FISCAL STRAIN ON LOCAL GOVERNMENTS-- THE EFFECT OF CHANGING POPULATIONS

William F. Fox
Patrick J. Sullivan

ECONOMIC DEVELOPMENT DIVISION

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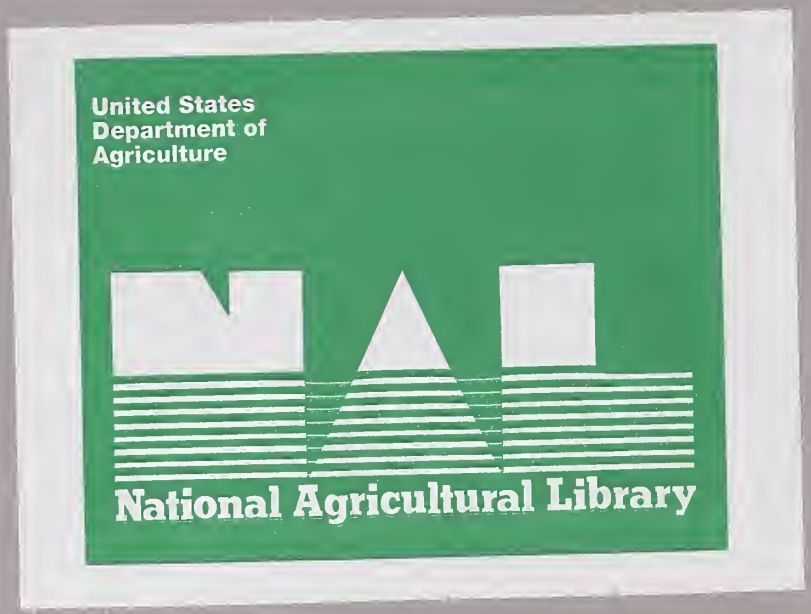
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ABSTRACT

Together with the continued interregional migration to the sunbelt states, the recent intraregional trend into nonmetropolitan areas has added to problems facing local governments throughout the Northeast. This paper is concerned with changes in local government expenditures and revenues that have accompanied population growth and decline and related shifts in population composition in county areas of the Northeast over the 1962-1976 period. Using both bivariate and regression analysis, the impact of population change on local government fiscal positions is examined within a demand and supply framework.

Key Words: Local government finance; Population growth; Population decline; Nonmetropolitan government; Fiscal strain; Impact analysis, Northeast governments.

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William F. Fox and Patrick J. Sullivan*

INTRODUCTION

There has been continued interest in the economic effects of changes in population and economic activity in recent years with attention focused largely on the various aspects of interregional migration. The popular and academic literature has given increasing attention to the causes, impacts, and policy implications of the continuing net migration out of the old industrial states of the Northeast and North Central regions into the sunbelt states of the South and the West (8, 10).1/ Somewhat overshadowed by these sunbelt/frostbelt issues, but also attracting increasing attention, are the impacts resulting from the recently documented intraregional migration out of the metropolitan centers into nonmetropolitan areas throughout the United States.2/ Although each type of migration, to some extent, has its own unique set of causes, economic and social impacts, and policy implications, both interregional and intraregional population shifts tend to impose a certain amount of fiscal strain on local governments. It is our

*The authors are Economists with the Economics, Statistics, and Cooperatives Service, U.S. Department of Agriculture, Washington, D.C. This working paper is a slightly revised version of a paper presented at the 4th Annual Convention of the Eastern Economic Association, Washington, D.C., April 29, 1978.

1/ Underscored numbers in parentheses refer to references listed at the end of the report.

2/ The shift from metropolitan growth typical throughout most of the 1960's to nonmetropolitan growth during the 1970's was documented in (6) and (2). See (3) for an example of a study concerned with the economic impacts of this shift. That the intraregional shifts are attracting more attention was illustrated at the White House Conference on Balanced National Growth and Economic Development held in Washington, D.C., January 1978.

purpose to analyze, on both a conceptual and empirical basis, the impact of population shifts on the demand for and supply of local government services and on the local government's ability to finance these services.

