid a higher share of total property taxes levied. To do otherwise seems inconsistent with vertical equity, for then those whose wealth was growing the fastest, i.e., homeowners and farmers, would have been paying relatively less, not more. Yet that is precisely what subsequent relief measures achieved, albeit unevenly across taxing districts, by attempting to insulate home-owners and farmers from higher bills (see appendix 2 for details).[9] To the extent that this insulation was paid for by owners of local service businesses (e.g., retail establishments), the effects are even less vertically equitable, for these busi-nesses likely pass some of the increase along to their custom-ers. As such, relief for homeowners and farmers was partly fi-nanced by a de facto, regressive sales tax on Minnesota con-sumers.[10]

The perverseness of this policy can be illustrated in another way. In the 1980s, Minnesota farm land values have drop-ped dramatically. In taxing districts with a mixture of property uses, including farms, property taxes would normally be shifted away from farm owners and toward other property owners whose wealth had not fallen so dramatically. The exact same argument used to justify lower classification ratios for homeowners and farm owners in the 1970s could now be used to justify increased ratios for farms. Of course, doing so would perversely place a

larger burden on those whose wealth had grown the least (in fact, had fallen), much as the policy of the 70s did.

A third side effect of Minnesota's current intergovernmental system has been its propensity to generate inefficiencies. Table one shows the combined effect of credits, aids and classifications on the distribution of tax bills paid by property ownership. In the last column, we see that farms paid an effective property tax rate of only 0.85 percent on the market value of their farms (as corrected for differences in local assessors' valuations).[11] Owners of housing, which include farm homeowners and cabin owners, paid 1.33 percent of the corrected market value of their properties. But commercial and industrial property owners paid effective property tax rates of 3.72 percent and 3.89 percent, respectively. Both economic theory and empirical findings argue that efficiency is enhanced by lower and more uniform taxation of capital, such as property.[12] These studies indicate that higher living standards would result from doing so. Table 1 shows that Minnesota could do more to help achieve this.

Finally, another undesirable side effect of the countless changes made to Minnesota's intergovernmental system is its complexity. The final report of the blue-ribbon Minnesota Tax Study (Latimer) Commission concluded that Minnesota had the most complex property tax in the nation (Tax Study Commission, p. 18). The Minnesota Dept. of Revenue has noted that one of its components, the classification system, has been changed in each legislative session since 1941 (Dept. of Revenue, p. 5). The formula for local government aid to municipalities, first enacted

in 1971, has been changed twice since, and is currently likely to undergo yet another overhaul. There are around 30 other aids paid to cities, counties and school districts, in addition to the nine property tax credits and the circuit breaker property tax refund programs discussed earlier. The cost of these aids is summarized in table 2 below. This complexity makes it more difficult for tax officials to administer the system, and more difficult for both taxpayers and public officials to understand its impacts.

In summary, there are at least four major, undesirable side effects of Minnesota's current intergovernmental system. First, it enables higher than optimal levels of government spending for some local services. Second, it doesn't deliver cost effective property tax relief. Third, it creates inefficiencies by generating large differences in effective tax rates across property uses. Finally, its extreme complexity hampers both its administration and the body politic's understanding of its effects. But one needn't despair. In the next section, we will see that there are feasible reforms which would at least partially redress each of these problems, while retaining desirable equity and efficiency gains present in the current system.

SOME DESIRABLE REFORMS OF MINNESOTA'S INTERGOVERNMENTAL SYSTEM

One desirable reform would be to replace the existing circuit breaker refund, credits, and the local government aid to municipalities and counties programs with a direct, cash payment program to residents (i.e., homeowners and renters). Direct cash payments would not create as large an incentive for overspending on some services as the current system does (see appendix 1). Any

underspending on education, health, and welfare created by the elimination of credits could be remedied by increased funding for the existing categorical aids to school districts and counties. Further, the cash payments could be targeted to the nonwealthy residents much more accurately than the current credits do, which ignore taxpayer income. Both of these advantages would ensure that it would more cost effectively deliver progressive property tax relief, and as such, improve vertical equity. In addition, the replacement of as many as fifteen separate programs by one large program would reduce the complexity of the current system.

While such a program, which I will dub SALT (State Aid to Local Taxpayers), would be somewhat similar to the current circuit breaker program, there would be some important differences. First, SALT would be much larger than the current circuit breaker, which is only intended for the poor. SALT would be a program for nonwealthy taxpayers. Second, also unlike the circuit breaker, SALT would be based on a formula which would include measures of fiscal disparity among municipalities. As discussed in section 2, one rationale for both school aid and local government aid to municipalities is to mitigate the horizontal inequity created by fiscal disparities in per capita property tax bases and incomes across communities. But doing so through lump sum payments to municipalities creates the aforementioned problem of incentives for overspending, which prevents the funds from fully mitigating the horizontal inequity. SALT would remedy this by paying "equalizing" funds directly to residents, rather than to their governments. In appendix 4, one method is detailed for constructing a SALT formula with these features.

The victims of the inequity (the poor and those living in areas with low property tax bases) would then have the means to pay for efficient levels of municipal services. Currently, they must accept whatever spending/relief package their municipal government chooses to deliver, which may or may not be efficient. Of course, SALT might cause their gross (net of SALT) property taxes to rise, as municipalities try to partially make up for lost revenues. But due to the current system's propensity for overspending, it is unlikely that net property taxes--the bottom line for needy residents--would rise.

Another desirable reform has been suggested by the Citizen's League, a respected nonpartisan research organization (Citizen's League, 1987). The reform is to eliminate the current classification system, so gross property taxes would be uniformly based on full market value. In addition to fostering efficiency by more uniform taxation of capital, this would simplify the system. And doing so would prevent the legislature from continuing to use appropriationless changes in classification ratios to inequitably shift payments across property users (as argued in appendix 2).

Again, the aggregate, gross property taxes of homeowners, farmers, and other property users favored by the current classification system would rise because of this reform. But due to four reasons detailed in appendix 3, the net tax burden of homeowners, both on and off the farm, would not rise by nearly as much as one might guess. These reasons, which are frequently overlooked by public officials and their analysts' computer print-

outs, should be seriously considered when evaluating these reforms. But if, having done so, officials believe that more property tax relief for nonwealthy homeowners was consistent with equity and efficiency objectives, SALT would be the appropriate vehicle. And if additional property tax relief for other property owners, e.g., farm owners, owners of wetlands or native prairies, Iron Range homeowners, etc. were similarly deemed desirable, it too would best be doled out by SALT-like, formula-based direct payment programs. Tax relief would then be cost effectively, uniformly achieved by openly voted appropriations, rather than by unevenly distributed shifts resulting from the uneven distribution of property uses.

