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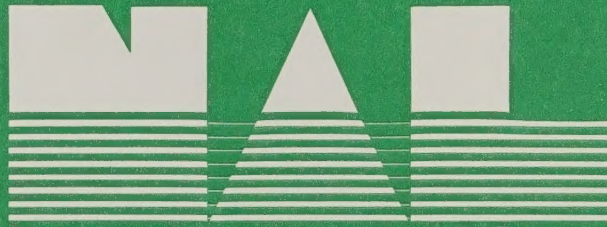
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**THE IMPACT OF LOAN-GRANT COMBINATIONS
ON LOCAL GOVERNMENTS**

Judith N. Collins
Economic Development Division
Economics and Statistics Service
U.S. Department of Agriculture
Washington, D.C. 20250

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ABSTRACT

The loan-grant program for rural water and waste water disposal facilities of the Farmers Home Administration of the U.S. Department of Agriculture is described. Using concepts found in the literature on the impact of grants on local governments, the consequences of this program for local governments are discussed. The existing theory of grants is inadequate to deal with this type of program because of several attributes of the program, including the use of loans in combination with grants, and the use of user charges to finance part of the aided project.

Keywords: Farmers Home Administration, Governmental aid, Local governments, Public finance, Revenue, Rural areas, User cost, Water, Waste disposal.

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SUMMARY

The loan-grant program for rural water and waste water disposal facilities administered by the Farmers Home Administration of the U.S. Department of Agriculture is described. A review of the extensive literature on the impact of grants on local governments reveals that this literature is inadequate to assess the impact of this particular program. Specifically, the literature has not dealt with the issues of alternative forms of assistance (such as loan-grant combinations), the importance of the type of service being aided, and the type of revenue used to cover the community's financial responsibility resulting from the aid.

Although the loan-grant program contributes to the maze of categorical grants which require applications, such a program is nonetheless better suited to assuring adequate water or sewer services than the more easily administered unrestricted block grants, and can do so at a lower cost.

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INTRODUCTION

The purpose of this paper is to review the literature on the effects of grants on local government fiscal behavior and to explore the extent to which the theory can be applied to a specific Federal program which provides grants in combination with loans. The first section of the paper reviews some of the literature on the effects of grants on local government fiscal behavior. The next section describes a particular loan-grant program, the water and waste water disposal facilities loan-grant program administered by the Farmers Home Administration (FmHA) of the U.S. Department of Agriculture. The third section of the paper discusses some of the unusual features of the program and the extent to which the program's impacts can be evaluated within the existing grants framework. The final section offers some conclusions and implications.

REVIEW OF THE LITERATURE

During the last two decades, a great deal of literature has been devoted to analyzing the fiscal impact of Federal grants to State and local governments, and the rationale for such a system of grants. Although the literature is quite diverse, there are a number of common issues or themes. These issues include proper specification of a model of local government behavior, the importance of the form of the grant, the elasticity of demand for the aided good, simulation of government behavior, the impact of general revenue sharing, the degree of aggregation, and the choice of an appropriate decisionmaking model.

Specification of a Model of Local Government Behavior

The most basic issue, perhaps, is recognizing that Federal grants might indeed influence the fiscal behavior of State and local governments, particularly their expenditure behavior. An early study of the influence of grants was that of Brazer, who found that per capita intergovernmental revenue was consistently positive in its association with per capita city expenditures (10). 1/ Brazer attributed this to the fact that intergovernmental revenue is a "practical measure of the distribution of functional responsibilities between the cities on the one hand and the state and its

*/ Economist; State and Local Government Program Area, Economic Development Division, Economics and Statistics Service.

1/ Underscored numbers in parentheses refer to items in the Literature Cited section.

local subdivisions on the other" (10, p. 67). Much later, the Advisory Commission on Intergovernmental Relations (ACIR) followed up this idea when it studied the impact of grants on State-local wage rates, expenditures, and employment (2). This study noted that the division of responsibility between State and local governments for funding and providing services, as well as the type of grant, affect the response of State and local governments to grants. Kurnow noted that the "basic three" determinants proposed by Fabricant (per capita income, degree of urbanization and population density) and used by Fisher were inadequate to explain variations in per capita expenditures (13, 16, 39). Kurnow suggested that per capita aid is an additional determinant and that, moreover, the proper functional form for a regression is multiplicative instead of linear because the impact of one determinant depends on the value of the others. Despite this suggestion, the most common functional form has been linear.

Bahl and Saunders, and Sacks and Harris incorporated the influence of aid on per capita spending by including per capita Federal aid as one of several independent variables in a linear regression model (6, 16). In another study, Bahl and Saunders found that changes in per capita expenditure were best explained by changes in per capita Federal aid (5). Since that time, numerous studies have tried to measure the impact of aid to a given function on spending for the function. These studies include those by Adams, Auld, Gabler and Brest, Henderson, Hyman, and Sharkansky (1, 3, 19, 33, 36, 57, 63). Bahl and Gramlich both reviewed much of the pre-1969 literature on grants and discussed some of the problems with these studies (4, 28). Bahl, for example, pointed out that differences in costs reflect in part differences in quality, which are not readily measured.

