THE INTERINDUSTRY DISTRIBUTION OF EFFECTIVE TAX RATES FOR A STATE CORPORATE INCOME TAX

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Abstract—This paper examines the extent to which a single state tax imposes differential burdens across industries. We provide quantitative estimates of the intrastate interindustry distribution of effective rates for the corporate income tax. In addition, we are able to remove that part of the interindustry variation introduced by formula apportionment, the method used by most states to calculate the portion of multi-state firms' incomes to be taxed as income earned in-state. The remaining interindustry variation reflects state over- and under-taxation induced by preferential state tax credits and the differences between state and federal progressivity.

I. INTRODUCTION

The influence of state and local business taxes on a firm's choice of location continues to be one of the most unsettled of all policy-related issues in regional economics. In early studies, surveyed by Due (1961), the dominant theme was that these taxes have, at most, only minor effects on industry location. However, recent studies, employing more detailed data sets and more refined econometric techniques, have generated results that cast some doubt on the received conclusion that tax effects are generally negligible.¹ While this debate has yet to yield any universally accepted conclusions, there is a well established consensus that hypotheses about spatial allocation effects of interregional tax differentials ultimately involve questions of incidence. Though McClure (1970) and Mieszkowski (1972) have adapted the Harberger (1962) tax incidence model for the analysis of state and local taxes, empirical applications demand both information that is difficult to obtain (production function characteristics and area-specific demand elasticities), and information that is hard to interpret (factor mobility elasticities). In addition, methodological problems arise in the construction of business tax proxies that closely correspond to conventional notions of effective rates. The central research question is how to measure the magnitude of tax differentials when jurisdictions (e.g., states) employ different tax bases as well as rates. This is

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critically important when the purpose of the empirical analysis is to isolate tax effects from the multitude of other important locations determinants.² Thus measuring interregional tax differentials becomes the necessary first step to correctly study incidence and the resulting resource allocation effects.

In an interesting paper, Wheaton (1983) calculated state and local effective tax rates on businesses for each of forty-eight states, dividing the sum of all business taxes by net business income or the value of the business capital stock. These aggregate effective rates exhibited a substantial amount of variation across states and regions, and also revealed that state and local taxes have become a significant percentage of business income. One distinct advantage of this exercise is that it permits one to address the issue of possible burdens imposed by a state's entire business tax structure, an assessment that is difficult to make on the basis of comparing interstate differentials in statutory rates.

On the other hand, actual tax policy decisions must also recognize that a particular tax may impose substantially different burdens on one industry relative to another. Wheaton's aggregate rates provide less insight at this level, since he pools taxes having theoretically different impacts on firm behavior. His aggregation includes capital-related taxes (property, corporate income), taxes on labor (unemployment payroll), output taxes (insurance, stock transfer, mining or severance), and general license or business fees.

In a more recent paper, Papke (1987) focuses exclusively on capital taxes and allows tax burdens to vary across industries within a state. Papke's empirical analysis of the relationship between interstate tax differentials and industry location clearly reveals the importance of taking into account the interindustry variation in effective rates imposed by business taxes. The method employed by Papke to estimate industry-specific tax burdens involves simulating the after-tax rates of return on marginal capital investment. These simulations are conducted for sets of representative corporations endowed with a specified capital composition and operating characteristics. The resulting after-tax rates of return vary along two dimensions: Across states and across industries within a state.³ By isolating the industry-specific effects of business taxes, Papke finds that investment location decisions are indeed sensitive to state and local tax-cost differentials. Furthermore, Papke's results suggest that previous studies in this area, employing generalized average or statewide aggregate measures of taxes may have concealed an empirically significant range of tax cost differentials among locationally sensitive industries.

Even though the issue concerning differential impacts of state business taxes across industries is important, the paucity of state level industry tax data has made additional empirical analysis virtually impossible. Special data recently as-

sembled by the Louisiana Department of Revenue and Taxation, however, provides a unique opportunity to pursue the issue a bit further.

