THE IMPACT OF MUNICIPAL ELECTRIC PROFITS
ON LOCAL PUBLIC FINANCE

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ABSTRACT

Several financial and distributional implications of municipal electric profits are examined for cities in North Carolina. Profits are found to reduce own-revenue collections. After controlling for per capita income and population, per capita own-revenues in cities with public electric companies are observed to be 25% to 45% lower than in other cities. Substantial exporting to nonresidents is also indicated; the median rate of exporting is estimated to be approximately 10%. Finally, the impact on general revenue sharing entitlements for all types of local governments is analyzed when profits are included in tax effort.

I. Introduction

Municipally-owned utilities sell electric power to nearly one-seventh of the population in the United States, a fraction that has about doubled since the mid-thirties.[1] These sales have consistently generated revenues in excess of operating expenses (including depreciation) and payments to debtholders. In fact, 98.8% of the statements filed with the Federal Power Commission by city-operated electric utilities during 1951–1971 reported positive net incomes.[2] Profits in many cities have been substantial when compared with revenues raised by local taxation.

We seek in this paper to examine the budgetary impact of municipal electric profits, their implications for horizontal and vertical equity, and the import of their inclusion in measured "tax effort" on general revenue sharing allocations. Section II provides background material for the study. Section III analyzes the effects of municipal electric profits on the composition of local public finance. Section IV analyzes some equity issues which are raised by municipal electric profits and considers how they might relate to revenue-sharing allocations.

II. Background

While city-owned electric utilities are operating at profitable levels throughout the nation, the data base for this study includes only the cities and towns of North Carolina. The major reason for limiting the study to one state is the desirability of eliminating variations in local governmental financial data that would be caused by interstate differences in state laws which assign public functions to state governments, county governments, townships, towns, and special districts.

Municipalities in North Carolina may levy property taxes and sales taxes (when imposed countywide), issue licenses, and engage in the profitable sale of alcoholic beverages. The sum of these collections is referred to as "own-revenue," data for which are taken from *Statistics of Taxation: 1972*, published by the North Carolina Department of Revenue.

In addition to collecting own-revenues, seventy-two towns and cities, called "ElectriCities," distribute electric power to 13.4% of the state's population. In many respects they would be indistinguishable from a random sample drawn from the 424 incorporated places in the state. For instance, ElectriCities are situated rather evenly throughout the state, and the per capita income of persons in ElectriCities ($2577 in 1969) is very close to the statewide average ($2492).[3] ElectriCities, however, tend to have larger populations.

TABLE 1

Average Per Capita Profits, ElectriCities
(58-sample)

SIZE GROUP	PROFITS	RELATIVE TO PROPERTY TAXES	RELATIVE TO OWN-REVENUE
I	$33.74	128.1%	99.6%
II	$32.20	94.5%	68.8%
III	$38.65	121.3%	98.3%
IV	$48.73	103.4%	87.2%

Exactly one-fourth of the ElectriCities fall into each of the following categories: group I cities, having fewer than 1500 persons; group II cities, having 1500 to 2999 persons; group III cities, having 3000 to 8999 persons; and group IV cities, having 9000 or more persons. The proportional representation of the 352 nonElectriCities in the same groups is 67.3%, 13.6%, 13.1%, and 6.0%, respectively.[4] Because financial data for ElectriCities will be compared to data for other places in reaching conclusions, it is advisable to control for variations that may be due to city size or correlates of city size. Consequently, comparisons between ElectriCities and nonElectriCities will be confined to towns and cities that are in the same population group.

The reports of ElectriCities to the State Utilities Commission for 1973 provide the basic data on nonresident customers served, sales revenue, and net income. Because some utilities treat money transfers to a city's general fund and/or the free provision of power to other municipal entities as uncompensated expenses of the utility, it was necessary to adjust reported net incomes in order to obtain a more accurate figure of profits which utilities can make available to their local governments. Information complete in all respects could be found for fifty-eight of the ElectriCities, a subset that is referred to as the "58-sample."