Our analysis will examine local government expenditures and revenues within county areas of the Northeast3/ over the periods 1962 to 1972 and to a lesser extent 1972 to 1976. Although the emphasis of the research is on local government responses to population change, county area aggregates form the unit of analysis. By aggregating the data to a county area level, it was felt that much of the potential distortion caused by differences in the distribution of functional responsibility across States and over time could be reduced. In addition, the use of county area aggregates should allow treatment of population shifts as an exogeneous variable when considering local government fiscal behavior. Intercounty population shifts are not likely to be dependent upon the identified differences in county area aggregate fiscal variables. The Northeast was chosen as our sample because it exhibited rapid growth in its nonmetropolitan areas before this trend was evidenced nationwide.4/ By studying the impact of population growth on nonmetropolitan areas of the Northeast during

3/ The Census definition of the Northeast was used in this analysis. The States include: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

4/ Nonmetropolitan areas of the Northeast grew by 8.4 percent between 1960 and 1970 while their metropolitan counterparts grew by 9.9 percent. In comparison, the national average indicated a continued shift towards metropolitan America over this 10 year period with metropolitan areas growing by 17 percent and nonmetropolitan areas growing 4.4 percent. The figures for 1970-1974 also indicate that the trend toward nonmetropolitan America, although nationwide, was strongest in the Northeast. See (7) and (2).

the 1960's, we may shed some light on the adjustments being made by local governments in nonmetropolitan areas throughout the rest of the country in the 1970's.

To date, the published work focusing on the effects of population change on local governments has tended to be concerned with the relationship between population growth rates and changes in various fiscal variables. This is a valid first step, but the results of such analyses may lead to biased inferences regarding the impact of population changes in the future. Along with changes in the size of the population, changes in its composition and its distribution are likely to have an effect on the demand for and supply of local government services and on local government revenue bases. By basing their analyses solely on changes in the size of the population, previous studies have implicitly assumed that population composition and distribution either remain stable or do not have any perceptible impact on the local governments' fiscal position. We shall argue that compositional changes and distributional aspects of population change are as important as changes in population size in explaining local government fiscal behavior and may be more important in explaining long term fiscal strain.

The analysis which follows has been divided into several distinct steps. The first section merely reports the average local government expenditures and revenues for our sample in 1972. Since our primary concern is with the impacts of the growth and decline processes, the main thrust of the analysis deals with changes in fiscal positions over time. The second section follows the simple approach of examining the impacts of changes in population size by

comparing mean percentage changes in expenditures and revenues for growing and declining areas. The third and fourth sections attempt to extend the analysis by adopting a demand and supply framework within which the growth process is examined. The third section uses a bivariate analysis approach to portray the general impacts of several factors that may accompany changes in the size of population. The final section uses a regression analysis approach to determine the impact of growth and decline on fiscal strain.

REVENUES AND EXPENDITURES IN 1972

Before proceeding with our analysis of the growth process, it may be instructive to describe the fiscal position of growing and declining county area governments in 1972. The mean per capita values of several major categories of local government revenues and expenditures as well as the number of full time equivalent employees per 1000 population, grouped according to population change between 1960 and 1970 are listed in table 1. It is interesting to note that these figures are at variance with the results of earlier studies on Colorado local governments (9) and on large urban governments (11). On the average, local governments in growing county areas collected more revenues per capita and spent more per capita than their counterparts in declining county areas. It is difficult to attach much meaning or importance to these results, however, since a government's level of spending and the means by which it finances its operations at any point in time are a result of many factors. A list of the determinants of a local government's fiscal position would have to include its historical functional responsibility, the production technologies and parameters it

Table 1.--Mean per capita values of major fiscal variables for growing and declining local governments in 1972 a/

Revenue and expenditure categories	Total sample N=213	Growing county areas N=174	Declining county areas N=39
General revenues	$481	$497	$409
Own source revenues	289	305	221
Intergovernmental transfers	191	192	188
Direct expenditures	488	510	391
Local school expenditures	266	276	223
Nonschool expenditures	222	234	169
Current expenditures	427	444	349
Capital outlays	62	66	43
Long-term debt outstanding	330	346	258
Full-time equivalent employment b/	30.4	30.9	28.1

Source: United States Census of Governments, 1972; United States Census of Population, 1960 and 1970.

a/ Growing and declining according to change in size of population between 1960 and 1970. All the numbers represent unweighted means.

b/ The number of full-time equivalent local government employees per 1000 population.

faces, as well as a host of socioeconomic, bureaucratic and political factors. The fact that the governments' citizenry has recently increased or decreased in size may have had an impact on per capita spending, but unless these other phenomena can be accounted for, growth's impact may be difficult to determine.

