AN ANALYSIS OF STATE AND LOCAL INDUSTRIAL TAX EXEMPTION PROGRAMS*

WILLIAM E. MORGAN

University of Wyoming

AND

MERLIN M. HACKBART

University of Kentucky

During the post World War II period, a major expansion occurred in the use of tax and financial inducements by state and local governments to attract industry and thereby promote regional economic growth. The financial inducements used by state and local governments may be classified as tax exemptions, subsidies and changes in state or local tax structures for the purpose of attracting industry.¹ The most extensively used subsidies are local aid through industrial development bond-financing and state aid in the form of guaranteeing mortgage loans made by private institutions, purchasing second mortgages on industrial property, and making loans to local development corporations for development and construction of private industrial facilities. The common forms of tax exemptions include complete or partial exemption of land, buildings, equipment and inventories from ad valorem taxes for periods of five to ten years.

The present study is focused on the state-wide economic impact of industrial tax concession programs. More specifically, the study attempts to measure the major benefits and costs of the property tax exemption programs for the seven states which actively promote industrial development on a state-

wide basis through the use of property tax exemptions—Alabama, Kentucky, Louisiana, Mississippi, South Carolina, Rhode Island and Vermont.

To the authors' knowledge, this study is the first in which formal benefit-cost techniques have been used to evaluate tax concession programs on a state-wide basis. William D. Ross conducted a study of tax concession programs in Louisiana using investment as the measure of benefit and employing a very informal benefit-cost framework [12]. James R. Rinehart, using benefit-cost techniques, analyzed the economic impact of subsidy programs on ten communities in Southern states [11]. The case study method as employed by Rinehart ignores the issue of whether the firms would have located in the selected areas if subsidies had not been offered. A more recent study was focused on the benefits and costs of state loan inducement programs [13]. These studies represent attempts to employ, with varying degrees of detail and sophistication, benefit-cost techniques to evaluate state and local industrial incentive programs.

I. ANALYTICAL FRAMEWORK AND USE OF EMPIRICAL INFORMATION

In the present study, benefits are defined as increased value added resulting from investment that occurred because of the existence of the tax exemption programs (induced investment). Value added is used as a proxy for regional income. Because all of the owners of the factors of production do

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¹ For a description of the types of incentive programs and a discussion of the extent of their use by state and local governmental units in the United States, see [2; 7].

not reside in the region in which the income is earned, value added overstates benefits accruing to the region in which the tax exemptions are accorded. Although it might be argued on political grounds that the only benefits that should be considered in the analysis are payments to persons residing in the tax-exempt region prior to the commencement of the tax exemption programs, persons moving into the region after enactment of the subsidy program will share in exemption costs. Therefore, benefits accruing to new residents should not be excluded.

The cost of the exemption programs is defined as the loss of tax revenue resulting from exemptions granted to industry. If tax exemptions are granted to industry, the major risk takers (potential bearers of costs and recipients of benefits) are taxpayers in the tax-exempt region. Assuming that the property taxes normally paid by industry reflect the cost of providing public services to industry financed by property tax revenue, then loss of industrial property tax revenue is an appropriate measure of the cost of tax exemption programs to the taxpayers in the region. The taxpayers have to bear the cost of providing services to tax-exempt industry.

The quantitative importance of the tax exemption programs of the seven states was estimated for the four-year period 1958–1961. The estimates were based on information obtained from public industrial development authorities in each state. Tax-exempt investment exceeded \$1.6 billion, accounting for about sixty percent of the total non-farm industrial investment made during this period.

On the benefits side, alternative assumptions were used regarding the proportion of total investment that was induced by the tax incentive.² A net incremental capital output ratio and state input-output multi-

² Due to the lack of a firm basis on which to derive a set of assumptions regarding induced investment, the alternative values used were arbitrarily assumed. This aspect of the study is discussed in the latter part of the paper.

plier were employed to estimate the increase in value added resulting from the induced investment.

By utilizing data developed by the U.S. Department of Commerce and reported in the *Survey of Current Business* (various issues), it was possible to estimate a gross incremental capital output ratio for the manufacturing sector in the United States for the period 1950–1969 (expenditures on plant and equipment 1950–1968 ÷ Δ in national income originating in manufacturing 1951–1969 expressed in 1958 constant prices).³ The gross incremental capital output ratio (C/O gross) for manufacturing in the United States for the period 1950–1968 was 4.25. The estimated value of the net incremental capital output ratio (C/O net) is 1.52.

The weighted average mean age of service lives for manufacturing structures and equipment in the United States during the period 1960–1968 was 9.4 years.⁴ Assuming straight line depreciation, the annual weighted average rate of depreciation is 10.6 percent.⁵ The direct benefits of the tax exemption programs have been estimated by dividing the induced investment, net of depreciation, by the net incremental capital output ratio for each year of the economic life of the investment (9.4 years). The formula used to estimate direct benefits is indicated below.

$$B_d = \sum_{t=1}^n \left(\frac{I_t \text{ net}}{C/O \text{ net}} \right)$$

where B_d = direct benefits

I_t net = value of induced investment,
net of depreciation, at time t

³ Data regarding manufacturing were used because most of the investment which is accorded preferential treatment in the seven states is accounted for by manufacturing enterprise.