A classless system might be plagued by assessors' failing to assess all property uniformly. They might cave in to local political pressures to lower assessments of previously tax favored groups, and/or to raise assessments of previously unfavored groups. But there is a simple remedy for this. Currently, the state gathers ample data on the assessment accuracy of local assessors. In a classless system, this data could be used to reduce SALT and/or other state payments to communities with bad assessment practices. Alternatively, this data could be used to raise payments to communities with good assessment practices. In addition to statutory requirements on assessors, either of these plans would create another incentive for good assessment practices. A penalty plan was once enacted by the Minnesota Legislature, but was never implemented. It should be.

Finally, the property tax itself could be structured to increase efficiency. Currently, the land and buildings comprising taxed property are both taxed at the same rate. Economists have long maintained[13] and recent empirical work suggests[14] that efficiency gains would follow from taxing immobile land at relatively higher rates than buildings. This is done in several countries, and is also done in Pittsburgh and a few other Pennsylvania cities. Why not try it here?

CONCLUSION: THE SHIP IS SINKING, AND WE SHOULDN'T JUST REARRANGE ITS DECK CHAIRS

While there is some rationale for state aids to locally administered education, health, and welfare programs, there is little justification for the rest of Minnesota's cumbersome intergovernmental system. The numerous credits, aids, refunds and classifications could be replaced by a much smaller number of programs, aimed at helping taxpayers directly with cash payments. A generally much simpler property tax system would result, with only one new complication: differential taxation of land and buildings. By adopting these reforms, vertical equity objectives could be kept, while improving the system's horizontal equity and efficiency.

Table 1

Taxes Payable 1986

CLASS	% of Total Net Tax	% of Total Gross Tax	% of Market Value	% of Corrected Market Value	Effecitve Rate on Market Value (%)	Effective Rate on Corrected Market Value (%)
Residential	37.13	45.47	49.70	50.45	1.44	1.33
Farm	10.32	13.85	24.87	22.01	0.80	0.85
Commercial	23.19	17.84	9.90	11.28	4.51	3.72
Apts.	8.14	6.25	4.42	4.54	3.54	3.24
Industrial	9.01	6.93	3.68	4.19	4.72	3.89
Utility	3.14	2.42	1.78	1.68	3.39	3.39
Seas. Rec. R	2.35	2.03	2.53	2.80	1.79	1.52
Vacant	2.22	1.71	0.97	0.99	4.40	4.08
Other	0.54	0.41	0.20	0.19	5.25	5.25
Seas. Rec. C	0.13	0.10	0.15	0.17	1.66	1.37
Timber	0.17	0.18	0.22	0.21	1.50	1.43
Tot. Real Pro.	96.34	97.18	98.40	98.50	1.88	
Tot. Real & Pe	100.00	100.00	100.00	100.00	1.92	1.81

Source: "Property Taxes Levied in Minnesota, Taxes Payable in 1986," Minnesota Department of Revenue.

STATE AIDS TO LOCAL TAXING UNITS
FISCAL YEARS 1985-87

	STATE FISCAL YEAR		
COUNTY GOVERNMENTS	1985	1986	1987*
Property Tax Relief Aids			
Local Government Aid	$ 14,370,925	$ 14,361,361	$ 14,361,966
Attached Machinery Aid	3,123,667	2,381,787	2,381,787
Aid to Police Departments	4,583,335	4,996,238	5,827,316
Welfare Aids			
Medical Assistance	$ 294,373,400	$ 291,445,800	$ 342,250,000
General Assistance Medical Care	55,163,800	58,185,300	72,082,000
AFDC	106,067,600	80,831,000	82,485,000
Minnesota Supplemental Aid	14,441,000	15,529,000	18,905,600
General Assistance	57,847,100	54,487,800	57,819,700
Community Social Service	51,541,100	50,447,800	48,199,300
Pre-Admission Screening	6,663,400	11,460,000	14,501,500
Miscellaneous Aids			
Corrections Community Services	$ 15,369,200	$ 14,019,100	$ 13,574,900
Public Transportation Assist.	285,000	70,000	53,000
Community Health Services Act	10,118,800	12,789,500	12,918,900
TOTAL COUNTY	$ 633,948,327	$ 611,004,686	$ 685,360,969
CITY/TOWN GOVERNMENTS			
Property Tax Relief Aids			
Local Government Aid	$ 259,393,236	$ 274,055,884	$ 296,569,294
Aid to Police Departments	10,658,785	11,193,365	13,152,006
Aid to Fire Departments	8,333,085	9,221,198	10,765,392
State Amortization Aid	7,524,600	7,491,500	7,537,000
Miscellaneous Aids			
Public Transportation Assist.	$ 4,400,000	$ 4,600,000	$ 3,900,000
TOTAL CITY/TOWN	$ 290,309,706	$ 306,561,947	$ 331,923,692
SCHOOL DISTRICTS			
Education Aids			
Foundation Aid	$ 840,752,400	$ 928,221,600	$1,023,718,500
Transportation Aid	83,255,300	88,712,600	82,638,000
Special Education	151,534,000	172,348,400	175,716,300
Community and Adult Ed.	4,934,500	8,893,800	9,979,000
Tech. and Educ. Improvement	5,898,700	0	0
Libraries	4,802,000	5,128,700	4,740,900
Educational Effectiveness	0	5,052,400	5,062,400
Expanded Student Opportunities	0	9,049,300	12,369,700
Health, Safety and Nutrition	0	6,534,000	6,174,400
Interdistrict Cooperation	0	2,181,600	2,828,700
Other Education Aids	43,215,200	8,347,000	8,770,800
Property Tax Relief Aids			
Attached Machinery Aid	$ 1,003,133	$ 835,613	$ 835,613
TOTAL SCHOOL DISTRICT	$1,135,395,233	$1,235,305,013	$1,332,834,313
TOTAL ALL DISTRICTS	$2,059,653,266	$2,152,871,646	$2,350,118,974

*Fiscal 1987 data are preliminary.

TABLE 2

Footnotes

[1] At the time, it was generally believed that the proper-
ty tax was quite regressive (see, e.g., Netzer (1966)). However,
some later views cast doubt on the degree of regressivity, arguing
that the tax was borne by all owners of capital, similar to the
corporate income tax (see Aaron (1979)).

[2] In and of itself, this does not really remedy one of
the seven problems listed above. After all, totally decentralized
local governments could freely adopt income rather than property
taxation, if vertical equity were important to their residents. A
possible rationale for state property tax relief might be that
local income taxes would cause more spillovers (problem #4) than
local property taxes, by creating larger incentives to move to
lower them. Another possible rationale might be administrative
problems inherent in local income taxes, such as higher costs of
detecting and remedying tax evasion.

[3] The rationale for farm relief was that farmers own
large amounts of taxed land, and hence would pay higher property
taxes than the typical resident or small business, who share
roughly the same direct benefits from local public spending. But
this argument could also be used by childless residents to justify
paying no school taxes, as they also pay disproportionately com-
pared to the direct benefits received, or by owners of large
office buildings or factories. The principle of the property tax
is that ability to pay is measured, at least in part, by property
wealth. Nonregressivity requires that those with more wealth pay
more tax, in order to finance local public goods consumed by those
in the taxing district.

