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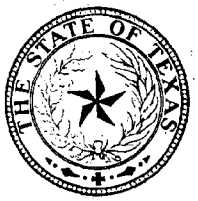
# Texas Coastal Management Program

Texas Coastal Management Program
Technical Paper No. 7

# ASSESSMENT OF FISCAL IMPACTS

## ACTIVITY ASSESSMENT ROUTINE
## SOCIAL AND ECONOMIC COMPONENT




The General Land Office of Texas
Bob Armstrong, Commissioner

RPC, Inc.
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This is one of a series of technical papers, which cover a variety of topics. For information concerning other technical papers in this series, or to order more copies of this paper, contact:

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## FOREWORD

This technical paper is one of a series of seven papers in which the background material, models, and data used to develop the social and economic component (SEC) of the activity assessment routine (AAR) are discussed. Together, the papers are reference sources for the SEC user's manual and form a basis for further system development.

Staff members of the Environmental Management Division, Texas General Land Office, in Austin are available to assist interested parties in learning to use the system, and they welcome any questions, comments, and suggestions concerning the SEC.

Many individuals assisted in the production of these technical papers. The principal-in-charge was Ron Luke. Project managers were Dennis Cooper and Ann Orzech. The author of this paper was Ann Orzech. The technical editor was Nancy Grona. Production assistance was provided by Lori Snyder and Kim Frazier.

Bob Armstrong

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# 1. INTRODUCTION

Government units are affected by a project through increased tax revenues as a result of rising income, higher employment, an expanded tax base, and increased demand for public goods and services due to an expanded population. The net fiscal effect of an activity is the difference between project-related tax revenue and project-related government service costs. If revenues exceed costs, a surplus is realized; if the reverse is true, a deficit is incurred.

More than just the final amount of a deficit or surplus is of interest, however; difficulties may arise for a community due to timing, jurisdicitional differences, or the cyclic nature of service demands.

In the first case, a lag may exist between the time demands are placed on a community and the time tax revenue is received. For example, construction of a facility may be well underway (with the associated work force demanding municipal services) before the first tax dollar is paid on the plant. This delay may cause an espeically severe problem for smaller communities.

Second, the taxing jurisdiction receiving the revenue may not be the one in which the new-resident workers and their families locate. A plant might be located, for example, outside of the taxing limits of the city in which most of the new residents live. The city would thus not receive any direct tax payments and yet must meet the infrastructural needs of the new population.

Finally, project employment, and thus new population and service demands, may peak and then level off, as during the construction phase. If capital expenditures are made in order to meet peak demands, excess capacity may exist as direct employment and population decline.

Because fiscal impacts are of paramount importance to government officials, the fiscal impacts on state and local governments are considered as part of the social and economic component (SEC) of the activity assessment routine. In this paper, the fiscal impact methodology employed in the SEC is outlined, and areas worthy of further development are suggested.

## TAX REVENUES

The total direct, indirect, and induced tax revenues resulting from a project are estimated in the SEC by using the Type II tax multipliers from the appropriate I/O model. Estimates are derived for revenue accruing to the state government for project-related activities within the I/O region, and for revenue accruing to all local governments within the I/O region.

Mathematically,

$$\text{Total Tax Revenue} = \text{Type II Tax Multiplier} \times \text{Direct Regional Output}$$

Since the multiplier represents total tax revenue generated per dollar of direct output per year, the product is then adjusted to conform to the time period. The derivation of the tax multipliers is discussed in detail in Technical Paper No. 6, Input/Output Models of the Texas Coastal Region.

Due to data limitations, the revenue estimate for local governments cannot be allocated to specific units of government. The I/O models from which estimates of tax revenue are derived are models of multi-county regions; as a result, tax revenue is estimated for all local governments within a given I/O region. In actuality, revenue will accrue to a given local government to the extent to which expenditures are made and new-resident employees and their families locate in the community. Dispersion of economic activity throughout the region, however, implies a dispersion of tax revenue as well.