A SIMPLE VIEW OF GROWTH AND DECLINE

A more direct approach to determining the impact of population change on local government behavior involves examining the change in revenues and expenditures that occurred over the period of changing population. Although this approach still requires the assumption that all the other determinants of local government fiscal behavior have remained unchanged, a simple growth versus decline comparison is revealing in one respect. It has been argued in the literature that the growth process is not symmetrical--growth and decline do not necessarily elicit adjustments in opposite directions from each other. Essentially, the argument rests on the belief that supply conditions such as bureaucratic resistance to cutbacks, recognition and response time lags, and the inflexibility of fixed capital inputs delay downward adjustments in spending when population declines. This view is generally supported by the results reported (tables 2 and 3).

Both the growing and declining county areas had fairly high mean percentage increases in expenditures over both the 1962-1972 period (table 2) and the 1972-1976 period (table 3). The increases in total expenditures and in per capita expenditures far exceeded the rate of inflation over the 10 year period, indicating real increases in local government spending, on the average, for both

Table 2.--Mean percentage change in major fiscal variables for growing and declining local governments 1962-1972 a/

Revenue and expenditure categories	TOTAL VALUES		PER CAPITA VALUES	
	Growing county areas N=174	Declining county areas N=39	Growing county areas N=174	Declining county areas N=39
	Percent			
General revenues	174*	140	138	150
Own source revenues	151*	108	118	117
Intergovernmental transfers	248	222	203#	237
Direct expenditures	170*	119	136	129
Local school expenditures	178*	128	142	138
Nonschool expenditures	171*	119	137	129
Current expenditures	175*	125	139	135
Capital outlays	245*	127	139	207
Long-term debt outstanding	120*	236	92#	257
Full-time equivalent employment	54*	40	34#	47

Sources: United States Census of Governments, 1962 and 1972; United States Census of Population, 1960 and 1970.

a/ Growing and declining according to change in size of population between 1960 and 1970. All the numbers represent unweighted means.

*Significantly different mean growth rate of total spending and revenue categories at the 90 percent confidence level for increasing versus decreasing population county areas.

#Significantly different mean growth rate in per capita values at the 90 percent confidence level for increasing versus decreasing population county areas.

Table 3.--Mean percentage change in major fiscal variables for selected growing and declining local governments 1972-1976 a/

Revenue and expenditure categories	TOTAL VALUES		PER CAPITA VALUES	
	Growing county areas N=54	Declining county areas N=22	Growing county areas N=54	Declining county areas N=22
	Percent			
General revenues	51*	45	43	80
Own source revenues	43*	35	36	68
Intergovernmental transfers	72	67	62	105
Direct expenditures	47*	39	39	68
Local school expenditures	35*	25	28	47
Nonschool expenditures	63*	51	54	83
Current expenditures	50*	43	42	75
Capital outlays	39	46	31	61
Long-term debt outstanding	44*	25	37	66
Full-time equivalent employment	11*	4	5	24

Source: U.S. Census of Governments, 1972; Bureau of the Census, Local Government Finances in Selected Metropolitan Areas and Large Counties, 1975-1976; Bureau of the Census, Current Populations Reports, 1975.

a/ Growing and declining according to change in size of population between 1970 and 1975. All the numbers represent unweighted means for a select group of the largest county areas.

*Significantly different mean growth rate of total spending and revenue categories at the 90 percent confidence level for increasing versus decreasing population county areas.

#Significantly different mean growth rate in per capita values at the 90 percent confidence level for increasing versus decreasing population county areas.

growing and declining county area governments.5/ This does not appear to be the case over the 1972-1976 period, however; in per capita spending, growing county areas have only managed to keep up with inflation.6/ It seems evident that spending adjustments in response to population decline take the form of slower growth rates at best, rather than lower spending levels in an absolute sense (12).