Adams, Osman, and Pogue and Sgontz, among others, suggested that the pertinent question to ask is whether Federal aid increases State and local expenditure from their own sources (stimulation) rather than just whether Federal aid is a significant determinant of State and local spending (1, 54, 57). Bishop and Renshaw had found that State aid to education was substituted for local revenue (8, 59). One implication Bishop noted was that the effect of additional State aid was primarily to reduce the property tax burden.

While not denying the importance of Federal aid, some authors (Fisher, Gabler and Brest, Horowitz, Morss, and Pogue and Sgontz) have questioned the use of aid as an independent variable because of the likelihood of joint determination of expenditure and aid, and hence of simultaneous equation bias (17, 19, 34, 48, 57). In their reviews, Bahl and Gramlich also cited these problems (4, 28). Fisher excluded Federal aid as a determinant, noting that in the case of matching grants, if one dollar of Federal aid is received for every dollar of State expenditure, then the correlation between aid and expenditure will be perfect. Regressing expenditure on aid, then, is really a case of regressing a variable on itself. Horowitz actually used simultaneous equations to explain differences in State and local expenditures. Horowitz and Gabler and Brest suggested that the determinants of Federal aid (such as population) are more appropriate as a variable than Federal aid itself. Miner too, in his study of spending for education, noted that "the effects of grants-in-aid for education are primarily the consequence of the economic and demographic characteristics in local communities that determine the size of the intergovernmental payments" (47, p. 76). Miner found that differences in spending for education within States did in fact result from differences in these characteristics.

Kurnow and Osman, on the other hand, defended the use of aid as an independent variable because the level of aid set by Congress is largely free of "feedback" from the States (39, 53). Brazer, too, noted that aid might be a truly independent variable, but also noted the appeal of a hypothesis suggesting a causative relationship (10). Pidot also treated Federal aid as exogenous because, although local governments can affect the amount of grants received, local governments must nevertheless work within criteria established by higher levels of government (55). Pidot used principal

components analysis to avoid problems of parameters that are difficult to interpret and that seem to indicate high correlations in part because of multicollinearity. Marsh and O'Brien asked if simultaneous equation bias is really a major problem; that is, did the use of ordinary least squares result in seriously biased estimates of the aid coefficients (42, 52)? From their empirical work, Marsh and O'Brien concluded that simultaneous equation bias does not matter.

Another line of research has focussed on the importance of possible interactions between units of local government serving the same population and on what Osman calls the "dual" impact of grant programs (53, 54). This latter line of reasoning allows for complementarities among functions and suggests that aid to a given function may also influence expenditures on other functions. Although Oates dismisses as unlikely the possibility of a dual impact, Lyons and Morgan, O'Brien, Smith, and Woo Sik Kee all find evidence that aid to a specific function does in fact influence expenditures on other aided and unaided functions (41, 51, 52, 64, 76). Weicher concluded that when different units of government serve the same population, the expenditure impact of aid is the same regardless of for which service the aid is earmarked and regardless of which government receives the aid (71). On a more general note, Gramlich concluded that, despite Federal regulations on the use of grant funds, States seem to spend grant funds as they please (27). Brazer argued that conditional matching grants would release State and local funds for financing unaided services only in those areas that would have provided the level of services required by the Federal government even without the requirements; otherwise conditional grants might force States to divert funds from nonaided functions (11). The budget distorting influence of additional grants thus can be expected to vary inversely with economic well-being and directly with the fiscal needs of the State.

Form of the Grant and Elasticity of Demand

A number of studies have demonstrated that the form of the grant (such as matching or nonmatching) greatly influences the response of the receiving government. Scott was probably the first to apply the theory of consumer behavior to local governments and to use indifference curve analysis to demonstrate the impact of different types of grants (62). A lump-sum grant has only an income effect, while a matching grant has both an income and a price effect; hence a community can be expected to respond differently to the two types of grants. Scott showed that a matching grant will stimulate more expenditure than will a lump-sum grant of equal size, but that the matching grant will leave the community on a lower indifference curve than will the lump-sum, unconditional grant. Haskell put forth a similar argument (31). Waldauer and Wilde also used indifference curve analysis (70, 73, 75). Wilde, as well as Scott, distinguished between open-ended matching grants and closed-end matching grants. A closed-end matching grant results in a kinked budget constraint and so may lead a community to the same postgrant equilibrium position as a lump-sum grant. Gramlich used a system of equations for State and local expenditures subject to a budget constraint, analogous to an individual's income constraint, to show that matching grants will provide more stimulus than block grants (27). Waldauer's analysis is similar to Wilde's, but more attention is paid to the differential influences of complementarity and substitutability among aided and unaided services. Besides affecting income or relative prices, a grant of any type can provide tax relief. McGuire noted that the true resource constraint facing a community after receiving a grant cannot be determined solely from the nominal provisions of the grant (44). The true resource constraint depends on the relative size of the price, income, and tax relief effects. In his study of education grants, McGuire found that the greater part (70 percent) of education grants had an income effect. Between 2 and 18 percent of the grant was used for tax relief; the remainder of the grant had a price effect.