All of the utilities in the 58-sample operated profitably in 1973. The mean per capita profits earned are shown by city size in column one of Table 1. To put these amounts into perspective, they are expressed both as percentages of mean per capita property taxes collected in ElectriCities (column two) and as percentages of mean per capita own-revenue collected in ElectriCities (column three). Municipal electric profits evidently play a major role in the transfer of purchasing power to local governments in these places. On average they exceed property tax collections [5] and come close to matching all own-revenue collections.

III. Profits and the Composition of Finance

Our assumption is that North Carolina towns of given size, whether ElectriCities or not, tend to raise the same amount of local revenue for financing the array of local public services that is common for their size. For ElectriCities this local revenue is own-revenue plus electric profits not retained for investment by the utility; for other places it is simply own-revenue. The assumption seems quite reasonable given the geographic dispersion of ElectriCities and the unexceptional economic status of their populations relative to other towns.

In one polar case of this model, where all profits are reserved for investment in the electric utilities, one would expect own-revenue collections in ElectriCities to mirror those in nonElectriCities of comparable size. At the other extreme, where nothing is retained for

investment, one would expect own-revenues in ElectriCities to run below those in nonElectriCities of comparable size, the difference being made up by a dollar-for-dollar substitution of profits for own-revenue. In the intermediate case one should find own-revenues to be smaller in ElectriCities than elsewhere, but the difference should not be as great as the electric profits earned.

To ascertain whether and how the existence of municipal electric profits may have affected the composition of local public finance, we first test the null hypothesis that the means of three per capita revenue figures do not differ between ElectriCities and nonElectriCities. Table 2 displays the results by population group. The pattern is clear. Per capita property taxes, other own-revenue, and all own-revenue are in every instance lower for ElectriCities than for other localities of comparable size. The statistical reliability of these differences, as indicated by P-values,[6] is very strong for property taxes[7] and all own-revenue. Note moreover that the observed differences are not as great as the corresponding mean per capita profits reported in Table 1. In short, the evidence is consistent with the "intermediate" case described above. The difference between own-revenues in nonElectriCities and ElectriCities is too small for profits to be replacing own-revenue on a dollar-for-dollar basis, and too large for profits not to be functioning as partial substitutes for own-revenue.

To check the possibility that our procedure does not control finely enough for effects of population and income on own-revenue levels, regressions of the following form are estimated:

$$PCOR = \beta_1 + \beta_2 E + \beta_3 P + \beta_4 PCY + \epsilon$$

PCOR denotes per capita own-revenue, exclusive of electric profits. E is a dummy variable equal to one for an ElectriCity and equal to zero otherwise. P is 1970 population and PCY is 1969 Census per capita income. At issue is whether the systematic differences in Table 2 are attributable to certain factors other than the existence of a municipal electric utility, in which case β_2 would equal zero. However the regression estimates displayed in Table 3 are compatible with our previous interpretation. The depressive effect of a profitable municipal electric utility on own-revenue, though now slightly smaller than the simple differences observed in Table 2, is statistically significant in three of the four groups.

In summary, municipal electric profits affect the composition of local public finance. They lower own-revenue collections, especially property tax collections. In magnitude they are sufficient both to substitute for the own-revenue foregone and to support some investment in the utilities. This pattern is observable in cities of all sizes, but appears to be more consistent in larger cities than in smaller ones.

IV. Profits and the Burden of Finance

The substitution of profits for own-revenue raises three sorts of distributional issues. They are examined in this section.

Horizontal and Vertical Equity

The horizontal equity criterion—that persons equally circumstanced be treated equally—has always been easier to state than to apply in the field of taxation. One approach to implementing the concept accepts a legalistic definition of the tax base as defining the "circumstances" and then examines tax payments as the "treatment." This is commonplace in literature on the taxation of owner-occupied dwellings. If two families in the same jurisdiction live on separate properties of identical market value and pay different amounts of property tax, then horizontal inequity is said to exist because legal standards would generally require uniform tax bills in such a case.[8] The well-known source of the inequity is the administrative difficulty of accurately assessing market value.