The revenue response to population change tends to conform with the expenditure response although the two are far from identical. A comparison of the percentage change in per capita revenues over the two time periods reveals some interesting differences. Over the 1962-1972 period, the average percentage increase in general revenues per capita was higher in declining counties due solely to a higher rate of increase in intergovernmental transfers. However, over the 1972-1976 period, declining county area governments increased their own-source-revenues as well as intergovernmental transfers at a faster rate than did growing county area governments. Although the differences between group mean growth rates were not statistically significant,7/ these figures may

5/ The Implicit GNP Price Deflator for state and local government spending rose by 68 percent over the 1962-1972 period and by 39 percent over the 1972-1976 period. This index may be a very poor proxy for actual price level increases for local governments, but the available evidence suggests it can be used as an upper limit. See (5).

6/ It should be noted that the sample of county areas used in the 1972-1976 analysis is restricted to 77 of the largest county areas in the Northeast due to the limited availability of data. Therefore, direct comparison between tables 2 and 3 is inappropriate. In discussing differences between the two time periods we have relied on unreported means computed for the same 77 county sample for the 1962-1972 period.

7/ Statistical significance was calculated on the basis of Student's-t-tests of the differences between group means. Use of statistical tests for analyzing Census data is sometimes questioned. For predictive rather than descriptive purposes, however, statistical tests are appropriate because the data represent a sample of government behavior over time.

indicate that fiscal strain is, to large extent, a result of disequilibrium. Adjustments in spending and taxing policies take time, perhaps a considerable amount of time. Until these adjustments can be implemented, local governments may have to rely heavily on local revenues and intergovernmental transfers to compensate for shifting local government service needs and resource bases. This implies that the time period considered and the timing of rapid population changes may have an impact on calculated changes in local government fiscal positions over time. Therefore, our ten-year analysis may not be indicative of the temporary fiscal strain experienced by boom town population changes.

GROWTH AND DECLINE IN A DEMAND AND SUPPLY FRAMEWORK

Analyses based upon the impact of changes in the size of populations, although useful, yield results of limited applicability. For predictive purposes, numerical changes in population size are unlikely to adequately reflect the changing conditions which confront local governments because they ignore changes in population characteristics. By analyzing the impact that population shifts are likely to have within a supply and demand framework, the response of local government expenditures and revenues, and the resulting effect on fiscal strain can be better understood and predicted.

Changing population characteristics are most likely to affect the provision of local government services by altering the demand for these services. For example, younger populations may tend to prefer greater education expenditures and possibly larger amounts of other services such as police protection. Also, to the extent local government services are normal goods, the inmigration of

above average income residents may increase the demand for government services. In sum, the types of citizens migrating into a growing community or remaining behind in a declining area may be as important as the numbers involved.

Supply conditions may also change over time leading to different expenditure levels among governments and at different points in time as the costs of providing services adjusts. Wages and general prices, for example, may increase at different rates in metropolitan and nonmetropolitan areas. Bureaucratic structures, which may be a function of the initial size or age of the local government, may also influence the growth of revenues and expenditures. Therefore, changes in a government's fiscal position may arise from changes in supply conditions as well as from changes in demand.

The following sections discuss how Northeastern local government revenues and expenditures responded to changes in certain demand and supply conditions between 1962 and 1972. Two distinct statistical approaches will be used in the analysis which follows. First, differences in mean percentage changes in various fiscal variables grouped by demand and supply oriented characteristics will be presented. Although this procedure has serious drawbacks as a technique for predicting the effect of population change on fiscal strain, it does allow the reader a more comprehensive view of local fiscal positions than more sophisticated statistical techniques generally allow. The comparison of grouped means examines the impacts of metropolitan status, growth of per capita income and change in the proportion of school aged children within the population on several major expenditure, revenue and employment measures. The second technique involves regressing

changes in a defined proxy for fiscal strain against changes in several demand and supply oriented independent variables. The results should allow specific inferences to be drawn regarding the impact of population changes on fiscal strain.

