HAVE RECENT CHANGES TO CORPORATE INCOME APPORTIONMENT FORMULAS CONTRIBUTED TO THE DECLINE OF STATE CORPORATE INCOME TAXES?

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INTRODUCTION

THIS PAPER EXAMINES THE IMPACT OF VARIATION in state-level corporate income apportionment formulas on state corporate income tax (CIT) revenue. In recent years, interest has peaked among researchers and policy makers in understanding the causes of the relative decline in the CIT as a funding source for state government. Since 1980, state CIT revenues have undergone a rather long period of relatively low annual growth. From 1980 to 2005, state CIT revenue experienced real annual growth averaging only 1.33 percent. Meanwhile, individual income and sales taxes experienced annual real growth averaging 4.3 percent and 3.5 percent, respectively. This lagging growth in CIT revenues occurred from 1980 to 2005 while statutory tax rates on average either increased or remained fairly stable. In fact, from 1980 to 2005 there were at least three periods of short-term CIT revenue decline.

As a result of lagging growth, the state CIT also has diminished substantially in importance as a revenue source for state governments. During the 1980 to 2005 period, state CITs have declined precipitously as a share of both state tax revenues and corporate profits. The GDP share going to corporate income taxes has declined by 1.7 percent annually since 1980 and corporate profits share going to corporate income taxes has fallen by 6.1 percent per year since 1980. Even more telling, while real CIT revenues grew by only 1.3 percent annually during the 1980 to 2005 period, real corporate profits rose by 7.9 percent per year and real GDP increased by 6.2 percent per year.

Recent studies by Brunori and Cordes (2005), Cornia et al. (2005), Fox and Luna (2005), and Bruce et al. (2007) provide a thorough review of the decline in the state CITs. Fox and Luna (2002) construct a typology of the potential factors resulting in this decline. Besides cyclical declines in corporate profits, the typology suggests that the decline in CITs is a function of three other groups of economic and policy factors: (1) Federal CIT base changes affecting state CIT revenue because states typically employ federal taxable income as a starting point for their CITs; (2) state policies that erode the CIT base such as tax incentives, income apportionment formula changes, and alternative business organizational structures; and (3) tax planning efforts by corporations including passive investment companies and transfer pricing arrangements. We investigate the impact of apportionment formula changes controlling for many of the other factors specified in these four categories by Fox and Luna.

Historically, states have employed the three-factor income apportionment formula specified under the Uniform Division of Income for Tax Purposes Act (UDITPA) to derive the taxable net income of multistate corporations. The three-factor formula apportions a share of a corporation's national net income to a particular state based on the average share of the corporation's national payroll (the payroll factor), national property holdings (the property factor), and national sales receipts (the sales factor) that are attributable to that state. This formula gives equal weight to each of the three apportionment factors. Since the early 1980s states have modified the UDITPA apportionment formula by overweighting the sales factor as reported in Table 1.

Typically, overweighting the sales factor has been done as an industrial and manufacturing development strategy to shift the emphasis of the CIT from an origin-based tax to a destination-based tax. Overweighting the sales factor reduces the corporate tax burden on multistate corporations that have a heavy capital and labor presence relative to sales levels in a state. This provides favorable tax treatment to producers in a state that export a significant proportion of their goods. It also does not increase the tax burden on a state's domestic corporations because they don't use the apportionment formula to compute the CIT liability. Conversely, overweighting the sales factor increases the tax burden on firms with a heavy sales presence but a relatively small capital and labor presence in a state. In recent years,

