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FISCAL INFLUENCES ON RESIDENTIAL CHOICE:
A STUDY OF THE NEW YORK METROPOLITAN REGION

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by

M.A.Haskell and S. Leshinski.

Dealing with a two-level federal system, James Buchanan has
pointed out that as a result of variations in state income and wealth
levels, equal-income taxpayers in separate states inevitably receive
unequal fiscal treatment, either in the form of unequal benefits for the
same amount of taxes or equal benefits for unequal tax payments.[1] This
means that in two states where benefits are equal and there is a higher
proportion of high-income taxpayers in one than in the other, then any
individual taxpayer in the high-income state will make smaller tax
payments than his equal-income counterpart in the low-income state. If
taxes are equalized, benefits will be less for the taxpayer in the low-
income state. It is technically impossible to reach any other result
where state per capita incomes are unequal. This is said to be so under
any tax system short of the limiting case of a fiscal system operating
on a pure benifit principle.[2] Prior to the appearance of Buchanan's
article, equal treatment for equals had usually been interpreted to mean
equal tax burdens. By introducing the benefit side, Buchanan was able to
take account of "aggregate fiscal pressure" on a taxpaying unit, and
gave the name "fiscal residuum" to the algebraic difference between taxes
paid and benefits received from public services. Specifically, he
showed that an individual would be subject to the least fiscal pressure
the higher the per capita income and wealth of the state in which he
resided; i.e., the higher the state's per capita income, the lower the
fiscal residuum. While granting that fiscal pressure could be equali-
zed among equals through fiscal centralization, Buchanan maintained his

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1.   James M. Buchanan, "Federalism and Fiscal Equity",
American Economic Review, Vol. XL, No. 4 (September 1950), pp. 583-599.

2.   Another limiting case would be a head tax with the proceeds
distributed in any fashion. In point of fact, unequal fiscal residua
result only when tax liability is related to income or wealth, which,
to be sure, are the bases of virtually all tax systems.

well-known preference for decentralization and proposed a geographically discriminatory federal income tax as the device to equalize fiscal residua regardless of the taxpayer's location. He emphasized that under this arrangement, states would retain complete fiscal autonomy, choosing whatever types of taxes and expenditures they prefer at the levels they prefer. The task of the federal government would be merely to equalize fiscal residua between equals in alternative locations.

While focusing on a two-level system, Buchanan noted that the conclusions applied to the other levels of the federal system as well. On the local level, where most revenue is raised through the property tax, differences in tax capacity depend more on per capita real estate values in a community, including the value of business and industrial establishments and less directly on the income levels of the individuals residing within it. On the other hand, the need for public services is probably inversely related to the per capita wealth of a community, with social welfare and educational costs reaching higher per capita levels where low-income families are concentrated. While it is true that high income communities usually spend more per pupil on education, per capita or per family costs are often lower because of the existence of fewer children per family. This is a function of lower birth rates and a larger proportion of older families in the high-wealth communities.

Suburban communities are well aware of these facts and consequently welcome small, high-income families, clean, light industry and office centres while discouraging the settlement of low-income, low-taxpaying families who consume high levels of public services. These goals are most often achieved by means of large lot zoning. In the New York Region, the City is surrounded in all directions by a ring up to 40 miles in circumference where virtually all undeveloped residential land is zoned for residences on half-acre lots or larger. Even where small lot zoning exists, the same end is achieved by permitting only type of residential construction whose property tax yield is estimated to be greater than the marginal expenditures associated with families who occupy the units. Garden apartments which average far fewer school-age children per unit than low-and middle-range single-family dwellings are considered to be

more "profitable" in this respect than single-family dwellings in the $20,000 class, except where their rent is too "low" and thereby attract families with higher than average numbers of children.