[4]However, Hamilton (1976) has argued that full market capitalization of the intracommunity differences in residents' property values would prevent the horizontal inequity. To see this, suppose we have only one family, living in a big house, in a school district full of others living in small houses. One might argue that the family's schoolchildren are disadvantaged, because their school district property tax base is almost wholly made up of low valued homes, keeping their school tax rate higher than it would be in a homogeneous district of big houses. But if that were true, why wouldn't the family move to a district filled with similar big houses? If such moves aren't observed, it is probably because the market value of the big house already fell to reflect the disadvantage of the higher tax rate, i.e., full capitalization has occurred. As such, the owner of the big house was already fully compensated (by a lower home price) for this disadvantage, freeing sufficient resources to remedy the horizontal inequity himself. This argument depends on fiscal differences being fully capitalized into home values. While Oates (1969) presents some empirical evidence that local expenditures are capitalized, the issue has not yet been resolved.

[5]As detailed in footnote 4, if less-than-full capitalization occurs, so would the horizontal inequity.

[6]See, e.g., Wilde (1968).

[7]Differing theoretical arguments for this empirical finding, substantiated in appendix 1, have been put forth by Hamilton (1983) and by Courant, Gramlich and Rubinfeld (1979).

[8]See Advisory Commission on Intergovernmental Relations (1986), pp. 182-3. When more recent figures are computed, Minnesota's relative spending levels may appear more moderate.

[9]See Gold (1981) for a state-by-state description of this policy.

[10]See Sonstelie (1979) for an exposition of the excise tax effects stemming from classification.

[11]The effective tax rates on farms might currently be higher than this, because farm land values in Minnesota have fallen substantially since 1985.

[12]See Ballard, Shoven, and Whalley (1985).

[13]There has been a long and distinguished advocacy of heavier land value taxation, popularized first by Henry George. See Lindholm and Lynn (1978).

[14]An interesting general equilibrium simulation of the benefits of land value taxation in Jamaica was recently published by Follain and Miyake (1986).

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Appendix 1

Intergovernmental Revenue:

Its Effects on Recipient Government Spending

Summary

A clear majority of empirical studies imply that inter-
governmental aid stimulates higher total combined spending than
would occur if equal funds were distributed as lump sums to reci-
pient government taxpayers. Studies are virtually unanimous in
demonstrating that grants with matching features stimulate higher
recipient government spending than do lump sum grants. Because,
Minnesota property tax credits have matching features, it is not
surprising that Bell and Bowman [1986] found them to be more
stimulative than local government aid. Because even the latter
was found to stimulate higher local property taxes on the local
tax base, a shift to direct, lump sum payments to local taxpayers
should lower combined state and local spending growth.

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There have been many econometric analyses of the recipi-
ent government spending response to intergovernmental aid. These
studies can be grouped into two categories: ad-hoc regressions
and theory-based models. Results of these studies pertaining to
two issues are summarized and critiqued. The first issue is
whether aid stimulates (i.e., increases) or substitutes for (i.e.,
decreases) recipient government taxes, i.e., whether or not aid
provides even partial local tax relief. The other issue is
whether the recipient government response to lump sum, inter-
governmental aid differs from its response to an equal amount of

taxpayer income growth. In other words, do funds paid to local government yield the same local government spending as would cash paid directly to residents of local government? The observation that the spending response to lump sum aid typically exceeds that to an equal amount of taxpayer income growth is termed the "flypaper"[1] or "grant illusion" effect.

Ad-Hoc Regressions

A general form for an ad-hoc regression is:

$$(1) \qquad G_j \text{ or } T_j = A_{1j}X_{1j} + \ldots + A_{mj}X_{mj} + B_{1j}R_{1j} + \ldots + B_{nj}R_{nj}$$

$$+ D_j M_j + E_j$$

where $X_{1j}, \ldots, X_{mj}$ are m independent factors for recipient j other than intergovernmental aid, which are thought to influence recipient j's government spending G, or alternatively, its own source tax level, T_j. These factors include such variables as population density, percentage of population in school, and the percentage of urban population. $R_{1j}, \ldots, R_{nj}$ are intergovernmental aid variables, such as total federal grants to education, total federal highway aid, state welfare aid, state revenue sharing, and federal revenue sharing. M_j is the income or per capita income of recipient government j. In their excellent review of the literature, Whitman and Cline [1979] cite ten ad-hoc regression studies. All except one of these inferred that stimulation

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[1] The term "flypaper effect" was coined by Arthur Okun, and is meant to summarize the notion that "money sticks where it hits."

of recipient taxes resulted from federal aid, i.e., not only was there no local tax relief but higher local taxes resulted! Furthermore, most of them provide empirical evidence for the existence of the flypaper effect. Most ad-hoc regressions use cross-section data, i.e., observations across recipients in some year, for estimation of (1). Degrees of freedom are gained by assuming that the coefficients A_{ij} and B_{ij} are the same for all recipients, i.e., that all recipients' behavioral responses are the same.

A typical, recent ad-hoc regression study was conducted by Bell and Bowman [1986] for the Minnesota Tax Study Commission. In their study, the dependent variable T_j was the 1983 net (of state paid credits) property tax levy of Minnesota city j containing over 500 residents. They reported m = 7 independent variables for 1983:

X_{1j} = city j's per capita property tax revenue from one equalized mill.

X_{2j} = share of city j's property tax base composed of apartments, commercial/industrial and seasonal/recreational properties.

X_{3j} = per capita state-paid property tax credits to residents of city j.

X_{4j} = per capita local government aid paid to city j.

X_{5j} = per capita federal aid paid to city j.

X_{6j} = percent of city j's population aged 16 or younger.

X_{7j} = property tax share (including special assessments) of city j's own-source revenue.

With the exception of X_6, Bell and Bowman found all there variables to be statistically significant, positive determinants of city net property tax levies. Thus, their recent findings for Minnesota are consistent with the bulk of the pre-existing evidence from other aid programs. That is, state aid to cities results in higher local government spending out of their own revenue sources.

Theory-Based Econometric Estimates

More elaborate versions of the partial equilibrium utility maximization model of grants (see, e.g., Wilde [1968]) comprise most of the theory-based models. Whitman and Cline survey four such studies, done prior to 1974. Since then, a few more such models have cropped up, illustrated by one formulated and estimated by Slack [1980].