⁴ The weighted average mean age of service lives was derived from data reported in [4].

⁵ Assuming straight line depreciation, one-half of the capital will be productive during the total life of a project. If capital depreciates at an increasing or decreasing rate, the amount of capital that is productive during the life of the project will be different. For discussions regarding "survival curves" see [5, 139; 6, 142–67].

C/O net = net incremental capital output ratio

t = number of years after investment is in place

An input-output multiplier was used to estimate the total impact of the estimated change in value added originating in manufacturing which resulted from the induced investment.⁶ The multiplier used, a value added multiplier with a value of 1.49, was derived for the manufacturing sector of the state of Kansas from the 1965 Kansas input-output table (unpublished). The multiplier is a measure of the direct, indirect and induced income effects measured in terms of value added (i.e., it is assumed that one dollar of direct value added resulting from the induced investment generates an additional 49 cents in value added in the tax-exempt region). The information necessary to estimate the appropriate multipliers for each of the seven states was not readily available. The multiplier for Kansas has been assumed to be fairly representative of the multipliers for each of the seven states. The following formula was used to estimate direct and indirect benefits:

$$B_{d+i} = \sum_{i=1}^n \left(\left(\frac{I_t \text{ net}}{C/O \text{ net}} \right) (K) \right)$$

where B_{d+i} = direct and indirect benefits

I_t net = value of induced investment, net of depreciation, at time t

C/O net = net incremental capital output ratio

t = number of years after investment is in place

K = value added multiplier

In order to estimate the cost of exemption programs, it was necessary to obtain information for the period 1958–1961 regarding assessment ratios, tax rates (mill rates), and

⁶ Considerable controversy exists regarding the inclusion of indirect benefits in the calculation of total benefits. Therefore, two measures of benefits have been included in the analysis: a) direct benefits only and b) direct and indirect benefits.

the period of exemption for each of the seven states.⁷ It was assumed that assessment ratios and tax rates were constant during the exemption period. The formula used to estimate the cost of tax exemption programs is as follows:

$$C = \sum_{t=1}^n ((TI_t \text{ net}) (A) (R))$$

where C = cost of tax exemptions

TI_t net = value of tax-exempt investment, net of depreciation, at time t

t = number of years after investment is in place

A = tax assessment ratio

R = tax rate

The benefit-cost analysis was conducted using alternative assumptions regarding a) discount rates, b) benefits (inclusion or exclusion of indirect and induced effects), c) share of value added which is benefit, and d) induced investment as a proportion of total tax-exempt investment. The formula used to compare benefits and costs is as follows:

$$B/C = \frac{\sum_{t=1}^n \left(\frac{B_t}{(1+R)^t} \right)}{\sum_{t=1}^n \left(\frac{C_t}{(1+R)^t} \right)}$$

where B_t = value of benefits at time t

C_t = costs at time t

t = number of years after investment is in place

R = annual discount rate

Discount rates of .07 and .10 were used in the analysis. The rates represent estimates of the rates of return that the resources utilized would otherwise provide in the private sector.⁸ Although there are conceptual diffi-

⁷ Most of the information was obtained from the state development authority in each of the seven states. Since local tax rates vary within each state, the local industrial property tax rate used in this analysis is an average property tax rate from which industry was exempt in each state. The average local tax rates estimated with data provided by the state development authorities were found to be consistent with those based on U. S. Census data as reported in [15].

⁸ For a discussion regarding discount rates, see [1, 273–289].

culties in estimating the marginal rate of return on investments of state and local governments, the best approximation of the conceptually correct rate is "the average of the average rates of return on private investment, weighted by the proportion of investment in different parts of the private sector" [10, 24166-24167]. The real average rate of return in the private sector (exclusive of cash holdings), including the taxes on capital for the period from the Korean War to the Vietnam War, was estimated to be 10.4 percent [14]. A lower public sector rate has been justified on the basis that the full cost of federal long term borrowing is at least seven percent [10, 24167].

Two measures of benefits have been included in the analysis to represent direct and indirect benefits, and direct benefits only. Controversy exists regarding the inclusion of indirect benefits in the calculation of "total benefits."⁹ Because the direct costs of the inducement programs are financed by state and local governments, it can be argued that indirect benefit effects should be included as benefits of the tax incentive programs (i.e., the analysis should be focused on regional economic impacts vis-à-vis national economic efficiency).

As indicated earlier, benefits (as measured by value added) are overstated because all of the owners of the factors of production do not reside in the tax region (e.g., owners of capital). In addition, to the extent that payments to the factors of production located in the region do not represent a change in net income (i.e., the opportunity cost for all factors of production employed is not zero), benefits are overstated. It is virtually impossible to estimate the share of value added that should be treated as benefit. The share of value added that is benefit could vary widely among states and among regions within each state. Therefore, in order to test for sensitivity, the authors have made arbitrary assumptions regarding the proportion of value added that is benefit.