The relevance of all this to the main topic is that the same type of approach to horizontal equity may be applied to the revenue raised by ElectriCities in the form of profits. In particular, households in a given rate class that consume equal amounts of power (the "circumstances") should find their contributions to an ElectriCity in the form of profits (the

TABLE 2

Average Per Capita Own-Revenue

SIZE GROUP		ELECTRICITIES	OTHER CITIES	DIFFERENCE	|t|	d.o.f.	P-VALUE
	Property Taxes	$26.33	$44.90	$-18.57	2.39	113	.009
I	Other Own-Revenue	$ 7.53	$11.09	$- 3.56	1.36	52	.092
	(ALL) Own-Revenue	$33.86	$55.99	$-22.13	2.39	89	.009
	Property Taxes	$34.08	$55.99	$-21.91	4.06	62	<.001
II	Other Own-Revenue	$12.71	$13.47	$- 0.76	0.18	31	.429
	(ALL) Own-Revenue	$46.79	$69.46	$-22.67	3.03	54	.002
	Property Taxes	$31.87	$58.30	$-26.43	5.90	56	<.001
III	Other Own-Revenue	$ 7.43	$10.70	$- 3.27	1.78	36	.040
	(ALL) Own-Revenue	$39.30	$69.00	$-29.70	5.74	47	<.001
	Property Taxes	$47.15	$77.49	$-30.34	6.43	31	<.001
IV	Other Own-Revenue	$ 8.65	$10.74	$- 2.09	1.08	12	.151
	(ALL) Own-Revenue	$55.80	$88.24	$-32.44	6.46	33	<.001

TABLE 3

Regression Estimates

GROUP	β_1	β_2(E)	β_3(P)	β_4(PCY)	R^2	N
I	12.72	-14.87 (.57)	-.01 (.49)	.02* (2.36)	.03	255
II	-41.54	-16.40* (2.09)	-.01 (1.04)	.05* (5.70)	.43	66
III	34.66	-28.81* (4.72)	.001 (.34)	.01 (2.21)	.33	64
IV	39.14	-25.14* (5.37)	.0001* (2.81)	.01* (1.84)	.68	39

t-statistics are in parentheses

*denotes significance at levels less than .10 against two-sided alternatives

"treatment") to be very nearly equal. In this sense horizontal equity in ElectriCities is probably improved by the substitution of profits for own-revenue, for inconsistencies in the assessment of property are greater than in the pricing and sale of electricity.[9]

Vertical inequity of regressivity probably increases somewhat when municipal electric profits replace property tax collections. Davies [4] has estimated income elasticities of several tax bases at the local level, using four different concepts of income (net money income, Fisher income, permanent income, and net resources). His results indicate that payments for utilities constitute the most regressive of the twelve tax bases examined, regardless of the concept of income employed. In particular, expenditures on utilities respond proportionally less to changes in income (e.g., a 0.47% increase per 1% increase in net money income) than do expenditures for housing (0.63%). Our replication of Davies' procedure, in which expenditures for electric power in the South were considered instead of expenditures for all utilities nationwide, yielded only a slight deviation (0.49%) from Davies' estimate.[10] While this is a highly aggregative approach to the question, it is nevertheless suggestive of the regressivity which attends the raising of public revenue through municipal electric profits.

Yet one might still argue that poorer households in ElectriCities experience a net benefit from the public sale of electricity. Because municipal utilities borrow at subsidized rates and are taxed very lightly, if at all, they can and generally do supply electricity at lower rates than private companies. In 1971, for instance, municipal utilities nationwide charged households an average of 1.56 cents per kilowatt-hour while private companies charged 2.32 cents.[11] If these savings are regressively distributed, then the combined incidence of local taxes and electric bills may be less regressive in ElectriCities than in other cities. This line of reasoning applies if privately-supplied power is regarded as the only alternative to the status quo. It would clearly apply with more force if the municipal sale of power on a nonprofit basis were an alternative.