Slack assumes that recipient governments in Ontario, Canada, solve the following problem:

(2) $\max U_i(C_i, G_i)$

s.t.

$$C_i = M_i - T_i$$

$$G_i = (1+r)T_i + L_i + O_i$$

where C is private spending within the recipient jurisdiction, r is a matching grant rate, L are unconditional, lump sum grants (in which he classifies revenue sharing), and O are other miscellaneous revenues. Unlike other authors, Slack attempts to incorporate

the fact that "unconditional" revenue sharing grants are allocated by formulae, which in Ontario include the previous year's tax effort T^{t-1} as a factor. He represents the allocation as:

$$(3) \qquad L_i = a_0 + a_1 \frac{G_i - G_i^{t-1}}{G_i^{t-1}} + a_2 T_i^{t-1} + a_3 Pop_i$$

where the superscript t-1 is the year 1973 and all other variables are for the year 1974, and where Pop_i is recipient jurisdiction i's population.

After substituting (3) into (2) Slack assumes, as do all other authors, that all recipients have the same utility function $U_i = U$; i = 1, ..., N. He uses 3SLS to estimate simultaneous reduced form linear equations resulting from maximization of a Stone-Geary utility. He repeats the procedure for a translog indirect utility specification. In each case, there are 50 observations, consisting of 1973-74 data from 50 municipal governments in Ontario.

Slack's results showed that "unconditional" lump sum grants were very substitutive, with virtually all of the intergovernmental aid being used for local tax reduction. This stands in sharp contrast to most other studies. Whitman and Cline report that virtually all studies surveyed indicated stimulation. Some of these studies mixed lump sum and matching grants into one variable, while others separated them. Still others (O'Brien [1971], Pogue and Sgontz [1968]) resorted to procedures to remove the simultaneous equations' upward bias resulting from recipient taxes occurring as both dependent and independent variables. The

latter occurs when matching grants and/or tax effort revenue sharing are treated as exogenous independent variables. Yet, virtually all of these models find that even truly lump sum grants are stimulative of higher recipient taxes. A notable exception to this outcome, though, occurs in the study of Gramlich and Galper [1973]. Like Slack, they treat revenue sharing as an exogenous, lump sum grant in their complex, quadratic utility-based time series model. They report that revenue sharing will result in substantial substitution, with between 56 and 75 cents of every revenue sharing dollar being used for tax reduction.

Slack reports mixed findings about the impact of matching grants, however. The Stone-Geary utility specification resulted in a large stimulative effect, with one dollar of matching aid resulting in an additional 1.28 dollars of recipient taxes. The translog specification, though, indicated a high degree of substitution, with a dollar of matching aid reducing recipient taxes by 57 cents. Again, most other studies indicate that matching grants are stimulative, although Gramlich and Galper are the exception again. They show that matching grants are substitutive, with a dollar of matching aid resulting in a local tax reduction of 20 cents. In addition, they agree with virtually all other researchers that matching grants are more stimulative than lump sum grants.

A model based on voting theory has recently been constructed by Craig and Inman [1986]. They found that "the Federal match requirement brings more dollars into the target programs, but it also provides state legislators with a reason to increase

taxes and to reallocate all of that increase to their favored programs in OEXP." (Craig and Inman, p. 205.) OEXP is their notation for state expenditures on all things besides aids to local education and welfare programs.

Finally, most of the theory-based estimates also support the existence of the flypaper effect. Henderson [1968], for example, shows that virtually all of a dollar increase in personal income is privately spent, whereas a dollar increase in inter-governmental revenue actually reduces local private spending, i.e., stimulates recipient taxes. Gramlich and Galper find that a dollar increase in revenue sharing, with they classify as a lump sum grant, is five times more stimulative than a dollar increase in income. Craig and Inman [1986, p. 207] concluded that "Our results also confirm the presence of a flypaper effect on state budgets. Most all of private income stays in private hands; most all of public aid dollars stay in the public sector." Slack, unlike other authors, restricted his model so that income changes always have the same impact as unconditional grants. In contrast, Zampelli [1986] concluded that federal revenue sharing and state general revenue support to 18 U.S. cities between 1974 and 1978 did not cause a flypaper effect.

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Appendix 2

The Effects of Classification Ratio Changes
on the Distribution of Tax Bills.

Summary

    This appendix shows that the classification system was
used in the 1970s for a perverse purpose. Property tax bills were
shifted toward property owners of commercial and industrial prop-
erties, and away from owners of homes and farms. The size of the
shift is uneven across tax districts. The former group's property
wealth barely kept pace with inflation, while the latter groups'
property wealth grew well in excess of inflation. Thus, taxes
were unevenly shifted away from those whose wealth had grown, and
toward those whose wealth hadn't grown--a vertical inequity. Any
shifting of the resulting tax burden wouldn't improve vertical
equity, either.

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    Minnesota Department of Revenue reports (Dept. of Reve-
nue [1985], pp. 36-36) contain valuation data commencing with
properties assessed in 1973. In the subsequent seven years, the
real (i.e., inflation adjusted) market value of major property
classes (as adjusted for the consumer price index) grew unevenly,
as shown in table 2.1 below:

Property Class	Real Market Value Growth	Real Taxable Assessed Value Growth
Agricultural	+230%	+62%
Owner-Occupied Homes	+111%	+9%
Commercial/Industrial	+7%	+7%

TABLE 2.1: Growth of Real Wealth, '73-'80.

The first column in Table 2.1 shows that real farm value more than tripled, while real home value more than doubled. Meanwhile, commercial/industrial property value growth barely kept pace with inflation. The effects of classification are seen in the second column. Classification adjustments and/or bad assessment practices were used to slow the growth of both home and farm taxable, assessed values. In fact, hardly any of the doubling of real homeowner property wealth was taxed! Because of this, effective tax rates on homeowners and farmers fell relative to that paid by owners of commercial industrial property.

To see how this occurred, consider a taxing district with just two property classes: owner-occupied homes and commercial/industrial property. For our purposes, there is no need to consider split classification or other classes of property. Without loss of generality, we assume that commercial/industrial property is taxed at its full market value. We also adopt the usual assumption that there is no capitalization of tax changes into market values. Using the following notation:

H = aggregate market value of taxing district.

B = aggregate market value of commercial/industrial property.

r   = favorable classification ratio applied to homes; i.e.,
      $r < 1$.

m   = taxing district property tax rate.

T   = property taxes raised in the district.

V   = taxable, assessed value of the taxing district.

S   = homeowner's share of district taxes.

t_B = effective tax rate paid by commercial/industrial property.

t_H = effective tax rate paid by home owners.

^   = percentage change of the variable it is placed on.

In this notation, we have:

(1) $V = rH + B$

(2) $T = mV$

(3) $S = rH/V$

Logarithmically differentiating (1)-(3) we derive the fundamental relations governing percentage changes:

(3) $\hat{T} = \hat{m} + \hat{V} = \hat{m} + (\hat{r}+\hat{H})rH/V + \hat{B}B/V.$

(4) $\hat{S} = (\hat{r}+\hat{H}) - \hat{V} = (\hat{r}+\hat{H}) - \hat{T} + \hat{m}$

Substituting (3) into (4) and simplifying yields the result that:

(5) $\hat{S} = \left(\hat{r}+(\hat{H}-\hat{B})\right)B/V.$

So, homeowners' share of district taxes won't rise when home taxable, assessed values (i.e., $\hat{r} + \hat{H}$) are prevented from growing more rapidly than business market value (i.e., $\hat{B}$) does.