Table 1
Sales Factor Weights – 1980-2005

Year	Average Sales Factor Weight	Number of States with Sales Factor Weight (Wgt)				
		Wgt=0.33	0.33<Wgt<0.50	Wgt=0.50	0.50<Wgt<1.00	Wgt=1.00
1980	0.3882	36	0	5	1	2
1981	0.3882	36	0	6	1	2
1982	0.3920	35	0	6	1	2
1983	0.3920	35	0	7	1	2
1984	0.3959	34	0	7	1	2
1985	0.3959	34	0	8	1	2
1986	0.3998	33	0	8	1	2
1987	0.3998	33	0	9	1	2
1988	0.4036	32	1	9	1	2
1989	0.4067	31	0	10	2	2
1990	0.4136	30	0	10	2	2
1991	0.4167	30	1	13	2	2
1992	0.4335	26	1	14	1	3
1993	0.4404	25	2	15	1	3
1994	0.4459	23	1	16	1	3
1995	0.4488	23	1	22	1	3
1996	0.4691	17	0	23	2	3
1997	0.4791	16	0	23	2	3
1998	0.4852	16	0	24	2	3
1999	0.4920	15	1	23	3	3
2000	0.5020	14	0	22	5	3
2001	0.5119	14	0	23	4	4
2002	0.5282	13	0	22	3	6
2003	0.5282	13	0	21	4	6
2004	0.5350	13	1	21	4	6
2005	0.5366	12	0	22	6	7

Source: Advisory Commission on Intergovernmental Relations, various years; Council of State Governments, various years; state tax forms and contacts with state legislative fiscal staff and state revenue department personnel.

this strategy has evolved from double-weighting the sales factor to single sales factor apportionment where a corporation's national net income is apportioned to a state solely on the basis of the sales factor, with the property and payroll factors eliminated as a means of apportioning corporate income.

We employ a 43-state panel spanning 1983 to 2005 to estimate the determinants of CIT revenue and the CIT base. We estimate fixed-effects regression models specifying the sales factor weight in the model and controlling for economic and policy factors previously tested in the literature. The study extends the existing research by lengthening the span of the estimating data, which may improve on the existing analysis of single sales factor policy impacts. We also investigate two issues not examined in the existing literature: (1) the effects that variation in a state's industry mix might have on the revenue effects of sales factor changes; and (2) the extent of the long-run effects that sales factor changes may have on CIT revenue.

PRIOR LITERATURE

Since the sales factor component of state corporate apportionment formulas has been the subject of frequent change in the states during the last 25 years, a number of single-state studies have been conducted to analyze the fiscal impact of these policy changes. These analyses generate static estimates via micro-simulations with state CIT return data. They tend to suggest that double-weighting the sales factor (Raabe, 2001) or employing single sales factor apportionment (Hassell and Sanders, 2005; Edmiston, 2001) results in a net loss of state CIT revenue, at least in the short run. Simulations by Hassell and Sanders (2005) suggest that the net impact of increasing the sales factor weight results from tax liability reductions for multistate manufacturing corporations with a heavy in-state payroll and property presence. Meanwhile, the revenue loss is partially offset by tax liability increases on multistate corporations in the manufacturing sector and other sectors such as trade and services.

Comparative multistate studies examining the CIT impacts of corporate tax policy changes and corporate tax planning strategies have generated inconclusive estimates of the impact of different apportionment schemes on CIT revenue and the CIT base. These studies specify regression models employing a measure of state CIT revenue as the dependent variable and various economic and policy determinants as independent variables. The models account for state apportionment formula changes and specify various economic and policy controls, including gross state product (GSP); the corporate tax rate; dummy variables indicating whether a state employs combined reporting and/or a throwback rule; measures of tax incentives provided by states; and state fixed-effects dummies, trend variables, and time fixed-effects dummies.

Brunori and Cordes (2005) conduct preliminary modeling to determine the impact of double-weighting the sales factor as well as single sales factor apportionment.[1] They employ dummy variables to implicitly measure the impact of both weighting schemes on CIT revenue. Thus, while the regression results indicate whether and how these weighting schemes are correlated with CIT revenue, they don't provide precise measures of the effects of sales factor weights on CIT revenue. It's also unclear how these measures account for phase-ins that have been utilized by states to implement double-weighted sales factors and single sales factor apportionment. The model estimates fail to indicate that double-weighting the sales factor leads to discernable reductions in CIT revenue, but they do suggest that single sales factor apportionment leads to significant reductions in CIT revenue. Potentially, the estimated impact of single sales factor apportionment needs confirmation through additional research with data extending beyond 2000, as only three states employed single sales apportionment prior to 2000.