In Buchanan's terms, communities which operate in this fashion are trying, not so much to minimize expenditure, but to minimize the fiscal residua of residents. This article is essentially an attempt to measure that fiscal residua for a family of particular type in a cross-section of 280 suburban communities in the New York City Region in 1965.[3]

The purpose of the study is twofold. The first was suggested by Charles Tiebout in his article "A Pure Theory of Local Expenditures,"[4] where he hypothesized that movement to suburban communities takes place on the basis of a family's preference for a particular collection of expenditure benefits. Communities vary in the mix and level of benefits they offer; the family chooses the one, ceteribus paribus, which most closely meets its preference pattern for public goods. In taking account of the tax side, we refine the Tiebout approach and convert it to a fiscal residuum measure. While the level and type of expenditure may still be the principal public finance locational criterion, fiscal residua comparisons allow choices between communities providing similar sets of public services, on the basis of relative cost. Maximizing a fiscal residuum as such is then not so much the goal as maximizing it where expenditure levels and patterns are comparable. Specifically, we intend to show the extent to which fiscal residua vary and relate these to expenditure levels.

The second purpose is to explain the variation in the fiscal residua among communities. While this attempt is limited in scope, we are able to indentify one variable which is a statistically significant factor in accounting for differences among the fiscal residua.

Expenditures

Some expenditures which governments make have no value, or even negative value, for our representative family and should thus be excluded

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3 It should be noted here that we define "fiscal residuum" in a way opposite Buchanan's definition; i.e., as the algebraic difference between expenditure benefits and taxes. Our taxpayers are concerned, therefore, with maximizing their fiscal residua rather than minimizing them.

4 _Journal of Political Economy_, Vol. LVII, No. 4 (December 1949), pp. 416 - 424.

from the computation of the fiscal residuum. For example, a relatively
high-income family would place no value on welfare expenditures for which
it is not eligible. Consequently in the computation of benefits, we
include only those that are valued and perceived; i.e., those most akin to
consumer's goods. We thus exclude welfare and other redistributive
expenditures as well as those which tend to be perceived as equal between
communities such as fire and police protection, sewage disposal and trash
collection.

Since we are dealing with two states, New York and New Jersey, and
ten counties,[5] differences in public benefits result from state and county
as well as local expenditures. Thus all levels of government except the
federal government are included. Taxes and expenditures of the latter are
not taken into consideration, since they are roughly equal for equal income
individuals, no matter where they reside in the Region.

We have chosen as our standard family, one which consists of four
persons, including two school-age children, which has a family income of
$12,500 per year and lives in a $25,000 home which it is assumed to own.
We chose this relatively high level of income for the reason that we
consider it necessary deal with a family that has a choice among alter-
native locations. Below this income level, families either have an
extremely limited choice among suburban communities, or must of necessity

5 In New Jersey, all suburban communities in Essex, Bergen and Union
Counties, exclusive of those with extreme income levels were included. In
Morris, Somerset and Passaic Counties, only communities within commuting
range of New York City were used in the sample. In New York State, all of
Nassau County was included along with portions of Westchester, Rockland
and Suffolk Counties, choice again being based on income levels and dis-
tance from New York City. But unlike New Jersey where data was available for
for all communities chosen, the existence of a maze of overlapping dis-
tricts with taxation and expenditure powers in New York made fiscal resid-
uum computations for some communities impossible. Even where calculations
were possible, variations within a particular community were in many in-
stances so minor, it would have distorted the statistical tests to count
them as separate observations. Thus many communities or parts of them had
to be dropped. As a result, data for New York State is more limited and
somewhat cruder than for New Jersey, and for the most part organized on
the basis of school districts rather than on the basis of more conventional
political units.

In addition to the above, fiscal residua were calculated for nine
"old cities." These are Bayonne, Elizabeth, Jersey City, Newark, Passaic
and Paterson in New Jersey, and Mount Vernon, Yonkers and New York City
in New York.

remain apartment dwellers in the major cities of the Region.