Table 2.1 shows that this is precisely what classification achieved. The legislature had to adjust r downward ($\hat{r}<0$) to counter the huge increase of H relative to B ($\hat{H}-\hat{B}$). In doing so, $\hat{S}$ was kept close to zero.

Note also from (5) that the precise change in the home-owners' share of taxes depends on the fraction of commercial/industrial property in a taxing district (B/V). Decreases in the classification ratio r do less to help homeowners in districts with small fractions of commercial/industrial property, while doing more for homeowners in districts with large fractions. The distribution of homeowner aid from classification ratio changes is thus uneven across districts.

But what happens to the effective tax rates paid by commercial/industrial property owners and by homeowners in any district? Using the relations:

(6) $t_B = mB/B = m$

(7) $t_H = mrH/H = mr$

logarithmically differentiate to find:

(8) $\hat{t}_H - \hat{t}_B = \hat{r} < 0$

so

(9) $\hat{t}_B > \hat{t}_H.$

Thus, changes in classification ratios caused the effective tax rate on commercial/industrial property owners to rise relative to that on homes.

In this way, the payment of tax bills is shifted toward owners whose property wealth is growing the least. This does not appear to be vertically equitable.

While commercial/industrial property owners might be able to shift some of the burden to their workers or customers, this is unlikely to eliminate the vertical inequity. For example, local service businesses, such as retail stores, might be able to

pass some of the added burden onto their customers. But this would constitute a de facto sales tax, already known to be regressive. Passing the burden back to predominantly low wage service workers is no better.

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Appendix 3

Summary

Tables of tax burden shifts caused by changes in current
state and local tax policies are often based on five erroneous
assumptions. Four of the five erroneous assumptions lead the
usual method to overstate a shift of tax burdens away from busi-
ness property owners and towards the majority of residents and
farm owners. The fifth incorrect assumption leads it to overstate
the shift of tax bills paid, but not necessarily the burdens
borne. Because of the documented strength of these five effects,
burden estimates which ignore these effects will vastly overstate
the size of any burden shift away from business property owners.
Policymakers should be wary of computer simulated "burden tables,"
which often measure the wrong quantities (tax bills) with high
accuracy, instead of the right quantities (actual burden shifts)
with less accuracy.

•   •   •

Legislative staff and special interest lobbyists often
employ computer simulations of tax systems, to highlight purported
shifts in tax burden implied by new tax proposals. These computer
programs typically contain both the existing tax laws and the key
characteristics of tax filers needed to compute a taxpayer's bill
under these laws. The programs are often capable of displaying
various distributions of tax bills paid. Frequently computed
distributions include the distribution of bills paid across prop-
erty classes (e.g. residences, farms, commercial properties,
etc.), the distribution of bills paid across incomes, and the
geographic distribution of tax bills paid.

Insofar as these programs are used solely to display the current distribution of tax bills paid under current law, they will not mislead policymakers. However, these programs are seldom used solely for this purpose. These programs are also used to infer the true burden of current tax law, by implicitly (and incorrectly) assuming that the distribution of tax burdens is the same as the distribution of tax bills. And these programs are also used to simulate the changes in tax bills which would result from changes in existing tax laws, implicitly making additional incorrect assumptions in doing so.

This paper investigates both of these misleading uses. We show that, in this case, the usual incorrect assumptions all work to overstate the increased burden on residents resulting from major reforms of Minnesota's intergovernmental aid system described in this paper. When viewed in the light of reality, the proposed reforms will not significantly increase the burden on homeowners, and needn't increase the burden on any homeowners other than the extremely wealthy. We analyze the impacts of the following reforms:

(1) Eliminate property tax classification.
(2) Eliminate all existing credits, refunds and the local government aid to cities and counties.
(3) Combine all state funds saved by (2) into one SALT program of cash payments to residents.

A typical estimate of the tax burden shifts which would follow the above reforms would proceed as follows. First, all

classification ratios would be reset to unity. Second, the dollar value of all existing credits, refunds, and the local government aid would be added to the local property tax levy. Third, given these two data changes, the aggregate property tax bills paid by the various classes can be recomputed. Finally, SALT payments would be subtracted from the homeowner and renter classes aggregate tax bills, to obtain a net bill for residences. The difference between bills paid before and after the reforms would be the estimated change in burden.

Following this procedure would undoubtedly imply a shift in burden toward homeowners and owners of medium to large agricultural enterprises. It would also show a shift in burden away from all other property, primarily commercial and industrial property. The appearance of this shift would be magnified by comparison with the status quo, in which the former groups pay very low effective tax rates while the latter groups pay very high effective tax rates (see table one in the text).

Policymakers might worry about the implications of this alleged burden shift. But before they do, they should bear in mind that five incorrect assumptions are made in the usual burden estimation procedure. All of them make the shift appear bigger than it is. They are:

INCORRECT ASSUMPTIONS OFTEN MADE IN COMPUTER BURDEN ESTIMATES

1. Except for residential landlords, tax burdens aren't shifted to others, i.e., the burden is borne by the person paying the tax bill.

2. Total government spending, and hence, total property taxes raised, are not changed by the enacted reforms.

3. Tax burdens aren't significantly changed by their deductability from Federal and State taxable income.

4. It is reasonable to analyze tax burdens by classifying taxpayers into homogeneous classes for which data are readily available, e.g., all homeowners, all farm owners, all homeowners living in some county, etc.

5. Capitalization of property tax changes into market values of property does not occur.

We analyze the effects of each of these mistakes in turn.

First, tax burdens are often shifted away from the owners of taxed property. Indeed, the central tenet of modern tax analysis is that the burden is often shifted by economic adjustments people make in response to changes in tax bills (see any recent text on public finance, e.g., Atkinson and Stiglitz [1980]). This fundamental fact is not ignored in many simulations of Federal tax policy changes (see Scarf and Shoven [1984]), but is usually ignored in simulations constructed by state lobbyists and legislative staffs, at least in Minnesota. For example, competitive local service businesses that don't operate with lots of "personal property" (e.g., retailers and restaurants) pay relatively high property tax bills in Minnesota. Their customers do not have easy access to similar firms paying lower taxes in other states. Because of this, it is probable that part of the burden of these relatively higher taxes has been shifted to consumers of these local services--a de facto excise tax. Because excise taxa-

tion is generally regressive, what was intended to be a progressive measure, i.e., the taxation of business owners' property, becomes partly a regressive measure. While the business owners pay the bill, the burden falls partly on their customers as well. Such excise tax burdens on customers are likely wherever business property tax rates are relatively high, and where customers cannot easily avoid doing so by obtaining similar goods from lesser taxed businesses (see Mieszkowski [1972] and Sonstelie [1979]).