Cornia et al. (2005) estimate the relationship between the payroll factor weight employed by states and state CIT revenue controlling for other economic and policy determinants of CIT revenue.[2] The regression estimates fail to support the proposition that increasing the sales factor weight (via reductions in the payroll factor weight) will drive down CIT revenue. The coefficient estimate on payroll factor weight is negative and not statistically significant. This suggests that CIT revenue would on average increase when the payroll weight is reduced, say, from 0.33 to 0.25 to double-weight the sales factor.

Fox and Luna (2005) and Bruce et al. (2007) measure the impact of variations in the sales factor weight on CIT revenue directly. Both studies employ an extensive set of economic and policy determinants of CIT revenue, but fail to indicate that either the CIT base or CIT revenues are diminished by increases in the sales factor weight. Random effects estimates by Fox and Luna are statistically significant, but suggest a direct relationship between the sales factor weight and revenue. This is the case also when state and time fixed-effects are specified. Controlling for state fixed-effects only, a statistically significant relationship is not observed.[3] Testing for single sales factor effects using a dummy variable also failed to generate statistically significant estimates. The statistically significant estimates suggest that a 10 percent increase in the sales factor weight is associated with an increase in CIT revenue ranging from 0.8 percent to 0.9 percent. Interestingly, Fox and Luna posit that apportionment formula concessions (such as overweighting the sales factor) may be enacted due to the influence of politically powerful firms or highly mobile firms. Thus, while the concession reduces the tax liabilities of this select group of firms, the revenue loss isn't discernable in the aggregate.

Bruce et al. (2007) find that higher sales factor weights are correlated with higher relative CIT base growth.[4] This suggests that apportionment schemes don't expand the tax base nationally, but allow states with higher sales factor weights to tax a larger share of the CIT base. Tests of interactions of CIT rates and CIT base characteristics suggest that the throwback rule has a significant downward effect on the CIT base in high tax states. However, higher sales factor weights have a significant expansionary effect on the CIT base in states that also impose a throwback rule. Thus, the impact of "throwing back" sales to a state has a greater impact when the determination of the tax base relies more heavily on firm sales due to high sales factor weights.

Economic development studies by Goolsbee and Maydew (1999) and Gupta and Hofmann (2003) suggest that further research on the effects of apportionment formula changes examine: (1) whether a state's industry mix (in particular, the relative strength of a state's manufacturing sector) interacts with apportionment formula changes to effect CIT revenue; and (2) whether the revenue effects of apportionment formula changes are transitory or persist in the long run. Estimates by Goolsbee and Maydew suggest that reduction in the payroll factor weight leads to statistically significant increases in state employment, with the largest impacts occurring in manufacturing industries, particularly, in the durable goods sector.[5] The regression estimates suggest that double-weighting the sales factor (thus, reducing the weights on both the payroll and property factors from 0.33 to 0.25) increases employment in the durable goods sector by an average of 1.6 percent and in the non-durable goods sector by an average of 0.9 percent. The estimated employment effect in the non-manufacturing industries averages 0.7 percent. Thus, capital intensive industry sectors tend to be most responsive to reductions in the payroll factor weight - which generally have corresponded to equal reductions in the property factor weight and increases in the sales factor weight. Tests for lagged impacts indicate that double-weighting the sales factor leads to a 2.8 percent average increase in manufacturing employment in the first three years after the policy change. However, 75 percent of the increase occurs in the second and third years. This suggests that corporate expansion after the apportionment change is not transitory but continues beyond the initial year after the change. This also suggests that CIT revenue could potentially rebound in the long run as corporate expansion increases taxable income and generates additional CIT revenue, offsetting revenue losses due to increases in the sales factor weight.

Gupta and Hofmann (2003) find that reduction in the property factor weight has a statistically significant inverse impact on manufacturing employment, but one that is small in absolute terms.[6] The regression estimates indicate that a 1 percent reduction in the property burden (the top statutory corporate tax rate multiplied by the property factor weight) leads to an average increase in manufacturing capital expenditures of about 0.1 percent.[7] The economically modest impact of property factor changes (with corresponding changes to the sales factor weight) could be due to the short run inelasticity of capital investment. Thus, once capital assets are placed in service at a geographic location, sizeable tax incentives are required for them to be profitably transferred to another site. In addition, large capital expenditures are likely planned well in advance of being made, so there could be a considerable lag in investment decisions by firms based on apportionment formula changes. Thus, research on the impact of apportionment formula changes should investigate the long run impact of these changes on CIT revenue.

