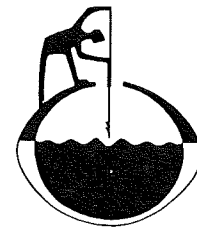


MAN IN THE ARCTIC PROGRAM
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405

**Fiscal Consequences of Energy
Resource Development
Planning for Government Services in Alaska**

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INTRODUCTION

This paper reports on an effort to extend University of Alaska research in support of state budget planning and financial management. The Institute of Social and Economic Research Man in the Arctic Program (MAP), in cooperation with the National Bureau of Economic Research and the Harvard-MIT Joint Center for Urban Studies, has spent the last 5 years developing a comprehensive econometric model with endogenous fiscal and population links which is capable of simulating the long-range impacts of a broad range of fiscal and development policies, the results of which have been reported elsewhere.¹ Approximately 3 years of impact studies concerning growth and development in Alaska under a wide variety of assumptions has made it increasingly obvious to MAP researchers that all development projects proposed for Alaska which result in large revenue impacts are likely to have a negative impact on the state's fiscal position, if (1) new migrants to Alaska have approximately the same distribution of social characteristics as past migrants, and (2) new migrants require approximately the same level of state spending per capita as past migrants. The problem is not trivial, since the State of Alaska is currently heavily dependent upon oil and gas severance taxes to finance current operating expenditures, and the state administration and a significant number of legislators would like to reduce this dependence. On the other hand, our research has shown that if constant real per capita expenditures are assumed, and if migration is not controlled, then development projects would typically result in larger increases in expenditures than increases in revenues. Thus, attempts to improve the State's fiscal picture could cause it to deteriorate.

This apparent paradox is caused by the fact that the current level of state expenditures per capita is beyond the revenue-producing capacity of the state, aside from the petroleum industry. Thus, when these levels are projected into the future and coupled with the migration response to development, estimates of "required" state expenditures are larger than the state revenues, direct and indirect, induced by

¹A brief description of the MAP models may be found in Kresge [8]; Kresge and Seiver [9]; Kresge, Morehouse, and Rogers [10]; and in the applications listed below. Growth rules for state expenditures are discussed in Kresge and Seiver [9], while some fiscal options for use of the state's oil revenues are explored in Goldsmith (1977a) [1] and Goldsmith (1977b) [3]. Economic impacts of various development options are examined in Scott (1975) [11]; Goldsmith, et al. [7]; Scott (1976) [13]; Scott (1977) [12]; Goldsmith (1978a) [2]; Goldsmith and Huskey [6]; Goldsmith (1978b) [5]. The Man in the Arctic Program economists will produce a summary book-length report on the econometric models and applications for professional audiences in the fall of 1979 (tentative title: Public Policy and Regional Development). The manuscript is now in preparation.

BRUs assigned to five agencies and is, in turn, part of the Social Services program, which contains programs administered for various purposes by eight agencies. The expenditure models follow a similar organization (Table 1).

A model has been constructed for each program category, and each model produces estimates of future expenditures for each cover program under three different conditions. The first of these projections is based on past relationships between the level of expenditures for the program category and the size of some demographic determinant such as the projected number of children enrolled in school or the number of persons of working age in the economy. The second projection uses an estimated relationship between expenditures for the program category and total operating expenditures for all purposes. The third projection estimates a constant real per capita expenditure for the population assumed to be the primary users of the services provided by the specified cover program. Each projection gives a different perspective on the significance of past trends or past determinants of expenditures. While not a forecast of future expenditures, for example, the demographically determined projection reveals the combined future fiscal influence of the trend in the level of expenditures per person and the growth of a broadly defined group of beneficiaries for each individual cover program within each program category. It thus permits the highlighting or identification of possible "problem areas" in the budget which may be growing especially rapidly and contributing to budget increases. It also provides some feel for the future consequences of not changing past trends in services for individual categories of expenditure. The second type of projection, "past trends against total expenditures," provides information on the current direction of expenditures for individual cover programs compared to the budget as a whole and can be used to reveal how a simple expenditure rule applied proportionately to all program categories might affect per capita expenditures for each cover program and its constituency. If the first type of projection can be viewed as a sort of "demand for expenditures" type of projection, the second is more useful in analyzing simple types of "supply" constraints applied to the budget as a whole. The third type of projection has a couple of interesting uses. When the level of real spending is set at the current level, the projection measures the future effects of population growth and demographic change on the operating budget, independent of changes in the real level of services as measured by expenditures. The level of real spending can be changed in the model for any program category or group of program categories, however, to estimate the effect either of changing the level of services to be provided, or to measure the effect of efficiency gains which would tend to lower the unit costs of services. Finally, the difference between the first and third types of projections provides an estimate of the budgetary effect of increased levels of service

(not adjusted for efficiency gains) and constant levels of service (either adjusted or not adjusted for efficiency gains).