Exporting

When a city government replaces property tax collections with municipal electric profits, it reduces the amount of local levies that its residents can export because their contributions to profits are not deductible in computing state and federal income tax liabilities. On

TABLE 4

Exporting by ElectriCities, Per Resident

SIZE GROUP	AMOUNT	RELATIVE TO PROFITS	RELATIVE TO PROFITS PLUS OWN-REVENUE
I	$7.78	21.9%	11.8%
II	$3.34	9.9%	4.2%
III	$4.03	10.1%	5.0%
IV	$7.40	14.0%	6.9%

the other hand, a municipal utility that makes profitable sales outside the corporate limits of a town provides a new mechanism for shifting some of the burden of local public finance to nonresident buyers.

Fifty-four ElectriCities in the 58-sample retailed power to nonresidents and each one earned profits overall. The profits actually paid to non-residents are unknown due to the insufficient detail of reported data. Estimates of exported burdens were formed by prorating profits according to sales revenue received from residents and nonresidents. Their average values for ElectricCities of various sizes are expressed on a per resident basis in column one of Table 4. In column two these amounts are related to average total profits; in column three, to average profits plus own-revenue.

The estimated degree of exporting is most pronounced in the smallest ElectriCities where every fourth or fifth dollar of profit is paid by nonresidents. These contributions alone constitute at least one-ninth of the funds that are raised in own-revenues and municipal electric profits. The estimated degree of exporting tapers off in groups II and III and then increases among the largest ElectriCities. It is interesting to note that the median export rate for all ElectriCities, 9.8%, is very close to McLure's [10] estimate of the proportion of property taxes exported from North Carolina due to the federal offset, 8.7%. A gross comparison of the figures suggests that taxpayers in ElectriCities have *on average* experienced no net loss in the exportability of local levies by having substituted electric profits for own-revenue. This is a conservative statement since the tax exemptions granted municipal utilities, which enable lower electricity bills for their customers, have not been included in the comparison.

The foregoing discussion does not necessarily imply that nonresident customers as a class are exploited by this arrangement. In the first place they may be compensated by their use of an ElectriCity's streets, parks, library, and so on; and in the second place they are, as already noted, almost surely buying power more cheaply than they could from their alternative source of supply, a privately-owned company.

Revenue-Sharing

Yet another distributional consequence of a city's substituting profits for own-revenue is a potential decrease in the size of its federal revenue sharing grant. This happens because own-revenues (exclusive of profits from alcoholic beverage sales) meet the definition of "adjusted taxes" whereas municipal electric profits do not; and, to a first approximation, a proportional change in any one city's collection of adjusted taxes results in a nearly equiproportional change in its grant, all other things being equal.[12] Since the total amount of money to be shared annually is fixed, the exclusion of profits in the measurement of tax effort in effect transfers funds from an ElectriCity to other places.

The magnitude of revenue-sharing losses experienced by ElectriCities can be computed by supposing that profits are treated the same as own-revenue collections for the purpose

TABLE 5

Revenue-Sharing Grants

	SIMULATED (Millions)	ACTUAL (A) (Millions)	DIFFERENCE (D) (Millions)	100 D/A
Counties With ElectriCities				
County Govts.	$10.95	$11.74	$-0.79	-6.7%
ElectriCities	$ 5.80	$ 4.12	$ 1.68	40.8%
Other Cities	$ 6.12	$ 6.30	$-0.18	-2.8%
Area Total	$22.87	$22.16	$ 0.71	3.2%
Counties W/O ElectriCities				
County Govts.	$11.69	$12.10	$-0.41	-3.4%
Cities	$10.49	$10.78	$-0.30	-2.7%
Area Total	$22.18	$22.88	$-0.71	-3.1%

of determining entitlements. The simulated grants can be compared with grants actually received. This has been done and the results, which refer to Entitlement Period One, are summarized in Table 5. The simulation assumes that the total amount to be shared by all county governments and municipalities in North Carolina is unaffected by the inclusion of profits.