## GOVERNMENT SERVICE COSTS

### METHODS CURRENTLY IN USE

Six approaches, singularly or in combination, are presently used to project government service costs (Burchell et al., 1978). These are:

1. Per Capita Multiplier Method. In this approach, average municipal costs per person (either total cost or cost of a specific service) are multiplied by the expected population increase. Because this method

relies on use of existing data, is easy to perform, and is simple in concept, it historically has been used in about 70 percent of fiscal impact analyses.

2. Case Study Method. With this method, intensive site-specific investigations are undertaken to identify present service capacities which are deficient or in excess. These capacities are then combined with best estimates of demands resulting from anticipated growth. Responsible government officials are relied upon to obtain present capacity and future service level information. This approach is relatively time-consuming and expensive; it has been used in about 15 percent of fiscal impact analyses.

3. Service Standard Method. In this approach, the total number of new employees required by service type due to the population increase is estimated; increased operating and capital outlays are estimated through the use of local operating costs per employee and U.S. Census of Governments ratios of capital-to-operating service. This method has been used in about 10 percent of past fiscal impact analyses.

4. Comparable City Method. This approach relies on relationships between community size, growth rates, and local expenditure levels to determine the effects of population changes on government costs. Briefly, the experience of other cities of comparable size and growth rates are used to estimate new government expenditure levels as a result of a population change. This approach is relatively new; its use should increase in the future.

5. Proportional Valuation Method. This method is used to estimate the fiscal impact of nonresidential facilities. A share of municipal costs is assigned to a facility on the basis of its real property valuation.

6. Employment Anticipation Method. The final method is an alternate approach to estimating municipal service costs of nonresidential growth. Municipal services are assumed to be related to the increase in local employment; the relationships are estimated through multivariate regression analysis.

METHOD UTILIZED IN SEC

The SEC employs the first approach, the per capita multiplier method. Use of a per capita cost model assumes that an increase in population is the primary factor which leads to increased expenditures. It is likely that other variables also influence the level of expenditures. Geographic size of the government unit, government regulations, and employment statistics are just three examples of these variables. However, when these intervenening variables are held constant, as this procedure assumes, increase in population becomes the dominant variable.

This procedure incorporates these additional assumptions:

1. The cost to a government of servicing a population increase (marginal cost) is comparable to the costs of servicing its present population (average costs); in economic terms, the average cost curves of public services are assumed to be horizontal, or nearly so.

   Studies of the shape of average cost curves have been undertaken; results are shown in Table 1. The cost functions for 80 to 85 percent of all expenditures (horizontally intergrated services) have been found to be horizontal over a very wide range. The shape of the curves for the remaining expenditures is either declining or U-shaped, with the trough in medium-sized communities.

2. All expenditures of a unit of government can be expressed meaningfully in, and are therefore included in, the cost per capita figure.

3. Increased services will be provided in the short run. If the relative increase in population in any one community is expected to be small, it is possible that governments will not increase their expenditure levels. In this case, demand would be met with existing facilities and personnel, and any strain on public facilities and services would tend to be reflected in a temporary decrease in the level and/or quality of services provided. Although the per capita approach provides a measure of the project's impact on the provision of public services, it is quite possible that the new population could be absorbed into communities with little actual increase in government expenditure.

Advantages of the per capita method are these: (1) the approach will provide estimates of government expenditures for the I/O region, the geographic area for which estimates of tax revenues are made, and (2) it is relatively simple to use. The underlying assumptions may limit its applicability, however. Consequently, it is recommended that the fiscal impact of a project be examined as a special issue to the extent to which an analyst believes the assumptions not to hold for a specific case.

The projected change in government service costs is calculated in the SEC by multiplying present per capita government expenditures by the estimated change in population. The derivation of expenditures per capita is outlined in Technical Paper No. 6, Input/Output Models of the Texas Coastal Region. In general, government service costs equal total direct general expenditures (including both capital outlays and operating expenses) minus intergovernmental transfer revenues. The result is then divided by total population to obtain expenditures per capita.