For such a family, the most important public service is undoubtedly the quality of elementary and high school education in a community — roughly approximated by average per pupil expenditures. Since the family is assumed to have two school-age children, this figure is doubled so as to represent the total educational benefit it receives. To this educational variable, we have added per capita expenditures on higher education by local and state governments, per capita state expenditure on educational assistance and subsidies,[6] and per capita county educational expenditures. While it may seem strange to add per capita data to per pupil data, it can be justified in terms of our orientation, i.e., how does a prospective resident measure benefits which accrue to him in a particular community? Certainly, as a proxy for quality, it would be inappropriate to measure local educational benefits on anything but a per pupil basis, since varying age compositions of communities would distort per capita comparisons. On the other hand, since age composition is not significantly different between the three states in the Region, per capita higher educational expenditure is a reasonable measure of the quality of state colleges and universities, and more particularly, of the number of available student spaces within the institutions. For other expenditure categories such as parks and libraries, we also use per capita data since no other measure is sensible. Consequently, we end not with an exact measure of perceived expenditures and revenues, but rather with a proxy dollar figure showing the value of a set of benefits as against the cost of receiving them.

The other benefits in the compilation are those made for parks and recreation; for highways in the county of residence by the state and county governments, and in the locality by the municipal government; for local libraries; and for state hospitals. Table I recapitulates included expenditures by level of government.

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[6] Not to be confused with per pupil aid which is included in the local governments' expenditure. Assistance and subsidies describe such state programs as those for the handicapped and for veterans.

Table I

PERCEIVED EXPENDITURE BENEFITS[a] FOR FAMILY OF FOUR

$12,500 INCOME

Benefit	Level of Government		
	Local	State	County
Elementary and High School Education	X[b]	X[c]	X
Higher Education	X[d]	X	e
State Hospitals		X	
Parks and Recreation[f]	X	X[f]	X
Highways	X	X[g]	X[g]
Libraries	X		

[a] Per capita, unless otherwise noted.

[b] Per pupil expenditures X2.

[c] Assistance and subsidies.

[d] New York City only.

[e] County governments spend some funds on community colleges in New York State. These are, however, quite small.

[f] Includes state government forestry expenditure.

[g] In county of residence.

Certainly it is debatable whether some of these are, in fact, perceived expenditures. For example, residents of northern New Jersey might place more value on state parks in adjacent New York than in New Jersey. Whether the quality of state hospitals for the chronically or mentally ill is a factor taken into consideration in choice of residence is also debatable. While expenditure on state parks is a small item with little variation between states, expenditures on hospitals are much larger, with approximately a $10 per capita differential between New Jersey at the low end and New York at the high. Further, while the condition of local streets and roads may be a significant consideration to suburbanites dependent on automobile transportation, the most important roads for particular persons may be in adjacent localities,

counties or states. And to New York/City/residents who are not owners of automobiles, expenditure on local streets may well be a matter of indifference. Certainly these issues cannot be resolved satisfactorily short of an opinion survey regarding what factors these families do, in fact, consider.[7]

Taxes

On the tax side, we have included all state and local income, excise and property taxes, excluding business and other taxes which may be shifted to consumers, but only after a hard-to-trace process. For New York City, Newark, Jersey City and Yonkers where the representative family was assumed to occupy rental quarters, real property taxes were assigned by applying the residential tax rate to the average value of housing for that income class.[8] For all of the suburbs and the remainder of the "old cities," the representative family was assumed to own and occupy a dwelling with a market value of $25,000. For these families, local property tax burdens including school, village and county taxes, if any, were computed for each individual locality on a standardized basis. Federal income tax offsets were computed for the homeowners to take account of the effect of mortgage interest and property tax deductibility. Offsets were also computed to take account of the federal tax advantage that families paying New York State and New York City income and sales taxes had over those who are not subject to them. Sales and excise taxes were estimated using the Bureau of Labor Statistics Consumer Expenditure Survey and Internal Revenue Service tables as bases for tax allocation.