If the $23.2 millions received as profits by ElectriCities in the 58-sample had been counted as "adjusted taxes," their grants in the first entitlement period would have been increased by $1.68 millions, a 41% gain relative to their actual entitlements. The simulated gain is a product of two factors. First, the county areas in which ElectriCities are situated become "fiscally more important" than other county areas, meaning that local tax collections in the former increase relative to local tax collections in the latter. Second, ElectriCities become fiscally more important than other governmental units within their own county areas. Each effect, in the workings of the revenue-sharing formulae, leads to larger grants for ElectriCities. Note that much ($0.79 millions) of the simulated gain is diverted from the fiscally less important county governments in counties where ElectriCities are located, and that most ($1.20 millions) is diverted from all county governments as a group.

The experience of some local governments in all groups of Table 5 would have differed from the aggregated changes shown for their respective groups. One ElectriCity would have received a smaller grant than it actually did, because it earned a small amount of profit while other ElectriCities in its county earned large profits. This ElectriCity, like other places that did not sell power, would have thus become fiscally less important. The simulated grants of seven ElectriCities equal their actual grants, because their allotments continue to be determined by constraints governing maximum and minimum payments.[13] The same is true of 126 nonElectriCities. These constraints would plainly dampen the redistributional impact of defining adjusted taxes to include electric profits.

In spite of these qualifications the general flow of the redistribution is clear enough and its magnitude substantial enough to predict that definitional changes will be urged by places like ElectriCities when modifications of the revenue sharing act are considered. Their argument is likely to be opposed by the view that municipalities ought not to be

encouraged to earn profits on the grounds that (i) the consumption of electricity is a datum irrelevant to the purposes of general taxation; (ii) profit-making leads to allocative inefficiencies; (iii) profit-making aggravates vertical inequity; and (iv) substantial practical difficulties exist in unambiguously accounting for such profits.[14]

V. Concluding Remarks

The aggregated financial data of all local governments in the United States show that property, income, and sales taxes constitute the greater part of revenue raised by them. Gross revenues of utilities are but a small part; profits from selling electricity are even smaller. The ElectriCities of North Carolina, roughly one-sixth of the incorporated places in the state, deviate markedly from this general pattern. The profitability of municipal electric utilities throughout the United States suggests that comparable subsets of municipalities may exist in many of the other States. It would seem necessary to attend to this diversity of structure whenever legislation is being formulated to remedy problems that are thought to originate in the composition of local public finance. Actions and analyses premised on the picture provided by aggregated data may miss their marks when applied to ElectriCities.

FOOTNOTES

[1] Compare Federal Emergency Adminstration of Public Works [6] and Federal Power Commission [7], p. 17.

[2] Federal Power Commission [9].

[3] U.S. Bureau of the Census [12].

[4] U.S. Bureau of the Census [13].

[5] The entries in column two of Table 1 might be interpreted as average percentage increases in property tax rates necessary to yield the amounts collected in profits.

[6] Degrees of freedom must be calculated because we do not assume equal population variances. The method is discussed at Brownlee [2], pp. 299–303.

[7] See, generally, Colberg [3].

[8] A convenient listing of general legal standards is found at Advisory Commission on Intergovernmental Relations [1], pp. 7–8. Some exceptions are listed at *ibid.*, pp. 269–76.

[9] See Netzer [11], pp. 173–83, and Davis and Wertz [5]. The normative force of the textual discussion is obviously diminished if one regards imperfectly measured property values, but not the consumption of electricity, as a proper base for the raising of public revenue.

[10] Data for our computations are from U.S. Buerau of Labor Statistics [14].

[11] Federal Power Commission [9], 1971, p. VII.

[12] Public Law 92–512, 92nd Congress, 1972, secs. 108(b) (2) and 109(e) (2).

[13] Public Law 92–512, 92nd Congress, 1972, sec. 108(b) (6).

[14] For a qualitative treatment of allocative effects of municipal electric profits, see Colberg [3]. Data indicative of the nonuniformity of current accounting practices appear at Federal Power Commission [8], p. 11.

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