This paper examines the extent to which a single state tax imposes differential burdens across industries. Specifically, we provide quantitative estimates of the intrastate interindustry distribution of effective rates for the corporate income tax. Utilizing data provided by the Louisiana Department of Revenue and Taxation, effective rates for 55 industries in the state are calculated by taking the ratio of actual state corporate income taxes paid to net income before taxes. While not a measure of tax incidence, substantial variation in effective rates across industries may suggest a pattern of differential tax treatment of one sector of the regional economy relative to another. These unintended effects would tend to distort the amount of resources that might otherwise be invested in the absence of the tax (or relative to a neutral tax). To the extent that effective rates vary, it might also provide a rationale for why some recent econometric studies on locational determinants find that some industries are more sensitive than others to inter-regional differentials in corporate income tax rates.⁴

Our exercise represents a logical extension to the existing disaggregated studies on tax-induced business location. It also complements the studies by Wheaton and Papke, but differs from both in two important ways. First, unlike Wheaton, we focus on the effective tax rate differentials that exist within a single taxing jurisdiction for a single business tax. Second, rather than simulate differential tax burdens, we estimate these differentials from actual business income and tax payments.

In the next section we provide a brief discussion of the structure of state corporate income taxes. In the third section, after describing the data, we present estimates of the intrastate interindustry distribution of effective rates for the Louisiana corporate income tax. In addition, we are able to remove that part of the interindustry variation introduced by formula apportionment, the method used by most states to calculate the portion of multi-state firms' incomes to be taxed as income earned in-state. The remaining interindustry variation reflects state over- and under-taxation induced by preferential state tax credits and the differences between state and federal progressivity. In the last section we offer a few concluding remarks concerning the significance of our estimates.

II. THE STRUCTURE OF STATE CORPORATE INCOME TAXES

States first began imposing corporate income taxes during the second decade of this century--Wisconsin being the first in 1911. By 1920, eight states plus Hawaii had enacted such legislation. By far the largest number of enactments oc-

curred during the 1930s, when a total of 15 states passed legislation to tax corporate income. Activity died down during the 1940s and 1950s, with the next surge of activity beginning in the 1960s.

By comparison, beginning with the 1977 tax year Louisiana raised its corporate income tax rate from a flat rate of 4 percent to a five-tiered schedule with a range of 4 percent on the first \$25,000 of taxable income to a maximum of 8 percent on taxation income exceeding \$200,000. Like many other states, Louisiana employs the federal definition of taxable income as the starting point for calculating tax liability. For multistate corporation, the share of total net income subject to the state's tax is determined through formula apportionment. Under this formula the proportion of total income that is to be allocated to Louisiana is the average of three factors: the percentage of total property in the state, the percentage of total sales occurring in the state, and the percentage of total payroll paid in the state.

Corporations may reduce their income tax liability by taking advantage of a wide range of tax credits presumably intended to encourage certain kinds of business activity. Two of these credits are intended to reward job creation in economically depressed areas (i.e., rural and urban enterprise zones). There is also a credit for "new" jobs created. Finally, one rather unique credit permits corporations to reduce their tax liability for donations to political sub-divisions of Calcasieu Parish, up to 20 percent of their Louisiana tax.

In the 1960s and through most of the 1970s revenues from corporate income taxes provided about 5 percent of the total tax collections in the state. Since the rate increase in 1977, the percent of total tax collections derived from this tax has averaged about 9 percent, which closely mirrors the average of all states. Because the state corporate income tax appears to be relatively unimportant in terms of revenue provided as a percent of total tax collections, there is a tendency for policy-makers to minimize its importance.⁵ This is a mistake for two reasons. First, *share* measures do not provide a useful tool with which to study either the incidence or resource allocation effects of business taxes. Obviously, the share of tax payments made by business will vary substantially across states depending on the size and type of the industrial tax base, and not just on the rates levied. Second, the theory of excess burden suggests that a tax may create economic distortions that are far out of proportion to the share of revenues yielded. Ultimately, the analysis of the resource allocation effects of a tax must begin by a comparison of the level of taxation relative to some common index of ability to pay.