Both in the interest of brevity and simplicity of presentation and because only a tentative specification is available at this time, a complete description of each model does not appear in this paper. However, a general schematic diagram is shown in Figure 1. The demographic projections required to run the model can be derived from any source. In the following cases, the projections were provided by a run of the MAP econometric model, which has a population model attached and integrated into the modeling framework. State total expenditures for the second, or trend, projections were estimated using a simple expenditure rule and state revenues generated by the fiscal component of the MAP econometric model. When used with the MAP econometric model, the expenditure models provide a perspective on the government services which would be delivered by a given level of state expenditures consistent with projections of future state revenues.

GROWTH IN STATE EXPENDITURES, 1978-2000

To provide the reader with a feeling for how the expenditure models can be used to plan for state government services in the context of vastly expanded temporary oil wealth, and to place the future in the perspective of recent experience with Alaska budgets, I have set out in the first section of Table 2 the historical rates of growth of real per capita state expenditures for the last 15 fiscal years. These are divided into eight major program categories² for the period before the Prudhoe Bay lease sale (1963-69), and after the sale (1970-77). Because the \$900 million provided in Prudhoe Bay lease bonuses in the fall of 1969 resulted in a rapid upward adjustment in state spending in FY 1970-1972, I have also shown the more "normal" post-sale period, 1972-1977. As can be seen from the table, the rate of increase was quite rapid in nearly all categories.

In the future, state expenditures will help determine the rate of growth, but the growth process itself will create additional demand for government services. In the second and third sections of the table, I have set forth a hypothetical example of "demand" for state expenditures in a rapid growth case. In this case, the state legislature, encouraged by royalty and severance tax revenues from Prudhoe Bay, allows total state government real per capita spending to rise at 9.8 percent per year, between 1976 and 1985, or at about 50 percent above the 1970-1977 rate. In 1985, the per capita budget growth process is stopped, but population continues to grow

²The ninth category, General Government, has also grown rapidly, but because it provides mostly legislative, general administrative, and intragovernmental services, I have ignored it for this paper.

Table 2

Rates of Growth in Real Per Capita State Expenditures
by Program Category, Selected Periods
Case 1

	Education (%)	Social Services (%)	Health (%)	Natural Resources (%)	Public Protection (%)	Administration of Justice (%)	Development (%)	Transportation (%)
Historic Rates:								
1963-69	NA	10.4	-0.6	2.9	16.5	8.4	9.5	7.7
1970-77 ^a	9.0	10.8	12.7	7.7	15.6	10.7	11.7	4.9
1972-77 ^a	1.4	3.2	9.9	3.8	16.3	8.3	7.0	2.2
Business as Usual, Implicit Demand:								
1976-1985	2.8	9.8	2.5	7.2 ^b	5.0	2.5	2.6	5.1
1985-2000	5.2	6.9	3.0	13.2 ^b	6.3	3.9	3.1	4.0
Demographic Influence Only, Implicit Demand:								
1976-1985	0.9	2.0	0.9	0.7	0.7	0.7	0.8	1.1
1985-2000	2.4	2.7	1.6	1.4	1.4	1.5	1.5	1.6

^aNo data was available on the 1977 University of Alaska expenditures for this function. 1970-76 and 1972-76 rates were used.

^bLarge increases in Natural Resources spending are projected because of state spending in support of commercial fishing, to sustain a rate of growth of approximately six percent per year to the end of the century consistent with the state's fishery rehabilitation plan.