As noted by several authors, the impact of the grant on the demand for the aided function depends very much on the price elasticity of demand for the aided good. In the same study of education grants, McGuire concluded that the demand for education is price inelastic (44). Bishop's and Renshaw's findings of a substitution of State aid for education for own revenue also suggest this (8, 59). Price elasticities are central to Waldauer's analysis (70). Smith argued that the "distortion thesis," which states that Federal aid causes governments to neglect nonaided functions, is based on the assumption that the demand for the aided good is price elastic (64). Smith found that the demand for highways, welfare programs, and education, three expenditure categories that are commonly included in analysis of grants, is in fact price inelastic. Woo Sik Kee also found that aid significantly increased highway expenditures but not education expenditures (76). In a different study Woo Sik Kee concluded that variations in city-suburban differentials in expenditures per capita for public welfare and health services were in part determined by the city-suburban differentials in State aid for noneducational purposes (77). City-suburban differentials in State aid for education, however, were not significant in explaining the city-suburban difference in spending for education. McCann studied the expenditure response of local governments to aid and concluded that local governments substitute outside aid for own revenues for both highways and education (43).

Simulation of Local Government Behavior

Some studies have used the theory of grants to simulate government response to proposed or hypothetical grant programs. Strauss simulated the impact of three different grant proposals (65). Gramlich and Galper were interested in simulating the effect of structural changes in three types of grants, open-end matching grants and restricted and unrestricted lump-sum grants, in order to estimate the longrun expenditure impacts of general revenue sharing and special revenue sharing (29). In a similar vein, Gramlich simulated the expenditure response of State and local governments to several \$7 billion policy actions including monetary policy, matching grants, an income tax credit, an unconditional block grant, and a Federal income tax cut (26). Gramlich concluded that monetary policy stimulates the largest increases in expenditures, a Federal income tax cut the least.

General Revenue Sharing

Both the anticipation and the actual introduction of general revenue sharing provided the basis for another whole set of grants literature. Only a few of these studies will be reviewed here. Plummer estimated the potential uses of revenue sharing funds based on past expenditure patterns. He concluded that education would benefit, but also anticipated "significant expenditure opportunity leakage" (56). Goetz, noting that Plummer's estimates were based on the spending patterns prior to the introduction of revenue sharing, asked whether these estimates were consistent with rational fiscal choices under postgrant conditions (23). Goetz also argued that, because the distribution formula includes tax effort, general revenue sharing, even though it is a lump-sum grant, would have a substitution effect. In particular, after the introduction of such a grant program, an increase in private consumption "costs" its own price plus a loss of grant funds at the State level. Moreover, this price effect is not equal across States; that is, the marginal impact on aid of an increase in tax effort is not equal across States. Those States in which the marginal impact is higher have more incentive to compete for higher Federal funds by increasing their tax effort. Fisher, who developed a model of revenue sharing to include the central government and subnational taxes, reached a similar conclusion (18). That is, an allocation which is based on tax effort will stimulate greater expenditure increases in low income and high tax effort jurisdictions, and cause welfare losses in high income and low effort jurisdictions.

Rittennoure and Pluta studied the impact of State aid on local government in the Southern States in order to draw some conclusions as to the long-term implications of revenue sharing for communities in nonmetropolitan areas (60). They concluded that the demand for education is revenue inelastic, while that for highways is revenue elastic. The implication is that general revenue sharing, because it will encourage development of social overhead capital (roads, for example) rather than the development of human capital, is not likely to be instrumental in improving the quality of nonmetropolitan life. A General Accounting Office (GAO) case study of 250 local governments found this prediction at least partially fulfilled (21). About one third of the general revenue sharing funds received by these 250 governments was used for capital outlays, and outlays for streets and highways did in fact make up a considerable portion of the capital spending. In contrast, very little of the capital expenditure was for educational purposes. The GAO also found that in about three fourths of the cases, the impact of revenue sharing was to reduce taxes, or to halt a planned tax increase, or to slow the rate of tax increases, or to have a combination of these impacts. Similar results were found in a later GAO study on the use of revenue sharing by 25 local governments (20).