III. INTERINDUSTRY VARIATION IN EFFECTIVE TAX RATES

Utilizing a unique body of data gathered by the Louisiana Department of Revenue and Taxation, we are able to construct quantitative estimates of the inter-industry distribution of effective tax rates for the state corporate income tax.⁶ These data were taken from corporate tax returns filed by July 3, 1984 for the period January 1983 through December 1983. For this period, there were 63,515 returns on file. Of these returns, 46,118 or roughly 72 percent had valid business codes that properly identified the type of business. For each industry grouping, summary totals were provided on net taxable income, amounts of corporate income taxes paid, and the number of firms. Only firms reporting positive taxable income were used in calculating effective tax rates. The final sample consists of 19,592 firms.⁷

For each industry an effective tax rate (ETR) was calculated expressing *actual* state taxes paid as a percent of net taxable income. One methodological problem involved the choice of an appropriate index of equality--the denominator of this ratio. In the present study the choice of net income as a standard of measurement was dictated by available data. But as Wheaton (1983) points out, in a study which examines only the initial impact of a tax, and not its ultimate incidence, the use of net income is the most reasonable.⁸ Implicitly this technique assumes that corporate income taxes are paid out of the funds that would otherwise be available to stockholders. This is certainly true in the short run, before any potential shifting can occur. However, even a tax that is shifted may affect the competitiveness of an industry as much as an unshifted tax. For example, a tax that is shifted forward on consumers in the form of higher product prices will encourage the diversion of consumption into other products and will consequently limit sales. An unshifted tax reduces the net rate of return to capital and will discourage additional investment by that industry in the state. In either case, the tax creates a distortion in both the interindustry and spatial allocation of resources.

The first column of Table 1 presents the mean effective tax rate for each of eight major industries in Louisiana. The mean across all sectors in the state was 5.53 percent. Wholesale trade had the highest mean ETR (6.33 percent), while the service sector had the lowest (5.12 percent). Looking down column 1 there appears to be a relatively small amount of dispersion in tax burdens among industries in the state. However, additional insight can be gained by examining the range of effective rates within each sector. The within-sector range is presented in columns 2 and 3. An examination of these two columns reveals a qualitatively different picture of the degree of the burden inequality. Within the manufacturing section, for instance, the ETR ranges from a low of 2.29 percent to a high of 7.66 percent. The largest effective rate (7.66 percent) occurred in the transportation

TABLE 1
Comparative Tax Burdens of Corporations:
1983 Effective Corporate Income Tax Rates
(expressed in percentages)

Industry	Effective Corporate Income Tax Rate			Sample Size	Coefficient of Variation
	Mean	Minimum	Maximum		
Mining	6.07	4.56	6.66	794	19.96
Construction	6.13	5.41	7.02	2,117	13.30
Manufacturing	5.87	2.29	7.38	1,230	18.72
Durable	5.50	2.29	6.50	688	23.76
Nondurables	6.24	5.12	7.38	542	11.69
Transportation & Public Utilities	5.89	4.08	7.66	918	20.73
Wholesale Trade	6.33	6.04	6.62	1,650	6.42
Retail Trade	5.70	5.18	6.88	3,797	8.95
Finance, Ins. & Real Estate	5.47	4.81	6.46	2,998	15.29
Services	5.12	4.15	6.77	6,042	17.82
All Industries	5.53	2.29	7.38	19,592	19.68

Source: Computed from data provided by the Louisiana Department of Revenue and Taxation.

Note: Effective tax rate equals corporation income tax payments divided by net income.

and public utilities sector. The last column reports the coefficient of variation. As can be seen, the greatest degree of within-sector variability was in the manufacturing durables sector, while the wholesale and retail trade sectors exhibited the smallest amount of relative dispersion.

In order to obtain a more complete picture of the degree of tax burden inequality among industries, ETRs were calculated for 55 two-digit (SIC Code) industries. Each ETR was then divided by the overall mean. The assumption is that differential tax burdens would be reflected in rates that differ substantially from the mean. These normalized rates are reported in the first column of Table 2. There were eleven industries that had effective rates exceeding the mean by at least 20 percent. Four notable industries were: food and kindred products (+33%); petroleum refining (+33%); chemicals (+22%); and public utilities (+39%). Conversely, there were six industries with ETRs that fell below the mean by 20 percent or more. For example, two industries that were "under-taxed" by this criterion were primary metals (-59%) and air transportation (-26%).