⁹ See [3; 9].

The final set of assumptions concerns the proportion of total tax-exempt investment induced by the property tax exemption programs. Due to the lack of a firm basis on which to derive a set of assumptions, alternative values are arbitrarily assumed. Of the four sets of alternatives used in this study (discount rates, definition of benefits, share of value added which is benefit and rates of induced investment), the third and fourth are most sensitive with regard to the results of the benefit-cost analysis.

II. EMPIRICAL RESULTS

The results of the analysis are presented in Table I. Assuming all of value added is benefit, irrespective of the assumptions used regarding discount rates and definition of benefits, the results indicated that if only one percent of the tax-exempt investment was induced by the exemption programs, the discounted costs would exceed the discounted benefits; if five or ten percent of the investment was induced, the discounted benefits would exceed the discounted costs.¹⁰ Moreover, the induced investment rates (induced investment as a proportion of total tax-exempt investment) which equate discounted benefits and costs, using the specified assumptions regarding discount rates and definition of benefits, are low—ranging from 1.14 percent to 1.70 percent.

However, as the share of value added treated as benefit is reduced, the benefit-cost ratios decline proportionately (e.g., if 50 percent rather than 100 percent of value added is benefit, the benefit-cost ratios are still greater than one with induced investment rates of 5 or 10 percent). Assuming 25 percent of value added is benefit, one benefit-cost ratio is less than one at the 5 percent rate of induced investment. Assuming only 10

¹⁰ During the empirical stages of the study, an additional direct benefit was considered—the value added in the tax-exempt region resulting from the construction directly associated with the induced investment. Because the inclusion of value added from construction did not significantly alter the empirical results, it is not included in the benefit-cost calculations.

TABLE I
COMPARISONS OF BENEFITS AND COSTS OF TAX EXEMPTION PROGRAMS (BENEFITS ÷ COSTS)

Definition of Benefits	Induced Investment as a Proportion of Total Tax-Exempt Investment		
	.01	.05	.10
Benefits = 100% of Value Added			
Direct and Indirect Benefits			
Discount Rate of .07	.88	4.39	8.78
Discount Rate of .10	.88	4.38	8.77
Direct Benefits Only			
Discount Rate of .07	.59	2.95	5.89
Discount Rate of .10	.59	2.94	5.88
Benefits = 50% of Value Added			
Direct and Indirect Benefits			
Discount Rate of .07	.44	2.20	4.39
Discount Rate of .10	.44	2.19	4.39
Direct Benefits Only			
Discount Rate of .07	.29	1.48	2.95
Discount Rate of .10	.29	1.47	2.94
Benefits = 25% of Value Added			
Direct and Indirect Benefits			
Discount Rate of .07	.22	1.10	2.20
Discount Rate of .10	.22	1.10	2.19
Direct Benefits Only			
Discount Rate of .07	.15	.74	1.47
Discount Rate of .10	.15	.74	1.47
Benefits = 10% of Value Added			
Direct and Indirect Benefits			
Discount Rate of .07	.09	.44	.88
Discount Rate of .10	.09	.44	.88
Direct Benefits Only			
Discount Rate of .07	.06	.30	.59
Discount Rate of .10	.06	.29	.59

percent of value added is benefit, none of the benefit-cost ratios is greater than one.

III. CONCLUSION

The effectiveness of exemption programs⁸ in attracting industry is not a settled issue. Theoretically, for state and local taxes to be significant location factors, interlocal tax differentials must exist that are quantitatively greater than the sum of differentials

among other cost factors. However, the empirical evidence indicates that other interlocal cost differentials are generally more significant than tax differentials.¹¹ State and local property tax exemptions basically modify nominal tax burdens and, as a non-generalized feature of state and local tax structures, constitute a supplementary factor

¹¹ For an empirical analysis of interlocal cost differentials, see [16].

in the decision-making process. A substantial number of questionnaire and interview method surveys of industrial firms have been conducted to estimate the relative importance of state and local taxes and tax exemptions in determining industrial location. Despite methodological weaknesses, the surveys indicate that tax exemptions, and state and local taxes, are unimportant location factors.¹²

The present study would seem to offer another dimension to the tax exemption controversy. As shown, tax exemption policies can be "efficient" if the share of value added which is benefit is not inordinately low (e.g., not less than 50 percent) even if induced investment as a percent of total tax-exempt investment is low (e.g., 5 percent). Consequently, if interlocational costs other than taxes are approximately equal among competitive regions for some types of industry, a tax exemption policy may be "efficient" even if the success rate of such a policy is low in terms of attracting industry. However, regional competition in industrial tax exemption programs will reduce the advantage (i.e., lower the success rate) that a single state or community might hold.

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