Use of Aggregated Data

Most of the studies that have used empirical analysis to explore the impact of grants have used highly aggregated data. The data are aggregated not only across geographical units, but also across broad expenditure categories. Two common independent variables are total State and local spending per capita and spending per capita on a broad category, such as education, in a given State, in a given year. In some cases the unit of observation is the municipality. Weicher and Emerine show that when the same independent variables are used to explain both total expenditures and expenditures on individual functions, the regression coefficient for any independent variable in the aggregate equation depends on the corresponding coefficient in the individual equation and on the covariance between each pair of individual regressions (72). The authors concluded that the aggregate equation provided no information not already provided by the individual equations. The individual equations however, cover broad expenditure categories, such as highways and sanitation.

A few attempts have been made to analyze the impacts of specific grant programs. Hardy criticized earlier studies for using such highly aggregated data (30). Such studies have generally found that grants stimulate State and local expenditures. Hardy's expenditure categories included fish and game, forests, general and public health, highways, and hospital care. The impact of the specific grant program on the corresponding expenditure category was not uniform across programs. Noto noted the tendency of Community Development Block Grant funds to "leak" from the intended uses (50). Feldstein examined the impact of Title I aid on local spending for education (15). Feldstein concluded that the program has been quite successful in targeting additional funds to needy pupils within a school district and in stimulating local school district expenditure. Miller looked at the impact of the Federal ABC highway program on State highway expenditures, and concluded that, in general, the program has merely funded what the States would have done anyway (46).

Partial Versus General Equilibrium Analysis

Aside from concern about simultaneous equation bias and aggregated data, the theory of grants as a whole has been subject to criticism. Teeple argues that the impact of a grant on a local government can be properly analyzed only if the source of the grant funds is considered (66). Since the receiving government presumably contributed revenue to the granting government, the price impact of the grant is reduced, and thus it is not clear a priori that the receiving government is better off. James makes a similar argument, noting that a general equilibrium analysis is necessary to account

for possible price changes and to model the impact of the entire grant program (38). The proper way to analyze the substitution and stimulation effects is thus to look at the pretax equilibrium position. Rasmussen argued that propositions concerning the stimulative effect of various types of grants are valid only if the grant does not distort the existing input price ratio (58). If, however, the grant covers only some inputs, then inefficiencies in production are introduced, and matching grants are not necessarily more stimulative than lump-sum grants. The effect of the grant in this case depends also on local demand for the aided good, on the production function for the good, and on input price ratios.

Use of Decisionmaking Models

Many of the studies that have introduced some sort of decisionmaking model have used the theory of individual choice to explain local public decisionmaking. For example, Auld, Gramlich, and Henderson do this (3, 27, 33). Alternatives to the constrained utility maximization model have been suggested, however. Inman chose to maximize a 'leadership preference function', where the impact of matching aid depends on the minimum acceptable level of spending for a given function in the absence of a grant (37). As in the traditional model, matching aid is found to be generally more efficient than lump-sum aid in stimulating a given level of total local outlays. This was not true in the case of spending for education and libraries, however. McGuire noted that another possible framework is the Niskanen model: the government as budget or vote maximizer (44). Wilde discusses the traditional model, the Niskanen model, and two variations on the Niskanen model: the bureaucracy as simply a budget maximizer, and the bureaucracy as a cost minimizer using average cost pricing (74). Wilde suggests that these additional models might provide a rationalization for larger regression coefficients than the standard model permits.

The Niskanen model considers the supply side of public expenditures and points out that bureaucratic behavior is not necessarily analogous to consumer behavior. It has also been suggested that the consumer choice model does not apply in the case where the decisionmaking involves some sort of collective choice mechanism through which individual preferences are voiced. In a public choice framework, revenue and expenditure decisions may be made by different people, and groups or coalitions of people with different characteristics become important. Bradford and Oates prove that under one particular public choice method, simple majority rule, with fixed tax shares and a single public good, a matching grant will always lead to a larger public expenditure than will a lump-sum grant of the same amount (9). Heins analyzes the impact of grants in terms of shifts in the excess demands of rich and poor people (32). In a collective choice framework, it is not clear a priori that spending will increase as a result of a grant. Goetz and McKnew go further and disprove the traditional notion that matching grants provide more stimulation (24). This contention is based on the argument that voting for taxes is separate from voting for expenditures and there is no guarantee that the median voter on the size of the budget is the same as the median voter on the mix of public expenditures.

Although the literature on the impact of grants on State and local governments covers a range of issues in the area of intergovernmental fiscal relations, the focus is on the grant form of assistance. Given the predominance of the grant form of assistance (over three fourths of the some 825 programs described in the 1979 Catalog of Federal Domestic Assistance as offering some sort of financial assistance do so through grants), this focus is not surprising. Rarer forms of Federal aid include guaranteed and insured loans, direct loans, and loan-grant combinations. This latter type of assistance, although uncommon (according to the 1979 Catalog of Federal Domestic Assistance only about a dozen assistance programs offer combined grants and loans), nonetheless could have substantial impact on those governments that receive this assis-

tance. One such program of this type is FmHA's loan-grant program for rural water and waste water disposal facilities. This program is described in the next section.