How might differential tax burdens arise within the state? Like many states' taxes, Louisiana's corporate income tax begins with the federal definition of income (in-state plus out-of-state). State taxable income, SINC, is calculated as a

TABLE 2
Louisiana and Federal Normalized Effective Rates by Detailed Industry Groups

Industry	Louisiana	Federal	Difference	
			DETR	DETR*
Mining				
Metal Mining	.95	2.01	-1.06	
Coal Mining	.83	1.83	-1.00	
Oil and Gas Extraction	1.12	.50	+.62	-.21
Nonmetallic Minerals, ex. fuels	1.20	1.37	-.17	-.22
Construction				
General Building Contractors	1.08	1.36	-.28	-.28
Heavy Construction Contractors	1.27	1.08	+.19	+.07
Special Trade Contractors	.98	.96	+.02	+.03
Manufacturing				
Food and Kindred Products	1.33	1.15	+.18	+.25
Textile Mill Products	1.12	1.52	-.40	
Apparel and Other Textile Products	1.04	1.56	-.52	-.41
Lumber and Wood Products	1.17	.94	+.23	+.27
Furniture and Fixtures	1.15	1.63	-.48	
Paper and Allied Products	1.16	1.02	+.14	+.15
Printing and Publishing	1.18	1.49	-.31	-.19
Chemicals and Allied Products	1.22	.78	+.44	+.29
Petroleum Refining	1.33	.52	+.81	+.28
Rubber and Misc. Plastics	1.01	1.18	-.17	-.03
Leather and Leather Products	.93	1.63	-.70	
Stone, Clay, and Glass	1.16	1.13	+.03	+.10
Primary Metals	.41	1.31	-.90	-.79
Fabricated Metals	1.13	1.27	-.14	-.06
Machinery, except Electrical	1.15	.81	+.34	+.46
Electrical and Electronic Equip.	.98	1.09	-.11	+.01
Transportation Equip., ex. Motor Vehicles	1.10	1.01	+.09	+.15
Instruments and Related Products	.88	.72	+.16	+.28
Misc. Manufacturing Products	.84	1.37	-.53	-.39
Transportation and Public Utilities				
Railroad Transportation	1.14			
Local and Interurban Passenger Transit	.80			
Trucking and Warehousing	1.09			
Water Transportation	1.16	1.08		
Air Transportation	.74			
Pipe Lines, ex. Natural Gas	1.23			
Misc. Transportation Services	1.00			
Communication	1.29	.58	+.71	+.77
Electric, Gas, and Sanitary Services	1.39	.97	+.42	+.46
Wholesale Trade				
Groceries and Related Products	1.20	1.39	-.19	-.17
Machinery, Equipment and Supplies	1.09	1.27	-.18	-.26
Retail Trade				
Building Materials, Garden Supplies, and Mobile Home Dealers	1.03	1.34	-.31	-.30
General Merchandise Stores	1.24	1.42	-.18	-.17
Food Stores	1.02	1.22	-.20	-.17
Automotive Dealers and Service Stations	1.02	1.14	-.12	+.02
Apparel and Accessory Stores	1.03	1.52	-.49	-.47
Furniture and Home Furnishings	.94	1.41	-.47	-.44
Eating and Drinking Places	1.00	1.18	-.18	-.15
Misc. Retail Stores	.97	1.26	-.29	-.27
Finance, Insurance, and Real Estate				
Banking	1.11	.75	+.36	
Credit Agencies and Other Banks	1.08	1.18	-.10	
Security, Commodity Brokers and Services	1.01	1.38	-.27	
Insurance	.87	1.34	-.47	
Insurance Agents, Brokers and Services	.87	.97	-.10	
Real Estate	1.17	1.16	+.01	
Holding and Other Investment Companies	1.08	1.26	-.18	
Services				
Hotels and Other Lodging Places	1.22	1.08	+.14	+.18
Personal Services	.90	1.05	-.15	-.10
Business Services	1.18	1.01	+.17	+.22
Auto Repair and Services	.97	.72		
Misc. Repair Services	.88			
Motion Picture Prod., Dist. and Theaters	1.07	1.06	+.01	+.14
Amusement and Recreation Services	1.18			
Health Services	1.00			
Legal Services	.79			
Educational Services	.89	.80		
Social Services	.75			
Membership Organization	.78			
Architectural Accounting and Misc. Services	.93			

Sources: Computed from data provided by the Louisiana Department of Revenue and Taxation, and 1983 Corporation Income Tax Returns.