GROWTH AND DECLINE: A BIVARIATE ANALYSIS

Metropolitan-Nonmetropolitan Status

Whether a local government is located in a metropolitan area or not is unlikely to change over a relatively short time period. However, metropolitan status may serve as a proxy for several phenomenon related to the growth and decline process. With respect to the supply of local services, metropolitan status may be a surrogate for how the costs of maintaining or increasing service levels change over time. For the demand side, growing populations in metropolitan areas are more likely to lead to externalities--congestion and crowding out of services. Therefore, metropolitan status represents differential demand responses given the same relative changes in population and socioeconomic factors.

Both the supply and demand aspects of metropolitan status deserve more attention. First, several hypotheses can be advanced about the supply side effects on local governments. Different production technologies may be employed in metropolitan and nonmetropolitan areas whereby the nonmetropolitan local governments use more labor intensive production techniques. Indivisibilities in the use of capital is one factor encouraging rural areas to use more labor. Also, since wage rates are typically lower in nonmetropolitan areas and capital costs are reasonably constant across geographic boundaries, labor becomes relatively more attrac-

tive in rural areas. Therefore, technological advances and uneven inflation rates for wages and capital will have different effects on the fiscal positions of metropolitan and nonmetropolitan local governments.

A significant portion of local government spending is designed to offset externalities which arise because of increasing population densities. Examples are highway spending to reduce congestion and larger police and fire expenditures to mitigate externalities from higher population densities. Since increasing population densities appear to be a greater problem in urban areas, the demand for services is likely to rise more quickly when population increases in metropolitan areas than when it increases in less densely settled nonmetropolitan areas. Spending is also likely to remain high in declining metropolitan areas because maintenance of an existing infrastructure and providing police and fire protection for aging communities can be very costly. This problem may be less pronounced in nonurban areas. Pressure for increased expenditures suggests that fiscal strain is more likely to develop in metropolitan areas.

Expenditures lead to fiscal strain through their impact on revenue needs. Fiscal strain can, therefore, be delayed or reduced if nonlocal revenue sources can be tapped for funds. Better access to capital markets may lead to increasing use of debt in metropolitan areas, thus delaying increases in locally collected revenues. Access to capital markets may be greater because of nearness to large lenders, greater visibility of metropolitan government units, and a belief that the economic diversity of metropolitan areas offers local governments greater stability. The availability of people with the knowledge of how to tap the capital market may also

be important. In addition, national concern over urban problems throughout the 1960's tended to encourage both the Federal and state governments to provide funds to urban governments, thereby making intergovernmental revenues more readily available to metropolitan areas. The availability of nonlocal revenues should tend to mitigate fiscal strain in metro areas.

Some of the above hypotheses can be tested by analyzing changes in metropolitan and nonmetropolitan spending over time (table 4). Direct expenditures in growing counties grew more rapidly in metropolitan areas for most categories of expenditures. Although this analysis does not separate demand and supply impacts on spending, it provides some evidence that metropolitan local governments experienced greater costs in providing services.

The notable exception to the spending patterns is for capital expenditures which increased more rapidly in growing nonmetropolitan counties. This result is surprising given our initial hypothesis that capital spending would be greater in urban areas but the results must be interpreted carefully. Per capita capital spending was still much lower in rural areas, both in dollar terms and as a percentage of total spending in 1972. Rapid percentage increases in capital spending in nonmetropolitan areas appear to be a function of the initial low base of capital spending in 1962 and possibly also because rising nonurban populations are making the use of more capital-intensive technologies a viable option. Although not significant for per capita values, full time employment rose more rapidly in urban areas, further accentuating the trend for adjustments in the capital/labor ratios of urban and nonurban areas.

General revenues increased more rapidly in urban areas in

Table 4.--Mean percentage change in major fiscal variables by metropolitan-nonmetropolitan status for growing and declining county areas, 1962-1972 a/

Revenue and expenditure categories	GROWING COUNTIES		DECLINING COUNTIES	
	Metropolitan N=84	Nonmetropolitan N=90	Metropolitan N=13	Nonmetropolitan N=26
	Percent			
General revenues	184	164*	142	138
Own source revenues	153	150# b/	109	107
Intergovernmental transfers	288	210*	249	208
Direct expenditures	180	161*	132	112
Local school expenditures	188	169*	152	116*#
Nonschool expenditures	178	165*	131	113
Current expenditures	188	162*	136	120
Capital outlays	171	314*#	146	118
Long-term debt outstanding	121	119	103	303*#
Full-time equivalent employment	59	265*	27	47*#

Source: U.S. Census of Governments, 1962 and 1972; U.S. Census of Population, 1960 and 1970.

a/ Counties are divided according to the Census definition of metropolitan status in 1972 and according to change in size of population between 1960 and 1970. All the numbers represent unweighted means.
b/ Increased more rapidly in nonmetropolitan counties when measured in per capita terms.