For non-New York City residents, two tax computations were made. The first assumed that the family head worked in the county of his residence and was thus subject solely to income and sales taxes levied by his state only, in addition to local taxes. The second computation assumed that the family head commuted to work in New York City and thus became subject to New York City income and sales taxes plus the New York State income tax if he was commuting from New Jersey. The income tax was

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7 What sketchy information we do have from a Regional Plan Association survey on housing and locational preferences indicates that good schools, parks, recreation facilities, and libraries are characteristics considered "very desirable" by a high proportion of respondents. See Regional Plan Association, Public Participation in Regional Planning, A Report of the Second Regional Plan, October 1967.
8 According to Census data, a majority of families in the $10,000-$15,000 income class reside in rental quarters in these cities. In all other municipalities, owner-occupiers predominate.

computed using <u>Statistics of Income</u> data to estimate deductions. With respect to the New York City sales tax, commuters were assumed to spend ¢500 per year, or ¢2 per working day on items subject to it.

The Data

Of the 280 suburban communities for which fiscal residua were calculated, 125 were in New Jersey and 155 in New York. In every case but one, the fiscal residuum was positive, a result of our assumption that the standard family contained two school-age children. The spread of the residua is vast; for non-commuters they range from ¢253 in Victory Gardens a small Morris County, New Jersey community, to ¢3,991 in Hawthorne, an unincoporated portion of Mount Pleasant Township in Westchester County, New York. For commuters to New York City, the range is from minus ¢37 to ¢3,959, the same communities occupying the extremes. The New York range for non-commuters is from ¢475 to ¢3,991; for New Jersey non-commuters, from ¢253 to ¢1,784. For commuters, the New York range is ¢443 to ¢3,959, the New Jersey extremes, minus ¢37 and ¢1,494.

Table II shows the distribution of the fiscal residua for the entire two-state area for non-commuters and commuters along with the arithmetic mean and the standard deviation for each distribution. In addition, the means for New York and New Jersey are shown separately. These appear to differ significantly at ¢1,101 for New York non-commuters and ¢654 for their New Jersey counterparts. The differences for commuters are similar.

The differences between the averages for the commuters and non-commuters in each state shows the tax cost of commutation. For New Jersey commuters who become subject to both New York City and New York State taxes, the increment amounts to ¢290. New York commuters incur only an additional cost of ¢32.[9]

The variation around the means as indicated by the standard deviation is rather wide. For non-commuters, two-thirds of the fiscal residua are between ¢480 and ¢1,356. For commuters, the comparable limits are ¢256 and ¢1,272.

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[9] The differences are greater for Yonkers, Jersey City and Newark since these commuters who are assumed to occupy rental quarters cannot take advantage of real estate tax and interest deductions on the income taxes to which they become subject by virtue of commuting. See table VII.

Table II

DISTRIBUTION OF FISCAL RESIDUA FOR NEW YORK AND NEW JERSEY

Fiscal Residuum	Non-Commuters	Commuters
Negative	0	1
$ 0-$ 200	0	21
200- 400	4	51
400- 600	51	41
600- 800	70	54
800- 1,000	71	41
1,000- 1,200	31	27
1,200- 1,400	20	17
1,400- 1,600	20	16
1,600- 1,800	3	2
1,800- 2,000	5	4
Over 2,000	5	5
TOTAL	280	280
$\bar{x}$	$918	$764
σ	438	508
X-New York	1,101	1,069
-New Jersey	654	364

An examination of the data, county by county, seems to indicate a strong positive relationship between per capita income and the size of the fiscal residuum, due no doubt to the strong positive relationship between per capita income and our most important expenditure item, per pupil educational expenditure.[10] However, to test for statistical significance is a troublesome matter since there is no income data disaggregated to the extent we require. As a proxy for income, we have been forced to use per pupil expenditures, recognizing that the dependent variable we are attempting to explain (fiscal residuum) consists in part of the independent variable itself (per pupil expenditures) and that the results are to some extent being forced. But we have considerable confidence that per pupil expenditures are an adequate proxy for per capita

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[10] Which item is doubled in our computation.

income and therefore not totally illegitimate as the independent variable.