proportion (which is the "apportionment factor" discussed below), AF, of total federal taxable income, FINC, less state deduction, SD, or

$$\text{SINC} = \text{AF} * \text{FINC} - \text{SD}.$$

The state tax burden is then calculated as the appropriate rate, T, multiplied by SINC, less any state credits, SC. Thus, ETR, the ratio of state tax burden to state taxable income, is ⁹

$$\text{ETR} = \frac{T [\text{AF} * \text{FINC} - \text{SD}] - \text{SC}}{[\text{AF} * \text{FINC} - \text{SD}]}$$

So that ETR is, in general, a function of the federal income tax definitions (i.e., federal tax treatment), the apportionment factor, and specific state tax provisions in the form of rate structure, deductions, and credits:

$$\text{ETR} = f(\text{AF}, \text{FINC}, \text{SD}, \text{SC}). \quad (1)$$

In what follows, we attempt to sort out the major influences of each factor on observed ETR differences across industries at the state level.

Since Louisiana is coupled to the federal tax, differences in effective rates at the state level may merely reflect differential treatment at the federal level.¹⁰ To determine how much of the observed interindustry variation in the Louisiana ETR reflects federal tax treatment, effective tax rates were calculated for the federal income tax. These rates were calculated in the same manner as the state rates and apply only to firms with positive net income.¹¹ The normalized federal ETRs are reported in the second column of Table 2. Note that a substantial amount of variation exists at the federal level as well. More importantly, however, is the correspondence between the pattern of variation between the state and federal distributions. Column 3 reports the arithmetic difference between the state and federal normalized rates. If there were no differential treatment introduced at the state level, the difference between normalized rates should not differ greatly from zero.

The numbers in column 3 can be interpreted in the following way. A positive sign implies over-taxation of that industry in the state *relative* to the federal tax. For example, the differential treatment of the oil and gas extraction industry (+.62) suggests that this industry was significantly over-taxed in Louisiana relative to its treatment at the federal level. Likewise, in the manufacturing sector, two industries, chemicals and petroleum refining, that together account for other 50 percent of value added, were being over-taxed. On the other hand, there was a tendency to under-tax those industries that were relatively minor components of the state's economy (e.g., apparel, leather, and coal mining).

It is the difference between the state and federal industry effective tax rates (DETR) that reflects the interindustry tax variations introduced at the state level.

There are basically three sources of cross-industry DETR variation: special state tax credits not available at the federal level, a different degree of progressivity at the state level than at the federal level, and the effects of formula apportionment. Although it is not possible to determine how much interindustry DETR variation is attributable to each possible source with the available data, it is possible to remove the formula apportionment effects. The remaining interindustry variation will reflect state over- and under-taxation induced by preferential state tax credits and the differences between state and federal progressivity.

Like many states, Louisiana determines multi-state firms in-state taxable incomes using a common three-factor formula which includes the proportion of firms' sales, payrolls, and property that fall under Louisiana jurisdiction. The apportionment factor, or the proportion of firms incomes subject to Louisiana tax, is the simple average of the sales, payroll, and property proportions. Thus, for a given income, an increase in one or more of these factors will increase the firm's taxes owed to the state.

The formula apportionment effect on tax rate differentials can be accounted for by regressing DETR on the factors that appear in the formula:

$$DETR = b_1 + b_2SALES + b_3PAYROLL + b_4PROPERTY, \quad (2)$$

where SALES is the industry proportion of sales or value-added in Louisiana, PAYROLL is the proportion of payroll in Louisiana, and PROPERTY is the proportion of property in Louisiana. The *residuals* from (2) will then capture the tax rate differentials net of formula apportionment effects.

Complete data were not available for all relevant industries.¹² No Louisiana property data were available, and Louisiana sales data were available for only 28 industries. Fortunately, though, the formula factors are expected to be highly collinear and the evidence we have bears this out: the simple correlation between SALES and PAYROLL is .98 for manufacturing and service industries (the only industries for which complete state and national sales and payroll data are available). For purposes of prediction, then, regressing DETR on PAYROLL should capture much of the apportionment formula effects on the tax rate differentials.