*Significantly different mean growth rate of total spending and revenue categories at the 90 percent confidence level for metropolitan versus nonmetropolitan county area governments.

#Significantly different mean growth rate in per capita values at the 90 percent confidence level for metropolitan versus nonmetropolitan county area governments. Per capita growth rates are not reported.

order to finance increased expenditures, though the difference between the two groups was not statistically significant on a per capita basis. Possible increased fiscal stress on metropolitan governments was mitigated, however, because a major source of the revenue increase was met by increasing intergovernmental revenue flows into metropolitan areas. Availability of intergovernmental transfers may also be a significant reason for increasing expenditures in metropolitan areas since the price and cost to the local governments of providing the services is effectively decreased. Per capita own source revenues, on the other hand, increased more rapidly in rural areas. Therefore, despite the rapid growth in revenue collection by metropolitan area governments, fiscal strain does not appear to have increased more rapidly in growing urban areas versus rural areas.

Few differences were observable for declining counties. Debt increased significantly faster in declining rural counties, a rather unexpected finding. Also full-time employment increased more rapidly in rural areas.

School Age Population

Increased fiscal strain on local governments may emanate from growing demand for services. One possible source of changing demand for services is if the percentage of school age population rises in an area. Increased demand for education is one obvious change to be expected as the proportion of school aged children in the population increases; demand for other services, such as police protection, may also increase. Providing for these increased services, and particularly the capital investments, may create severe pressure on local government finance.

In the analysis which follows, all counties were divided according to whether their population grew or declined and also whether the school age fraction of their population increased or decreased between 1960 and 1970. Within the group of growing counties, those with increasing school age populations generally reflected the anticipated trend that demand for services would rise and, therefore, expenditures would rise more rapidly than for other counties (table 5). Expenditures of increasing school age counties grew more rapidly than those of decreasing school age counties, particularly for current, local school purposes. Surprisingly, capital spending rose more quickly in decreasing school age population counties. This may be because increasing school age counties chose to postpone some capital purchases until fiscal strains were eased.

When expenditures rise rapidly in increasing school age counties, revenues must also be increasing. The fiscal strain of providing for increased service demands was reduced somewhat because the increasing school age counties also experienced significantly faster growth in intergovernmental revenues, particularly from the federal government. Again, the rising transfers may have been a cause of increased expenditures, as well as a source of funds.

Only two significant differences appeared for declining counties. Increasing school age counties increased their current education expenditures more rapidly than decreasing school age counties (not reported in table 5). Also long term debt increased more rapidly in declining school age counties.

Table 5.--Mean percentage change in major fiscal variables by changes in proportion of school aged population for growing and declining county areas, 1962-1972 a/

Revenue and expenditure categories	GROWING COUNTIES		DECLINING COUNTIES	
	Increasing percentage of school age children N=110	Decreasing percentage of school age children N=64	Increasing percentage of school age children N=9	Decreasing percentage of school age children N=30
	Percent			
General revenues	182	160*#	140	140
Own source revenues	155	145	98	111
Intergovernmental transfers	264	220*	261	211
Direct expenditures	183	149*#	138	113
Local school expenditures	194	150*#	158	119
Nonschool expenditures	178	160	149	110
Current expenditures	188	151*#	142	120
Capital outlays	205	315#	148	121
Long-term debt outstanding	126	109	76	284*#
Full-time equivalent employment	56	51	30	43

Source: U.S. Census of Governments, 1962 and 1972; U.S. Census of Population, 1960 and 1970.

a/ Proportion of school age population is defined as the percentage of population 19 and under in 1960 and 1970. Counties are categorized according to change in size of population between 1960 and 1970. All the numbers represent unweighted means.