FMHA'S LOAN-GRANT PROGRAM FOR WATER AND WASTE WATER DISPOSAL FACILITIES

FmHA's current program dates back to 1965 and PL 89-240, which authorized grants for specific projects to provide for the treatment, storage, purification, or distribution of water or the collection, treatment, or disposal of waste in rural areas. However, the history of FmHA's involvement in providing water in rural areas is almost as old as the agency itself (14, 22). FmHA was created in 1935 as the Resettlement Administration, a rural rehabilitation agency. In 1937 the Water Facilities Act was passed to provide loans for individual and association farm water systems in 17 Western States where droughts were common. The Resettlement Administration administered this act jointly with the Soil Conservation Service and the Bureau of Agricultural Economics. The act was amended in 1954 to apply to all States and to allow farm area water systems to take on nonfarm customers in rural areas. With the passage of the Consolidated Farmers Home Administration Act of 1961 (PL 87-128), the water systems program became available to the entire rural population, including incorporated towns of up to 2,500.

With the passage of PL 89-240 in 1965, the water systems loan program became a loan-grant program for both water and waste water disposal systems. Fifty million dollars per year in grant funds was made available to local governments, districts, authorities, and nonprofit corporations in rural areas with towns of up to 5,000 population. A grant could cover up to 50 percent of the eligible project costs; the unpaid principal indebtedness of the recipient was limited to \$4 million at any one time. The law required that the benefited population be unlikely to decline below that for which the facility was designed and that system capacity be adequate to serve foreseeable growth needs and be consistent with any other plans for rural development in the area. The Rural Development Act of 1972 (PL 92-419) increased the population limit to 10,000 and also authorized loans and grants to Indian tribes.

The amount of grant and loan funds obligated by FmHA since 1940 is shown in table 1. The 1,191 loans made before the implementation of PL 89-240 amounted to about \$121 million, or only 1.9 percent of the funds obligated through August 20, 1980. The loan-grant program has grown considerably since its beginning; from 1966 to 1979 total loan obligations per year have increased eightfold, while grant obligations have increased more than 15-fold. Despite the relatively large percentage increase in grant obligations, they are still small relative to the loan obligations: 9,700 grants worth \$1.6 billion dollars since the program began versus 19,155 loans for \$5.6 billion in the same period.

When deciding on which projects to fund and on the split between grant and loan funding, FmHA considers a number of factors. First, the community must be unable to secure financing from regular commercial sources. Both the community income and the charge to users of a similar system in another community are important in determining the split between loan and grant funding. The median family income of the community is the basis for determining how large a loan the benefited users can "afford" to repay. The guideline is that the users of the system should devote from 0.75 to 1.25 percent 2/ of their income to repaying the FmHA loan. Any shortfall between the

2/ The percentage depends on median family income in the community as follows:

- if income is less than \$6,000, percentage = 0.75
- if income is between \$6,000 and \$10,000, percentage = 1.00
- if income is greater than \$10,000, percentage = 1.25.

Table 1--Funds obligated by FmHA for water and waste water disposal projects, and number of obligations, fiscal 1940 through fiscal 1980

Year	Loans		Grants	
	Funds obligated	Number	Funds obligated	Number
	--Million Dollars--		--Million Dollars--	
1940-1944	0.14	12	-	-
1945-1949	0.60	42	-	-
1950-1954	2.92	104	-	-
1955-1959	7.07	115	-	-
1960	0.71	15	-	-
1961	1.89	32	-	-
1962	10.07	82	-	-
1963	13.83	134	-	-
1964	33.37	265	-	-
1965	50.16	390	-	-
1966	112.13	800	18.67	221
1967	172.69	1,078	22.51	325
1968	161.53	1,001	23.00	328
1969	163.02	953	23.96	350
1970	144.68	907	42.98	586
1971	261.70	1,325	41.35	625
1972	300.00	1,226	39.86	551
1973	400.00	1,502	29.33	359
1974	470.00	1,325	23.76	241
1975	470.00	1,451	156.86	896
1976	442.64	1,673	223.78	986
1977	748.85	2,048	246.39	1,430
1978	750.00	1,702	303.91	1,464
1979	900.00	1,802	291.60	1,066
1980*	672.34	1,017	284.92	952
Totals	6,290.26	21,001	1,872.88	10,380

*Obligations through August 20, 1980

SOURCE: Farmers Home Administration.