The following equation was estimated for 42 of the industries listed in Table 2 (since Louisiana does not apply the formula to banking, finance, and many transportation industries, these industries were omitted from the sample):

$$\hat{DETR} = -.1554 + 6.6175 PAYROLL \quad (3)$$

(0.634) (1.8476)

where $R^2 = .24$ and the standard errors are given in parentheses. The industry groups were tested for homogeneity and no structural differences were found in the sample. Given the extreme multicollinearity among the explanatory variables

in the specification (2), the estimated PAYROLL coefficient in (3) must be interpreted as the *net* impact of SALES, PAYROLL, and PROPERTY on DETR. Nevertheless, the residuals $DETR - \hat{DETR}$ from (3) estimate tax rate differentials with the formula apportionment effects removed, or DETR* in column 4 of Table 2.

Overall, formula apportionment accounts for 24 percent of interindustry DETR variation. Columns 3 and 4 in Table 2 also reveal that the state over-taxing of oil and natural gas extraction, petroleum refining, and chemical manufacturing industries appears to be mostly attributable to the apportionment formula.¹³ The state overtaxes the oil and natural gas extraction industry (+.62) when formula apportionment effects are included whereas it *under-taxes* this industry (-.21) relative to federal treatment when formula effects are removed. On the other hand, petroleum refining and chemical manufacturing were still overtaxed with formula effects removed, but by substantially less than the unadjusted DETR estimate indicates.

In addition, for those industries with both DETR and DETR* estimates, there are *more* industries over- or under-taxed by at least .20 using DETR* than those similarly treated using DETR, while there are *fewer* industries over- or under-taxed by at least .40 using DETR* than those similarly treated using DETR. This suggests that formula apportionment is responsible for reducing the *number* of industries in the over- or under-taxed category while increasing the *severity* of over- or under-taxation of those remaining in that category.

Finally, having accounted for federal interindustry differential tax treatment and formula apportionment effects, the residual effective tax rate differentials, DETR*, reflect the interindustry tax rate variation introduced at the state level by the differing state-federal degrees of progressivity and state tax credits. It is not possible, however, to determine exactly how the residual interindustry effective tax rate variation depends upon each of these factors. Nevertheless, these factors introduce substantial interindustry tax variation; in the manufacturing sector alone, the adjusted effective tax rate differentials range from -.79 (primary metals) to +.46 (machinery), with 9 out of 16 manufacturing industries over- or under-taxed by a factor of .20 or more.

IV. SUMMARY AND CONCLUSIONS

For an issue of such evident policy significance, measuring the magnitude of interstate or interindustry tax differentials has received a surprising lack of attention. In one attempt to fill this void, Wheaton (1983) calculated for each state an aggregate effective tax rate on businesses. He found that not only have state and

local taxes become a significant share of business income, but that they also exhibit substantial variation across states and regions. While his estimates are useful for assessing the possible tax burdens imposed by a state's entire business tax structure, they do not shed much light on questions concerning interindustry burdens created by a particular tax.

This paper addresses the second issue directly by focusing on one major component of general business taxes currently levied by all but a few states. Specifically, we provide estimates of the intrastate interindustry distribution of effective rates for a state corporate income tax. Utilizing data provided by the Louisiana Department of Revenue and Taxation, effective tax rates are calculated for two-digit industries by taking the ratio of *actual* state corporate income taxes paid to net income before taxes. The results can be summarized in the following way:

- 1) The share of business income devoted to the state corporate income tax is not trivial. In Louisiana the effective tax rate averages about 5.5 percent across all industries. This is in addition to other taxes for which corporations are legally liable (e.g., franchise tax).
- 2) Tax burdens vary significantly among industries. The effective tax rate ranges from a low of 2.29 percent to a high of 7.38 percent. Manufacturing durables exhibits the largest amount of relative dispersion in effective rates.
- 3) Since the Louisiana tax is coupled to the federal corporate income tax, some of the tax rate variation observed at the state level is the result of differential treatment of industries at the federal level.
- 4) Formula apportionment accounts for approximately one quarter of the interindustry tax rate variation not explained by the federal tax coupling. The remaining variation not explained by either federal coupling or formula apportionment is due to differences in state-federal progressivity and state tax credits.

Although the spatial variation in the level of business taxation is the focal point of the debate concerning taxes and interregional business location, an equally important issue concerns the potential differences in burdens among industries that may arise from a tax within a given region. The results of this study suggest that the interindustry variation in effective tax rates may be easily as large as the interregional variation observed by Wheaton (1983).¹⁴ Aggregating data across industries can therefore be misleading and the relationship between interregional tax differentials and industrial location should continue to be studied at a disaggregated level on an industry-by-industry basis.