*Significantly different mean growth rate of total spending and revenue categories at the 90 percent confidence level for increasing versus decreasing proportion of school age children to total population in the county areas.

#Significantly different mean growth rate in per capita values at the 90 percent confidence level for increasing versus decreasing proportion of school age children to total population in the county areas. Per capita growth rates are not reported.

Per Capita Income Growth

Counties with rapidly rising income may be expected to experience greater increases in demand for local government services than counties whose income rose at a lower rate. On the other hand, rising incomes provide more funds for financing services and, therefore, may reduce fiscal strain. Some significant differences are found for rapid versus slow-income growth counties. Significant differences, however, are probably minimized because counties were simply divided according to whether their per capita income rose faster or slower than average.

Among growing counties total spending rose more quickly in rapid-income growth counties, though the difference was not statistically significant on a per capita basis (table 6). The increase in expenditures was particularly directed toward current and local school purposes. Local government employment also rose more quickly in rapid-income growth counties.

Increased spending in the rapid-income growth counties was substantially financed from own source revenues, though debt also rose more quickly for these counties. The relative increase in debt was probably due to a shift in capital financing methods--capital spending itself was greater, though the difference was not statistically significant.

Again, among declining counties there were few differences between the two classifications. The most notable difference is the relatively rapid increase in intergovernmental transfers which would help ease the fiscal strain in counties with both declining income and population.

Table 6.--Mean percentage change in major fiscal variables by changes in average income for growing and declining county areas, 1962-1972 a/

Revenue and expenditure categories	GROWING COUNTIES: Rapidly rising per capita income N=88	GROWING COUNTIES: Slowly rising per capita income N=86	DECLINING COUNTIES: Rapidly rising per capita income N=15	DECLINING COUNTIES: Slowly rising per capita income N=24
	Percent			
General revenues	181	165*	135	144
Own source revenues	159	142*	104	112
Intergovernmental transfers	250	245	183	247*#
Direct expenditures	180	160*	123	119
Local school expenditures	191	165*#	127	128
Nonschool expenditures	178	165	129	118
Current expenditures	184	165*	125	128
Capital outlays	282	209	161	105
Long-term debt outstanding	153	86*#	307	182
Full-time equivalent employment	58	51*	30	47

Source: U.S. Census of Governments, 1962 and 1972; U.S. Census of Population, 1960 and 1970.

a/ Counties are divided according to whether their average income growth from 1959 to 1969 was faster or slower than the Northeast average of 115.9 percent. Counties are also categorized according to change in size of population between 1960 and 1970. All the numbers represent unweighted means.

*Significantly different mean growth rate of total spending and revenue categories at the 90 percent confidence level for rapidly rising versus slowly rising income county areas.

#Significantly different mean growth rate in per capita values at the 90 percent confidence level for rapidly rising versus slowly rising income county areas. Per capita growth rates are not reported.

FISCAL STRAIN: A REGRESSION APPROACH

The above bivariate anaysis is suggestive of how changing population compositions influence expenditures and revenues. However, since growth or decline cause many different changes to occur simultaneously, it is difficult to know which factors are most important. This section uses regression analysis to isolate the individual effects of various changing local characteristics on fiscal strain.

The reduced form equation estimated here has its basis in a series of supply and demand equations for local services. The focus is, of course, on the growth and decline process so the dependent variable is the relative change in fiscal strain from 1962 to 1972. Fiscal strain is measured here by own source revenues as a percentage of income.8/ In essence this assumes that income is an adequate measure of local fiscal capacity and own source revenues represent local government effort.9/ In using this measure of fiscal strain, care must be taken in equating fiscal strain with inequity. Fiscal strain, as we use the term here, includes both voluntary local government spending and involuntary spending. Therefore, high levels of fiscal strain may be a desirable trait in some cases and an imposition in other cases.

Independent variables in the fiscal strain equation are also

8/ In order to help account for interstate differences in the use of state revenue sources for local purposes, own source revenues plus transfers from the state as a percentage of income was also tried. The results were not noticeably different so they are not reported.