size of the loan as determined by this criterion and the eligible project cost is made up by grant funds. Once the grant size has been determined based on this "modified one percent rule," the user charge that will result can be calculated. This charge is compared to the user charge "in communities being served by an established system constructed at similar cost having similar economic conditions" (FmHA Instruction 442.13, Appendix A, Sec. 1823.472), and is considered "reasonable" if it is not less than the cost to users of the "similar" system. If the grant as determined by the "modified one percent rule" will result in a user charge that is greater than the reasonable rate by more than 10 percent of that rate or \$12, whichever is greater, the grant is increased to bring the user charge down to the "reasonable" rate. Similarly, if the grant as determined by the "modified one percent rule" will result in a user charge less than that of a similar system, then the grant is lowered in order to bring the user charge up to that of a similar system. In other words, if the user charge resulting from the grant as determined by the "modified one percent rule" is not close to that of a similar system, then the grant amount is determined by the "similar" system criterion instead of the "modified one percent rule". In such cases, then (and there is evidence that the "similar" system criterion does in fact override the "modified one percent rule" in the majority of cases), there is no guarantee that the debt burden will be at the level specified by the "modified one percent rule". In fact, debt service burdens often must increase over the levels specified by the "modified one percent rule" because this rule more frequently results in a user charge below that of a similar system rather than a user charge above that of a similar system.

The grant as determined by either rule must lower user charges below what they would have been without the grant, otherwise no grant is made. A reduction of \$12 per year is a rough guideline. Finally, if the grant as determined by the first two criteria is greater than 75 percent of eligible project cost, 3/ the grant must be lowered to 75 percent of eligible project cost. This statutory maximum is the deciding factor in determining grant size for about 25 percent of the projects. It should be noted that, aside from the 75 percent maximum, none of these criteria need be strictly followed. They are guidelines, subject to waiver at the discretion of either the State or national FmHA offices.

As a result of these rules, and differences in the absolute sizes of the projects, the absolute magnitude of the grants and loans, as well as the split between grant and loan funding, are different from project to project. In addition, the loan repayment terms are not uniform; the loans are usually 40 year loans at 5 percent interest, but in some cases principal repayment is deferred for several years, or the length of the loan is less than 40 years. In practice, the grant and loan funds are not received from FmHA until the project is well on its way to completion. In the meantime, the community must obtain interim financing from commercial lenders. When the community eventually repays the loan to the commercial lender, the FmHA obligation covers both the interest and the principal repayment.

Prior to fiscal 1979, the percentage was a flat one percent. The use of a sliding scale is an attempt to target more grant funds to lower income communities. The correspondence between 'users' (meaning a hookup) and 'family' is not necessarily one to one, so that multiplying the number of users by median family income and taking one percent of that figure only roughly determines the total amount of debt repayment that the users can afford.

3/ Eligible costs include those for the construction and improvement of central community domestic water and waste disposal facilities (treatment and distribution facilities, stabilization ponds, garbage trucks, sanitary landfills, incinerators, purchase or rental of necessary equipment, and so on), acquisition of land and rights, construction of buildings, fences, and secondary facilities, relocation of bridges and other improvements, and payment of services and fees. Grant funds may not be used to pay operation and maintenance costs, purchase firefighting equipment, purchase existing systems or refinance existing indebtedness (FmHA Instruction 442.13, sec. 1823.472).

LOAN-GRANT FINANCING AND THE THEORY OF GRANTS

Having presented both a review of the grants literature and a description of a Federal aid program, the question of whether the theory is adequate to apply to a program such as FmHA's water and waste water disposal program can now be addressed. Several aspects of the program suggest that the answer to this question is 'no'.

First, the literature has typically dealt with grants to assist ongoing programs, such as education, or ongoing construction projects, such as highways. In these cases it is quite clear that grant revenue can either substitute for or stimulate revenue from own sources to support the program operation. In the case of the loan-grant program, the cost of a specific project is covered, and FmHA regulations state clearly that grant funds may not be used to "pay any annually recurring costs that are generally considered to be operation and maintenance expenses" (FmHA Instruction 442.13, Sec. 1823.472).

Hence, the concept of substitution can only meaningfully apply to the construction funds themselves. Substitution of Federal funds for local funds would occur if the community would have built the facility even in the absence of Federal funds. Even though Miller found that this tended to happen in the case of highway construction, such substitution seems less likely in the case of loans and grants for water and sewer facilities. Applicants for FmHA loans must be unable to secure financing from regular commercial sources; hence if a community is rejected for an FmHA loan-grant, the community may well do without the facility. ^{4/} Moreover, because the Federal money is tied to a specific project, the money has little potential to be fungible with other community resources and so "leakage" of the funds from their intended use isn't likely. Fungibility would be possible, however, if communities replaced savings accumulated to pay for a water or sewer system with Federal funds, and then used the savings to pay for another facility. The tendency for small communities to save, while noted by some, has not been well documented.