Because a share of the business property tax bill reductions listed in table 3.1 would go to the local service sector, which is one of the faster growing sectors in the Minnesota economy, the regressive excise burden on their resident/customers would also fall. Thus, the burden on residents will be partly lessened by the business property tax reduction. This would lessen the actual size of the alleged shift.

Also listed as part of incorrect assumption number one is the commonly made guess that taxes on rental apartment property are wholly borne by apartment tenants. On the contrary, some believe that some of the burden, if not all of it, is borne by landlords and other owners of taxed capital (see Aaron [1979]). This may be especially true in periods of relatively high vacancy rates and/or high tenant mobility into home ownership. To the extent that landlords, rather than tenants, bear the burden of the property tax, the first assumption is in error. The burden on apartment tenants would be accordingly lower than indicated.

Second, it is extremely unlikely that the reform package will leave total state and local spending unchanged. The reason for this is the incentives for lower local spending growth inherent in the proposed State Aid to Local Taxpayers (SALT) program. A massive amount of scientific literature has indicated that payments from higher level governments (like states) to lower level governments (like cities) results in higher combined spending than if payments were paid directly to resident/taxpayers of those lower level governments. This finding has been dubbed the "flypaper effect", because aid from higher level governments sticks where it hits. The flypaper effect has been documented in numerous contexts (see, e.g., review articles by Gramlich [1977], Oates [1979], and appendix 1 in this paper). The flypaper effect has also been dramatically established by Bell and Bowman [1986] using recent Minnesota data, in work accepted by the blue-ribbon Latimer Commission.

It is important to note that this scientific research is conducted using well established, multivariate statistical methods which are the hallmark of serious research in the physical and social sciences. It is essential that multivariate methods be used, for they are the only way to control for other factors which may have affected the relationship between higher level government payments and lower level government spending. Failure to do so invites fallacious conclusions.

For an example of such a fallacious conclusion, consider the following chart, contrasting rapidly growing state and local spending with rapidly falling net farm income in Minnesota.

GOVERNMENT EXPENDITURES AND NET FARM INCOME
MINNESOTA
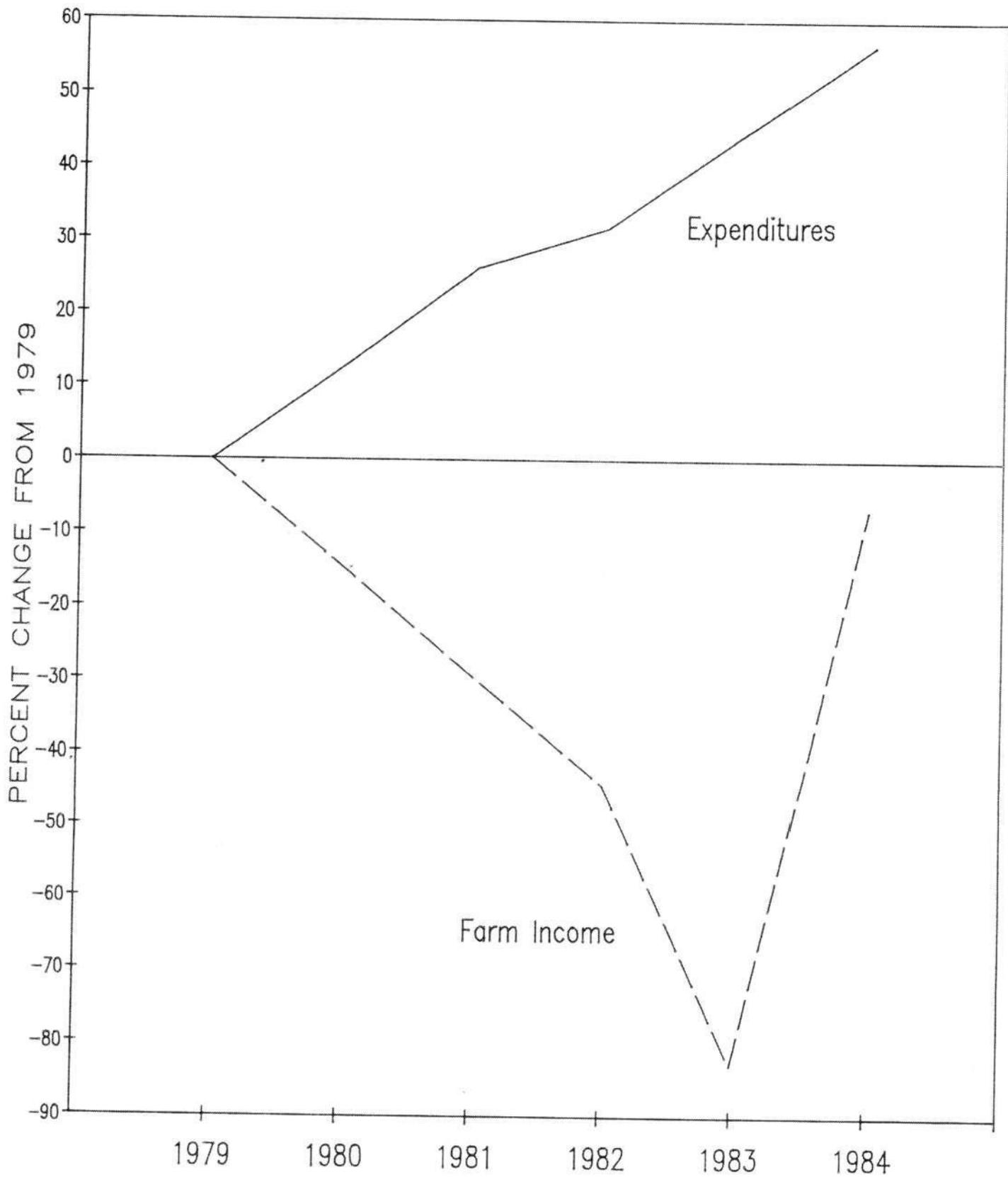
No one would seriously suggest that rising state and local spending caused the farm problem. Clearly ,there were other factors at work, including the strong value of the dollar, increased food production abroad, and foreign tariffs against U.S. farm exports. Correlation of the two series, in this case negative (-.42), does not imply causation. Only multivariate statistical studies can separate the wheat from the chaff, so to speak, to discern how important each of these factors are in causing the decline of net farm income. A competently done study of this type would undoubtedly rule out Minnesota spending as a major factor in the decline of agriculture.

We have just seen how dangerous it is to infer causation from a simple correlation of two data series. An equally serious mistake is to do the converse, i.e., to infer a lack of causation from a lack of simple correlation. Yet there are those who would replace the net farm income series with a series of Minnesota state aid values, which have not always moved in lockstep with state and local spending, and infer that there was no relationship between them. This simpleminded analysis ignores the fact that myriad factors influence state and local spending in any given year, e.g., personal income growth, number of students enrolled in public schools, highway maintenance needs, etc. What is relevant is whether or not state and local spending is higher than it would have been in the absence of state aid, which can only be determined after a multivariate accounting for the effects of these other factors.