The distribution of fiscal residua by per pupil educational expenditure for the entire sample is shown in Table III. Table IV andV show the same data for New York and New Jersey respectively. In these tables and the analysis which follows, we deal with non-commuter data since the commuter data differs from it only by a constant[11] which would not affect the statistical results.

Table III

NON-COMMUTER'S FISCAL RESIDUA FOR NEW YORK AND NEW JERSEY
SUBURBAN COMMUNITIES BY PER PUPIL EDUCATIONAL EXPENDITURE
===

Per Pupil Expenditure	Mean Fiscal Residuum	Number of Communities
Under $499	$503	19
$ 500 - 599	596	53
600 - 699	749	37
700 - 799	873	21
800 - 899	812	33
900 - 999	914	50
1,000 -1,099	1,160	29
1,100 -1,199	1,389	15
1,200 -1,299	1,496	12
1,300 and Over	2,350	11
TOTAL	$918	280

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[11] That is, one constant for New York communities and one for New Jersey communities.

Table IV

NON-COMMUTER'S FISCAL RESIDUA FOR NEW YORK SUBURBAN COMMUNITIES

BY PER PUPIL EDUCATIONAL EXPENDITURES

Per Pupil Expenditure	Mean Fiscal Residuum	Number of Communities
Under ¢499	--	0
¢ 500 - 599	--	0
600 - 699	--	0
700 - 799	¢ 593	9
800 - 899	752	30
900 - 999	902	49
1,100 -1,199	1,389	15
1,200 -1,299	1,496	12
1,300 and Over	2,350	11
TOTAL	¢1,101	155

Table V

NON-COMMUTER'S FISCAL RESIDUA FOR NEW JERSEY SUBURBAN COMMUNITIES

BY PER PUPIL EDUCATIONAL EXPENDITURES

Per Pupil Expenditure	Mean Fiscal Residuum	Number of Communities
Under ¢499	¢503	19
¢500 - 599	596	53
600 - 699	749	37
700 - 799	1,004	12
800 - 899	1,413	3
900 - 999	1,211	1
1,000 -1,099	--	0
1,100 -1,199	--	0
1,200 -1,299	--	0
1,300 and Over	--	0
TOTAL	¢ 654	125

The formal hypothesis is that the amount of the fiscal residuum in a community is related to per pupil educational expenditure. If we define MEI as the average fiscal residuum for those communities whose per pupil expenditure falls into the class EI, where I is the total number of expenditure classes, then formally we are testing the hypothesis:

$$H_0 \; : \; M_{E1} = M_{E2} = M_{E3} = \ldots\ldots M_{EI}$$

as opposed to

$$H_1 \; : \; M_{E1} \neq M_{E2} \neq M_{E3} \neq \ldots\ldots M_{EI}$$

where H_1 indicates that the fiscal residuum does vary with per pupil expenditures.

This type of hypothesis can conveniently be tested by analysis of variance. The results of four separate tests are presented in Table VI.

Test A for the entire sample combined rejects the null hypothesis H_0 and supports the hypothesis H_1, i.e. the fiscal residuum M_{E1} does vary with school expenditures, at the one percent level. The chance of accidental observation of so large an "F" is less than one out of 100.

Test B was based on the hypothesis that the fiscal residuum varied by state:

$$H_0 \; : \; M_{NY} = M_{NJ}$$

$$H_1 \; : \; M_{NY} \neq M_{NJ}$$

Table VI

RESULTS OF ANALYSES OF VARIANCE

	"F" Value		
		5% Level	1% Level
Test A – NY and NJ Combined by Educational Expenditure	7.18	1.92	2.49
Test B – NY vs. NJ	6.56	3.87	6.74
Test C – NY by Educational Expenditure	6.12	2.07	2.76
Test D – NJ by Educational Expenditure	3.24	2.68	3.94

Here the null hypothesis H_0 was rejected at the 5 percent level; the "F" statistic being barely shy of the one percent level.