Table 1

COST CURVE STUDIES OF SCALE ECONOMIES

| Name and Year | Service | Type | Result |
|---|---|---|---|
| | *Horizontally integrated services* | | |
| Riew (1966) | Secondary education | S | AUC is U-shaped with trough at about 1,700 pupils |
| Kiesling (1966) | Primary and secondary education | S | AUC is about horizontal |
| Hirsch (1959) | Primary and secondary education | S | AUC is about horizontal |
| Schmandt-Stephens (1960) | Police protection | S & Q | AUC is about horizontal |
| Hirsch (1960) | Police protection | S & Q | AUC is about horizontal |
| Will (1965) | Fire protection | E | AUC is declining with major economies reached at 300,000 population |
| Hirsch (1959) | Fire protection | S | AUC is U-shaped with trough at about 110,000 population |
| Hirsch (1965) | Refuse collection | S | AUC is about horizontal |
| | *Circularly integrated services* | | |
| Hirsch (1959) | School administration | S | AUC is U-shaped with trough at about 44,000 pupils |
| | *Vertically integrated services* | | |
| Nerlove (1961) | Electricity | S | AUC is declining |
| Isard-Coughlin (1957) | Sewage plants | S | AUC is declining |
| Lomax (1951) | Gas | S | AUC is declining |
| Johnston (1960) | Electricity | S | AUC is declining |

*Note:* The following abbreviations are used: S = statistical data; AUC = average unit cost; Q = questionnaire data; E = engineering data.

Source: Werner Z. Hirsch, "The Supply of Urban Public Services", Issues in Urban Economics, Perloff and Wingo, eds. (Baltimore: Johns Hopkins Press, 1968),p. 508.

## NET FISCAL EFFECT

The net fiscal effect of a project is the difference between the expected tax revenues, derived through the application of regional I/O models, and the expected government service costs, estimated through the use of a per capita cost model. Projections are made for the state government for project-related activity within the I/O region and for all local governments in the region.

The SEC fiscal methodology does not permit the estimation of fiscal impacts for specific local governments. For any project, a given government could realize a surplus, a deficit, or no effect, depending upon the actual distribution of project-related expenditures and new-resident population within the region. Consequently, the fiscal analysis is complemented in the SEC by the social/infrastructural analysis, in which specific service and facility capabilities are examined for each municipality likely to be affected by a project; those infrastructural impacts likely to require local government expenditures are identified.

## 3. FUTURE REFINEMENT OF FISCAL IMPACT METHODOLOGY

Refinement of the above methodology should focus on these three areas:

1. Development of procedures for determining the fiscal impact on a given community or unit of government

2. Examination of alternative methods for estimating tax revenues

3. Examination of alternative methods for estimating government expenditures

The three areas are interrelated; for example, accomplishments of the first will require the latter two.

The present approach estimates the fiscal impact on the state and all local governments within the I/O region; the net effect on a given community or unit of government cannot be determined, even though the latter is often of more interest than the former. As a result, considerable attention should be paid to the determination of fiscal impact at the community level.

Total government expenditures are estimated in the present model by using an estimate of per capita costs. This approach assumes constant average and marginal costs for all government services for a community. A refinement of the methodology in order to estimate expenditures by major types would permit a more accurate assessment of the impact of project-related population growth on a given unit of government.

## 4. CONCLUSIONS

Use of the above methodology permits the determination of the fiscal impacts of a project on the state government for project-related activity within the I/O region and for all local governments within the I/O region. The methodology is based on the use of I/O tax multipliers and current per capita government service costs. Fiscal impacts on specific local governments are not estimated; consequently the analysis is complemented by a separate analysis of a community's infrastructural capabilities. Efforts at refining the methodology should focus on developing alternative models for estimating revenues and expenditures so the fiscal impact of a project on specific services and units of government can be identified.

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