Bell and Bowman [1986] carried out precisely such an analysis for Minnesota, and concluded that" ... the size of the local public sector is larger with these property tax relief programs than without them.... But the stimulus is decidedly stronger for property tax credits than for local government aid" (Bell and Bowman, op. cit, p. 358). As listed in appendix 1, these findings corroborate a large number of earlier statistical studies conducted for different areas and time periods. Aid sticks where it hits, and that is that. Because of that, effective property tax relief must be sent directly to the property tax payers, rather than to their local government officials.

In summary, both property tax credits and local government aid stimulate higher combined state and local spending. The reform proposal entirely replaces the most stimulative payments (the over $700 million in credits) and another stimulative payment (local government aid) with SALT payments to taxpayers. Due to the flypaper effect, the rate of local spending growth would fall, lowering the property tax burden of all taxpayers, including residents and farm owners. Again, this effect would lessen the allegedly higher burden on residents incorrectly implied by ignoring it. Because of the size of the proposed SALT program, the reduction of burden could be quite substantial.

Third, Stinson and Vanderwall [1986] have called attention to the fact that deductability of property tax payments from State and Federal taxable income significantly changes estimates of the burden of the Minnesota property tax. The reduction in tax bills of business property owners would raise the owners' income

tax payments. Owners living in Minnesota will thus bear a higher burden of total Minnesota taxes than indicated by looking at the property tax alone. Some residents (those that itemize deductions) and farm owners, of course, will bear a smaller burden than indicated, for their state income tax liabilities will fall as a result of larger property tax reductions. Once again, we see that the shift in burdens are less than typically estimated.

Fourth, it is misleading to lump taxpayers into homogeneous classes. Within the class of homeowners, there are high income, moderate income, and low income people. The same is true of the class of farm owners, and of the class of business property owners. Unlike the current credits, the proposed SALT aid explicitly depends on both the taxpayer's income as well as her property value. As such, it makes more sense to examine the distribution of tax bills along the income dimension. It is doubtful that policymakers would be as concerned about a shift of burden toward residents and farm owners if all the burden fell on the wealthy residents and farm owners. Yet that is the intent of the SALT program.

Fifth and finally, there is some evidence that property tax bill changes may get capitalized into the market values of the taxed property (see, e.g., Oates [1969]). If so, business property values should rise as a result of lower tax bills, while wealthier homeowners and farm owners' property values should fall somewhat. As such, the actual tax bills paid by business property owners will be higher than indicated, while bills paid by wealthy residents and farm owners will be lower than indicated. But the

latter is small consolation for residents and farm owners, whose actual burden then includes the fall in their property values. Thus, while capitalization lessens the differences in tax bills paid due to the reforms, it doesn't really change the burden.

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Appendix 4:

A Method for Distributing SALT

Summary

We detail a method for distributing State Aid to Local Taxpayers (SALT) revenues directly to residents. The method distributes a fixed total appropriation to best achieve a pre-specified mix of horizontal and vertical equity. Data requirements are modest, and could most easily be obtained by having residents file for SALT in conjunction with their state income taxes.

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For purposes of this appendix, we make the following common (albeit not necessarily accurate) incidence assumptions. First, we assume taxes on rental housing are wholly borne by tenants. Second, we assume property taxes on business property are borne wholly by business, i.e., it is not shifted to consumers and/or workers. Third, capitalization of fiscal disparities into property values do not occur.

Due to our third assumption, fiscal disparities among local taxing units creates the horizontal inequity described in the text (but also see footnote 4 following the text). To remedy it, consider a taxing unit in our reformed system, with no classification nor credits. For simplicity, lump all property into two categories: housing and business. Adopt the following notation:

I_{ik} = current taxable income of the ith resident of the kth taxing unit.

H_{ik} = taxable, assessed value of the ith resident's dwelling in the kth taxing unit.

B_k = taxable, assessed value of the business property in the kth taxing unit.

R_{ik} = SALT payment to resident i of the kth taxing unit.

m_k = property tax rate of the kth taxing unit.

pop_k = population of the kth taxing unit.

T_k = total property tax collections of the kth taxing unit.

V_k = per capita property tax base of the kth taxing unit.

= $\left(\sum_i H_{ik} + B_k \right) / pop_k$.

Consider the state as a hypothetical, aggregate taxing unit, containing the state's total property tax base $\sum_k V_k pop_k$ and raising statewide property tax revenues $T = \sum_k m_k V_k pop_k$. Dividing the latter by the former yields a statewide average mill rate, denoted $\bar{m}$.

To achieve horizontal equity, the state must equalize effective net (of SALT) property tax rates paid by residents, as if they were all living in the hypothetical, statewide aggregate unit. To do so, first compute what a resident's effective tax rate would have been, had their taxing unit spent the same amount per capita as the hypothetical, statewide unit. The latter is:

(1) $\qquad T / \sum_k pop_k = \bar{m} \sum_k V_k pop_k / \sum_k pop_k$

while taxing unit k's actual per capita spending is

(2) $\qquad T_k / pop_k = m_k V_k$

Equating (1) and (2), solve for the hypothetical tax rate, denoted m_k^*, which would have given unit k the statewide aggregate per capita spending.

(3) $\qquad m_k^* = \bar{m}\left(\sum_k V_k pop_k / \sum_k pop_k\right)/V_k$

The state must provide a SALT payment R_{ik}^h to make $m_k^* = \bar{m}$. The net (of SALT) effective property tax rate paid by resident i is $(m_k^* H_{ik} - R_{ik}^h)/H_{ik}$, or

(4) $\qquad m_k^* - R_{ik}^h/H_{ik}.$

Equating (4) to $\bar{m}$ and substituting (3) yields the SALT transfer R_{ik}^h required to achieve horizontal equity:

(5) $\qquad R_{ik}^h = H_{ik}\bar{m}\left(\left(\sum_k V_k pop_k / \sum_k pop_k\right) - V_k\right)/V_k$

or

(5') $\qquad R_{ik}^h/H_{ik} = \bar{m}\left(\left(\sum_k V_k pop_k / \sum_k pop_k\right) - V_k\right)/V_k$

Thus, to achieve horizontal equity, SALT payments must be proportional to the residents' home value. The proportionality factor is the product of the statewide average mill rate $\bar{m}$, and the percentage deviation of the statewide average per capita tax base from unit k's per capita tax base. Residents of units with below average tax bases would receive positive SALT payments, while residents of units with above average per capita bases would be docked--an undesirable negative payment.