9/ Income is one of two measures of capacity used in (1). Nonetheless, controversy remains over the appropriate measures of capacity and effort of local governments. Our purpose is not to become involved in the controversy, but the interested reader may find a discussion of some of the issues in (4).

designed to account for growth and decline processes. Therefore, the variables represent relative changes over the time period 1960 to 1970. Variables included in the equation are population, school age fraction of the population, retirement age fraction of the population,10/ per capita income, and percentage of the population below the poverty level.11/ A dummy variable for metropolitan status was also included with metropolitan counties taking on the value one and nonmetropolitan counties being assigned the value zero.

Regression equations were estimated separately for growing counties, declining counties, and all counties (table 7). An interaction term comprised of the population term and a dummy variable with a one for declining counties and a zero otherwise was included in the all counties equation to account for nonsymmetrical responses to population growth and decline.

One very interesting finding was that rapidly rising population does not increase fiscal strain. In fact for growing counties, more rapid growth was associated with reduced fiscal strain over the ten year time period considered. Growth in per capita income had the most statistically significant relationship with fiscal strain, reducing it for each category, but particularly for growing county areas. For growing counties and all counties, metropolitan status was highly significant and indicated that fiscal strain was greater in rural counties. This result can be explained by the greater availability of intergovernmental revenues for metropolitan counties,

10/ Retirement age fraction of the population is measured by percentage of the population 65 and over.

11/ Poverty level is measured by Census definitions for 1960 and 1970.

Table 7.--Regression equations for estimating the change in fiscal strain as a linear function of the change in population size and character a/

Variable / Sample	Intercept	Population b/	School age b/ fraction of the population	Retirement b/ age fraction of the population	Per b/ capita income	Percentage population in poverty b/	Metro-politan status	R^2
Growing counties N=174	.40** (4.88)	-.01 (-.19)	.64* (1.79)	-.18 (-1.54)	-.36** (-4.80)	-.13 (-.98)	-.05** (-1.98)	.18
Declining counties N=39	.12 (.44)	-.56 (-.40)	.63 (.43)	.53 (.80)	-.10 (-.35)	.15 (.45)	-.03 (.44)	.08
All counties N=213	.37** (4.65)	-.00 (-.02)	.68* (1.89)	-.16 (-1.34)	-.32** (-4.36)	-.08 (-.71)	-.04* (-1.95) Decline Interaction -1.06* (-1.94)	.14

Source: U.S. Census of Governments, 1962 and 1972; U.S. Census of Population, 1960 and 1970.

a/ Fiscal strain is defined as the ratio of own source revenues to personal income
b/ Defined as the percentage change from 1960 to 1970.

*Significant at 90% level of confidence.
**Significant at 95% level of confidence.

reducing the need for large relative increases in own source revenues. In addition, increases in the proportion of school aged children were positively related with fiscal strain in growing county areas and for the total sample. Finally, the growth-decline interaction term in the all-counties equation was significant providing further evidence that growth and decline do not have symmetrical effects. Growing counties are shown to suffer greater fiscal strain.

CONCLUSIONS

Our purpose here has been to demonstrate that the impact of poulation change on local government behavior goes far beyond the often reported effects of changes in the size and density of the population served. It depends, to an equal extent, on the changing characteristics of the population, and on a host of other demand and supply factors which invariably accompany growth and decline.

Although the analyses reported here are certainly not the final word on growth and decline impacts, some interesting relationships previously ignored in the literature have been highlighted. It should be evident that such characteristics as metropolitan status, the age distribution of the population, and income have a significant impact on local government response to growth and decline. In particular, the increase in fiscal strain which is expected with either rapid growth or rapid decline seems to depend, to a significant extent, upon the metropolitan status of the affected area.

A much broader analysis still remains. First, the above analysis suggests the importance of defining growth and decline. Different implications may result depending upon whether growth and decline are defined in terms of population, income, employment,

economic base, or some other measure. After this issue has been approached, a dynamic, theoretical structure of local government behavior, including both supply and demand elements, must be developed before the impact of changing constituencies and techologies can be clearly understood. Such a model has only been alluded to in this study--until it is developed and applied, important interrelationships affecting the impact of growth and decline may escape examination.

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