The impact of the Federal funds on local expenditures thus must result from leaving the community to operate the facility and pay off the loan. Since the community must pay to operate the system and repay the FmHA loan out of its own resources, the project loan-grant means that the community must start, or increase, expenditures for water or sewer services.

Stimulation of expenditures on water or sewer services is fairly certain, then, even though an increase in the total community budget is not. If the total budget were not increased and if the community used tax revenue to operate the system, then spending for some other function would have to be decreased. This 'distortion' of the budget, however, is presumably desirable because the existence of a program to help communities build water and sewer systems is an indication that community investment in water or sewer services would otherwise be suboptimal. ^{5/}

Any shift in budget priorities in practice, however, would not be large because operation and maintenance expenses and debt service are covered by charges on the users of the system, rather than by general tax revenue. Thus existence of a water system

^{4/} Applying for FmHA financing involves two steps: preapplication and application. The preapplication is used to screen out approximately half the applicants: those who are ineligible or otherwise unlikely to receive funding. The remaining applicants are invited to submit an application, most of which are accepted.

^{5/} Additional, indirect impacts on the community budget are possible. The existence of a water or sewer system may prompt population or business growth which could lead eventually to higher expenditures for activities not aided by the project grant such as police protection and education. Such growth presumably would also increase the property tax revenue of the community. See Lundeen and Janssen for more on this (40).

will have more impact on private decisionmaking; a hookup and subsequent water purchases are added to the list of goods and services on which consumers may spend their income. The person who chooses to hook up to the system receives a bill that covers a portion of the debt cost as well as the operation and maintenance costs and, in the case of water, the quantity purchased. Of course, the community must determine whether there is sufficient interest in a system to warrant even considering a new or expanded system. Beyond that, however, because of the quasi-private nature of the service, individuals must adjust their purchases of other private goods, including savings, in order to pay water bills.

An increase in community revenues, which include utility revenues, is likely, and to the extent that the user charges cover the costs of the system, little change in the rest of the community budget would be necessary. Any deficit would require a subsidy in the short run. The solution in the longer run would probably be to raise water rates.

Finally, the literature's treatment of the issue of matching, whose effect can at least in theory be neatly diagrammed as a pivoting of the budget constraint, is not appropriate in the case of the project grant and loan. As so many other grant programs do, FmHA provides a variable matching grant, with the extent of grant funding determined by the various "rules" mentioned earlier. But rather than matching the grant out of its own sources (such as property tax revenue), the community obtains a loan, also from Federal sources, with which to match the grant.

A number of observations can be made about the use of the debt financing to match a Federal grant. First, borrowing, even at FmHA's relatively low interest rate of 5 percent, is expensive. If, for example, a project is financed 50 percent by a loan and 50 percent by a grant, the grant would not actually cover half of the total cost of the project; interest payments increase the cost beyond the eligible project cost which is used in calculating the loan and grant. ^{6/} The effect of matching the grant with borrowed money is to decrease the grant subsidy relative to the entire project cost, because interest payments increase the total cost.

Second, and offsetting the first effect, there is a discrepancy between the time benefits are received and costs are incurred. The costs are felt only a bit at a time over a period of 30 to 40 years; thus in any given year users of the system will mostly be concerned with the loan repayment cost for that year. The dollar amounts of future payments, if considered at all, must be discounted into a present value. Benefits, too, will accrue over a number of years, but the most tangible benefit, that of adequate drinking water or sewer services, will be felt in full as soon as the system starts to operate. The more intangible benefits, such as knowing that water or sewer service will be assured for a number of years into the future may not be viewed as valuable relative to the immediate tangible benefits. On balance, it is likely that the present value of all the benefits exceeds the present value of the total cash outlay.

Because of discounting and the discrepancy between the flow of benefits and costs, then, loan financing is not quite as burdensome as the absolute dollar amounts would indicate. In addition, in times of inflation it pays to be a borrower; payments of X dollars per year in nominal terms continually decrease in real terms and so become less burdensome. Moreover, Horvath points out that easing the terms of a loan with below-market interest rates, a longer repayment period and so on, are implicit forms of grants (35). The grant equivalent of a loan will be larger, *ceteris paribus*, the lower the rate of interest and the longer the repayment period. At current (October 1980)

^{6/} The loan and grant are sufficient, however, to cover the cost of interim financing, which must be obtained by the community from commercial sources. The funds obligated by FmHA provide a line of credit for the community and do not actually reach the community until construction is well under way.

market rates, an interest rate of 5 percent certainly increases the grant equivalent of an FmHA loan considerably.

Because of these opposing tendencies, then, the price effect of a grant which is "matched" with loan financing is not clear a priori. The nominal price reduction implied by the proportion of the project cost that is grant funded is effectively changed in opposing directions by the expense of debt financing and by the effects of inflation and discounting. In addition, the nominal value of the grant understates the true value of the grant because the nominal value of the grant does not include the grant equivalent of the subsidized loan. Moreover, even the nominal price is different from community to community.