The second purpose of SALT is to achieve vertical equity. Under our proposed reforms the property tax system is propor-

tional in SALT's absence. The state may strive to use SALT to achieve some target level of progressivity.

To see how this may be accomplished, we first have to define what is meant by a target level of progressivity. In doing so, we must settle on a reasonable measure of ability to pay. Rather than using either current income or property wealth, one could combine the two. To do so, first impute an annual "property income," which discounts to the resident's home value. That is, annuitize H_{ik} by multiplying it by a suitable capitalization rate, denoted by c, which can conveniently be taken to be some current, long-term, private sector interest rate. For renters, this imputed property income would approximate their annual rent payments, less depreciation on their rental property. For owner-occupiers, the imputed property income is the discounted present value of what they could annually earn (before tax), if they invested the total value of their home at the capitalization rate d. Adding imputed property income to current income yields a comprehensive measure of ability to pay, which I'll call full income Y_{ik}, i.e.,

(6) $\qquad Y_{ik} = I_{ik} + cH_{ik}$

To define the level of progressivity, the state may choose any increasing function f for the net (of SALT) effective tax rate:

(7) $\qquad \bar{m}H_{ik}/(Y_{ik}+R_{ik}) = f(Y_{ik}); \; f'(Y_{ik}) > 0.$

substituting (6) and solving for R_{ik} yields the solution:

(8) $R_{ik}^V = \left(\bar{m}H_{ik}/f(Y_{ik})\right) - Y_{ik}$

or using (6)

(8') $R_{ik}^V/H_{ik} = \bar{m}/f(Y_{ik}) - I_{ik}/H_{ik} - c$

For example, if the state desires that the net effective tax rate rise at a linear rate per dollar of full income, denoted "a," they would pay SALT equal to:

(9) $R_{ik}^V = (\bar{m}H_{ik}/aY_{ik}) - Y_{ik}$

Using (9) for concreteness, it is easy to see that R_{ik}^V falls with increases in the current income component I_{ik} of Y_{ik}.

Just as in (5), (8) might require payments from some residents to the state. Those residents would have sufficiently high ratios of current income to imputed property income to cause (8') to be negative.

Comparing (5) with (8), we see that there is an obvious tradeoff in achieving both horizontal and vertical equity--they require different formulas. Furthermore, we have only a fixed amount of state revenues Q to distribute, and we don't want to allow negative SALT payments, i.e., payments from residents to the state.

How then can the state produce a desirable distribution of SALT?

The best it can do is to produce a distribution of SALT solving the following simple quadratic programming problem:

(P) $\min_{R_{ik}} \frac{1}{2} \sum_i \sum_k \left[(R_{ik}-R_{ik}^h)^2 + w(R_{ik}-R_{ik}^V)^2\right]$

s.t.

$$(10) \qquad \sum_i \sum_k R_{ik} \leq Q$$

$$(11) \qquad R_{ik} \geq 0, \text{ for all } i, k.$$

where w is the state's desired tradeoff weighting of vertical equity relative to horizontal equity. Problem (P) minimizes the (weighted) sum of squared deviations of nonnegative SALT payments from their ideal levels. Expanding the squared terms in (P), it is easy to see that the optimal $R_{ik} = 0$ whenever $R_{ik}^h + wR_{ik}^v \leq 0$.

In fact, the Kuhn-Tucker conditions, which, are sufficient for a global minimum to the convex problem (P), are:

$$(12) \qquad (1+w)R_{ik} - (R_{ik}^h + wR_{ik}^v) + \lambda - \mu_{ik} = 0$$

$$(13) \qquad \lambda\left[\sum_j \sum_\ell R_{j\ell} - Q\right] = 0$$

$$(14) \qquad \mu_{ik} R_{ik} = 0$$

$$(15) \qquad \lambda, \ \mu_{ik} \geq 0$$

for all i, k.

We will assume that the target levels are such that the optimum solution distributes all the appropriated funds Q, i.e., that (10) is binding. Generally, then, $\lambda > 0$. For anyone receiving a SALT payment $R_{ik} > 0$, (14) implies that $\mu_{ik} = 0$.

Let N be the number of residents who receive SALT payments. Summing (12) over these residents allows us to solve for the positive λ:

(16)
$$\lambda = \Big[\sum_{\substack{j \\ R_{j\ell}>0}} \sum_{\ell} \big(R_{j\ell}{}^h + wR_{j\ell}{}^v\big) - (1+w)Q\Big]/N > 0.$$

Substituting (16) into (12) yields the payments in situations where it is optimal to exhaust the fund Q:

(17)
$$R_{ik} = \Big[Q - \sum_{\substack{j \\ R_{j\ell}>0}} \sum_{\ell} \big(R_{j\ell}{}^h + wR_{j\ell}{}^v\big)/1{+}w\Big]/N + \big(R_{ik}{}^h + wR_{ik}{}^v\big)/1 + w.$$

(16) implies that the first term in (17) is negative.

As long as the appropriation Q is smaller than the weighted aggregate target $\big(\sum_{j}\sum_{\ell} R_{j\ell}{}^h + wR_{j\ell}{}^v\big)/1 + w$ for j, ℓ such that $R_{j\ell}{}^h + wR_{j\ell}{}^v > 0$, (17) will be the solution to (P). The share of the fund Q received by the ith resident of the kth community is thus,

(20)
$$\frac{R_{ik}}{Q} = 1/N + \Big[\big(R_{ik}{}^h + wR_{ik}{}^v\big) - \big(\sum_{j}\sum_{\ell} (R_{j\ell}^h + wR_{j\ell}^v)\big)/N\Big]/1 + w.$$

summed over j, ℓ such that $R_{j\ell}^h + wR_{j\ell}^v > 0$.

Equation (20) has a simple interpretation. The share of Q paid to a resident is higher than an equal share when her target sum $R_{ik}^h + wR_{ik}^v$ exceeds the average target sum of those receiving payments. Otherwise, it is lower than an equal share.

To implement SALT, the state need only gather information sufficient to compute the target levels (5) and (8) or (9). This is easily done by having residents file for SALT along with their state income tax filing. Their property tax records can then be used in conjunction with the income tax filings to impute

full income for each resident. The taxing unit for a resident would be the overlapping districts containing the resident. After settling on a measure of the desired degree of progressivity, e.g., the constant a in (9), and the desired weight factor w, the state churns out (5), (9), and (20). Finally, the state mails the checks given by (20) to the happy residents, most of whom had previously never received any direct property tax relief.

This method can be generalized in several directions. First, more complicated objective functions could be used. For example, a quadratic penalty term penalizing large deviations from residents' previous net tax bills could be added. Experimenting with different penalty weights would allow the state to achieve a politically feasible mix of horizontal and vertical equity, should the optimum prove impossible to adopt. Second, other important structural features of the tax system could be used in deriving (5) and (8), e.g., deductability of the property tax from state income taxes. Third, other well-posed concepts of horizontal and/or vertical equity could be used.