Finally, tests were conducted for New York and New Jersey separately to determine if the fiscal residuum varied with educatinnal expenditure within each of the states. The null hypothesis H_0 was rejected at the one percent level in New York (Test C) and at the 5 percent level in New Jersey (Test D). In the latter, the "F" statistic was just short of the required level of rejecting H_0 at the one percent level.

The Old Cities

For purposes of comparison with the suburbs, we have computed the fiscal residua for nine "old cities" of the region including New York City. These are shown in Table VII.

Comparing these figures with those in Table II, we find that the fiscal residua for the New Jersey cities are almost identical with those in the New Jersey suburbs. Slightly lower per pupil expenditure benefits and higher poverty-related costs in the City, both of which would tend to lower fiscal residua, are probably offset by lower per capita educational costs due to a smaller proportion of school-age children relative to total population.

For New York State, where we have made computations for only three cities, the results are different. The substantial differences in average fiscal residua are no doubt due to the fact that per pupil educational benefits are substantially higher in the suburbs. These differences, which are accentuated by higher poverty-linked expenditures in central cities are too great to be offset by lower per capita educational costs.

Conclusion

Aside from the desirability of implementing the widely accepted tax principle of horizontal equity or "equal treatment of equals," Buchanan pointed out that unequal fiscal pressures, i.e. fiscal residua can result in a regional allocation of resources different from that which would occur as the result of economic considerations alone. In general, resource units would be drawn from low to high-income states so as to achieve the most favorable fiscal position.

We can see the same influences at work within a region, most likely

in a much more immediate way. While fiscal considerations may be only marginal in making location decisions between regions, once having chosen a region on the basis of other considerations, the choice of a high-income family or businessman between communities may be strongly influenced by fiscal considerations. That community which discourages in-migration by low-income families so as to keep its tax rate low, ceteris paribus, is most attractive to the high-income family trying to maximize its fiscal residuum and to the company looking for the optimal fiscal environment.

In addition to the effect on fiscal residua and its implications for horizontal equity in the tax structure, such occurrences have much more pernicious effects. Only recently have we begun to notice that Negroes, in effect "locked in" the Central City because of zoning and construction regulations, in addition to pure discrimination, have consequently been "locked out" from factory employment which is typically expanding in the suburbs and is stagnant in the City. In New York City, factory jobs have been declining in number for 17 years even as total employment in the City has risen. The unskilled who live in the City's slums are, of course, hardest hit by this decline. When job discrimination as such is not present, the absence of efficient transportation systems moving out of the Central City to the new industrial locations effectively prevents low-income city residents from taking advantage of the new employment opportunities.

To the extent that these locational decisions have been based on fiscal rather than economic considerations, we have resource misallocation in a pure form with particularly dire implications for the future of the City and its residents. The misallocation is, moreover, cumulative. Higher industrial tax burdens which result from the out-migration of businesses further accelerate out-migration. The tax base is further reduced and the stage is set for new increases in tax rates or for further deterioration of public services.

Happily, the basis for adjustment of unequal fiscal pressure is readily available on the local level. Unlike Buchanan's two-level system which required a radically changed and possibly unconstitutional method of apportioning income tax burdens and involved a host of

practical problems, local fiscal inequities can be eliminated through well tested devices such as state assumption of local functions, consolidation of local governments or of some of their functions and increased state grants based on need. Certainly there is movement in these directions; the recognition that unequal fiscal pressures are as large and widespread as they are should hopefully accelerate these fiscal reforms.

Table VII

FISCAL RESIDUA IN THE "OLD CITIES"

| State and City | Fiscal Residuum | |
	Non-Commuters	Commuters
New York		
Mt. Vernon	¢892	¢860
New York City	836	---
Yonkers	353	312
Average, New York State	694	586
New Jersey		
Bayonne	901	611
Elizabeth	900	610
Jersey City	710	338
Newark	628	256
Passaic	580	290
Paterson	310	20
Average, New Jersey	671	347