SUMMARY AND CONCLUSIONS

The literature on the impact of grants on State and local governments provides only a limited basis for analyzing the impact on local communities of FmHA's program of loans and grants for water and waste water disposal facilities. The usefulness of the existing theory is limited because several attributes of the program are not addressed in the literature.

First, the funding provided by FmHA is for a specific capital construction project and not for an ongoing program. It is possible that the Federal money merely funds what the community would have done anyway, allowing the money to, in effect, fund some other project or program. Such 'leakage' of funds, however, is unlikely because one condition of an FmHA loan is that the community be unable to secure financing from commercial sources. Such communities and communities in need of a water system, are apt to be low income communities. Their concern will likely not be with getting Federal money so that they can finance a water system plus another project, but rather just with getting a water system.

Second, the impact of a matching grant is more complicated than usual because money is borrowed to match the grant. Borrowing to match grant funds means that the nominal reduction in the price of building the project is not the effective price reduction. The effective price reduction is also influenced by inflation, the expense of interest payments, the discounting of future dollars, and the grant equivalent of the loan.

Finally, the main impact of the grant and loan results not so much from the infusion of Federal funds per se, but rather from the fact that the community must operate the system and repay the FmHA loan. The impact, however, is more on individual consumers than on the community, because individuals must decide how to allocate their own personal resources in order to pay for water or sewer services. Individuals must, through some sort of collective decisionmaking process, determine if there is sufficient interest in a water or sewer system, and if so apply as a community for FmHA funding.

This distinction between the nominal receiver of the grant and the true receiver has been relatively neglected but is essential when considering a grant program in which the funds go to the community but where the main purpose is to lower the price that individuals must pay for a service. The distinction is also important because the service has many attributes of a purely private good and so is amenable to user charge financing. In contrast, in the case of a tax financed service, such as education, the nominal receiver of a grant and the actual receiver more nearly coincide. The community as a whole is able to purchase or provide more education or reduce taxes. Of course, individuals benefit from the grant, but it is not causing them as individuals

to adjust their purchase of education. Whether or not community decisionmaking determines the postgrant behavior is perhaps an important distinction to draw.

Despite being different from many Federal programs, a number of observations about loan-grant financing in general and the FmHA program in particular can be made, drawing on the general concepts found in the grants literature.

The first observation concerns the goals of, or justification for, intergovernmental grants. One goal, or justification, is to assure a minimum level of provision of particular goods or services. By providing financing for a specific capital project, FmHA's loan-grant program certainly fulfills this objective. A second goal of intergovernmental grants is to equalize local fiscal capacity. The FmHA program does this in a sense, too, because the loan-grant ratio is determined in part by community income, at least in theory. A third goal is stimulation of local expenditures. By leaving the responsibility of day to day operations to the local community, this objective is achieved, although indirectly. Individuals, rather than the community, must adjust their purchases to accommodate the charge for water.

Grants combined with low interest loans are a relatively inexpensive way to meet these goals. The cost to the government consists of the grant money and the interest rate subsidy. ^{7/} By lending much of its money, FmHA can fund many more projects than it could if it just made grants. A loan-grant program can thus assure 'more bang per buck' (providing for minimum service levels, stimulating local expenditures, and compensating for differences in community income levels) than a grant program alone. By determining the size of the grant relative to the loan at least in part on the basis of income, the bulk of the grant funds can be reserved for the neediest communities.

Finally, it must be noted that any type of aid which requires an application to obtain has some drawbacks. There is no guarantee, for example, that a community, no matter how much in need of a water or sewer system, will actually apply for the assistance, or receive the assistance even if it does apply. In addition, an extensive system of categorical grants requiring application is unwieldy to administer; moreover, the potential applicants must find and apply for the grants most suited to their needs. Such a system encourages communities to play a grantsmanship game, a game in which not every community is equally talented. Administrative difficulties and grantsmanship could be reduced by providing assistance in part or wholly by means of unconditional revenue sharing grants. But, just as there is no guarantee that a community will apply for a specific categorical grant, so there is no guarantee that a community will use an unconditional grant to provide the service either.

In conclusion, then, while unconditional revenue sharing grants are better able to equalize the fiscal capacity to deliver services in general, a project grant can help equalize fiscal capacity to deliver a specific service and target funds to those communities with the greatest need for the service. A project grant can, in addition, stimulate spending on a particular function, if not overall, especially if the grant does not cover operation and maintenance costs. Finally, loan-grant assistance can help stretch the Federal aid budget, thereby allowing more communities to receive assistance in providing needed public services.

^{7/} That is, while FmHA itself charges only five percent on its loans, it must obtain money at the market rate of interest.

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