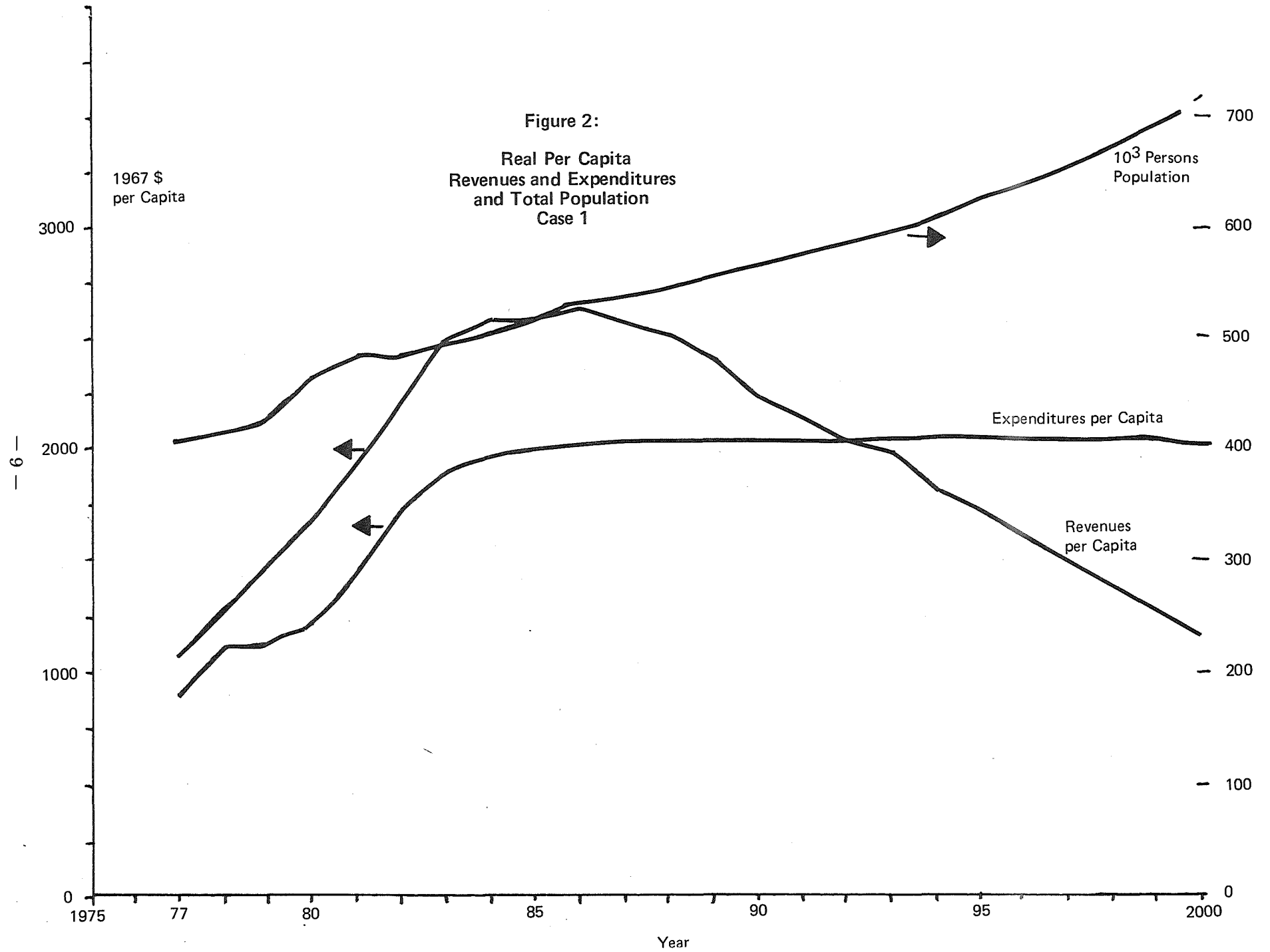


table also shows the estimated effect on state spending for elementary and secondary education, and the amount of money local governments statewide would have to raise if current trends in local funding were to prevail.

The long-term effect is about a 9.6 percent increase in state spending, since real spending increases have turned out historically to be more than proportional to enrollment increases, and because of higher price levels in this case. The impact is about \$72 million per year (about \$33.8 million in 1978 dollars) by the year 2000. There is also an impact on local government. The amount of money required to just maintain real per capita spending by local governments would, in this case, increase the implicit tax burden by the year 2000. However, during the construction period, high construction wages cause personal income growth to outstrip local expenditure increases. The impact on the variable TXLOCK does not necessarily imply increased taxes. If the burden of additional enrollment were solely distributed to the Kenai Borough, for example, where the plant is to be located, the property taxes generated by the plant (\$90.3 million) far exceed the increment in expenditure demand (\$16.8 million). However, if enrollment increases also appear in areas such as Anchorage, whose property taxes are not paid by the plant, some of the burden could occur in the form of increased local taxes. The alternative might be additional state aid to those school districts adversely impacted (if any).

A second set of figures in Table 3 describes some impacts on adult education. The demographic influence of total growth associated with the project could be expected to have an impact of about 3.8 percent increase in university enrollments over the long term (somewhat larger in the short run, with heavy adult migration to the state) if historic enrollment to adult population ratios prevailed. The total university budget would have to rise about 6.5 percent to maintain spending per student and to allow for normal demand growth for other university functions. In order to maintain state general fund expenditures per student at a constant level, due to the higher rate of inflation (price levels are about 4.2 percent higher) and the larger student body in the impact case, the state would have to increase nominal dollar expenditures by about 8 percent over the base case by the year 2000.

The expenditure and econometric models can be used iteratively in the following way to plan for impacts. A development project and government expenditure rule can be assumed and its consequences on the economy and the state budget estimated using the models; also, other combinations of rules can be tried which more closely meet the "demand for expenditures" requirements set forth by the expenditure models. While there is no guarantee that the process is a convergent one, it is cheaper and easier to use than either simple trial and error, or a large model with considerable (and usually expensive) simultaneity.

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