The substantial variation in ETRs across industries in the same taxing jurisdiction suggests that empirical studies attempting to isolate tax effects on industry

location decisions may seriously distort the results. Due to data limitations, these studies must resort to using a single tax rate (statutory or some adjusted rate) to approximate the effective rate faced by a typical corporation or industry within a given area. Despite the complexity involved in devising business tax proxies that closely correspond to theoretical concepts of effective rates, further research on regional location will have to devote additional energy to approximating industry-specific effective tax rates. This is particularly important if the empirical debate on tax effects intends to isolate the marginal firms on which taxes do have an impact, *ceteris paribus*. This in turn will permit the debate to focus on the size of the relevant elasticities.

Finally, the recent empirical evidence regarding tax-induced business location suggests that state and local business tax policies targeted to increase the return on new capital investment in a particular industry can be expected to generate new investment. Our estimates of the residual effective tax rate differentials, which reflect preferential state tax credit policies, support this proposition. Thus, even though it may require significantly large changes in state and local tax rates to alter the after-tax rate of return, there may be potentially high returns to industrial development programs that make use of selective tax credit policies.

ENDNOTES

1. The more recent econometric investigations are surveyed by Oakland (1978), Wasylenko (1980), and Newman and Sullivan (1988). Though these surveys arrive at slightly different conclusions, they suggest that the evaluation of tax impacts on industrial location should be treated as an open rather than a settled questions.

2. Existing empirical studies employ a wide range of proxies for effective tax rates.

3. For example, within a single state (Minnesota), an Apparel firm could expect a 6.59 percent after-tax rate of return while a representative Communication Equipment firm would receive a 7.17 percent return.

4. See, for example, Newman (1983 and 1984) and Hodge (1981).

5. Many attempts to analyze the economic impacts of business taxes mistakenly focus on the *share* of state and local revenue raised from the business sector. See, for example, ACIR (1981).

6. We are grateful to Janet Mollere, with the Louisiana Department of Revenue and Taxation, for providing us with a copy of this data.

7. The random selection process was carried out by the Department of Revenue and Taxation because of the requirement that tax records remain confidential.

8. An alternative approach would be to use the value of business capital stock on the assumption that in equilibrium this should reflect the capitalized long run average net income, thus eliminating the potential problem imposed by year-to-year variation of net income. But as Wheaton (1983) found, there was a highly significant rank correlation between the tax burden estimates produced under both index definitions.

9. More accurately, federal tax deductibility at the state level introduces an additional (simultaneous) adjustment to SINC. The argument that ETR depends upon federal tax parameters as well as state tax parameters (including apportionment) remains unaltered in the generalized model, however. In addition, although the tax rate normalization is ignored in Equation (1) below, it too does not affect our conclusions.

10. Our estimates are therefore dependent on the federal definition of income and thus may not necessarily capture the relevant economic concept of ability-to-pay. However, we are constrained by available data.

11. Data used to calculate federal rates were obtained from the *1983 Corporation Income Tax Returns*, Department of the Treasury, Internal Revenue Service, 1984.

12. The available Louisiana and U.S. industry data cover 1982 sales, value-added, property, and payroll. Data sources are: *1983 Annual Survey of Manufactures*, *Census of Construction Industries*, *Census of Manufacturers*, *Census of Mineral Industries*, *Census of Retail Trade*, *Census of Service Industries*, and *Census of Wholesale Trade*, all publications of the U.S. Department of Commerce, Bureau of the Census.

13. The apportionment formula is normally not considered to be explicitly discriminatory across industries even though transportation and financial industries are not covered by it. The special treatment of these industries is justified by the fact that the three factor apportionment formula was developed for mercantile and manufacturing operations and is therefore unsuited for transportation and finance operations (Hellerstein and Hellerstein (1978; p. 478)).

14. Using Wheaton's (1983) estimates from his Table 2, the highest state effective business tax rate for 1977 (Michigan) is approximately four times as large as the lowest (Texas). From Table 2 herein, the highest effective corporate income tax rate for Louisiana in 1983 (Electric, Gas, and Sanitary Services) is three and one-third times as large as the lowest (Primary Metals).

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