RESEARCH METHODOLOGY

A corporation's state CIT liability, r_i, is computed by applying the state's statutory tax rate, t_i, to the corporation's net income in that state, π_i.

(1) $r_i = t_i \times \pi_i$.

The determination of π_i for multistate corporations is based on the three-factor income apportionment formula which allocates a corporation's national net income, π, to state i, based on the average share of the corporation's national sales (S), property (P), and payroll (W) attributable to state i. The weights, ω, on the corporation's sales factor (s_i/S), property factor (p_i/P), and payroll factor (w_i/W), are each equal to 0.33 in the base situation.

(2) $$\pi_i = \left[\omega_i^s * \frac{s_i}{S} + \omega_i^p * \frac{p_i}{P} + \omega_i^w \frac{w_i}{W}\right] * \pi.$$

Efforts to increase the emphasis on the sales factor have increased the weight, generally, to 0.5 or to 1.0. The increases in the sales factor weight have been accompanied by equal proportionate decreases in the property and payroll factors to 0.25 and 0.0, respectively.

We use state-level panel data to estimate fixed-effects regression models with the general form:

(3) $$CIT\ Revenue_{it} = \hat{a}_0 + \hat{a}_1 GSP_{it} + \hat{a}_2 Tax\ Rate_{it} + \hat{a}_3 Sales\ Factor_{it} + \hat{a}_4 X_{it},$$

where *CIT Revenue* is the annual corporate income tax revenue generated by a state; *GSP* is the annual gross state product attributable to a state; *CIT Rate* is the top statutory corporate income tax rate imposed by a state in a particular year; *Sales Factor* is the sales factor weight ranging from 0.33 to 1.00 imposed by a state in a particular year; *X* comprises other economic and policy determinants of CIT revenue in a state; and *i* indexes the state and *t* indexes the year. We estimate an alternate specification replacing *CIT Revenue* with a measure of the *CIT Base* (*CIT Revenue* divided by *CIT Rate*) and eliminating *CIT Rate* from the right side of the equation. We expect the coefficient estimates on *GSP* and *Tax Rate* to be positive. Meanwhile, we expect *Sales Factor* to be inversely related to *CIT Revenue* and *CIT Base*. Other focal variables we specify in the estimating equations include lags of *Sales Factor*, which are expected to be negative initially but then positive in the long run. We also specify the relative strength of a state's manufacturing sector measured by the share of *GSP* attributable to manufacturing GSP (*Manufacturing GSP Share*). We expect *CIT Revenue* and *CIT Base* to be positively correlated with *Manufacturing GSP Share*. We also expect increases in the sales factor weight to diminish the magnitude of this correlation in high tax states as compared to low tax states. Table 2 provides variable descriptions and sources.

We specify measures of national corporate profits (National Corp. Profits) to account for the effects of national economic trends on CIT revenue. We also specify a trend variable (Trend) to capture the effects of the underlying downward trend in state CIT revenues (holding other factors fixed) during the period of analysis. State fixed-effects dummies are specified to account for state-level political and economic changes affecting CIT revenues that are not captured by the determinants specified in the model. We control for the significant variation in the sizes of state economies and CIT bases by employing the natural log of *CIT Revenue*, *CIT Base*, and *GSP* in the model specifications. The models include two additional policy variables, one measuring whether a state requires combined reporting of corporations (*Combined Reporting*) and the other indicating whether a state permits creation of limited liability companies (*LLCs*). Combined reporting requires that a corporate entity combine profits from all related subsidiaries before determining what portion of the corporation's profits are taxable in a particular state. Luna (2004) indicates that combined reporting reduces the effectiveness of CIT avoidance opportunities through transfer pricing and passive investment companies. The ability to establish LLCs in a state may also diminish the CIT base and CIT revenues. LLCs offer limited liability to members, but are typically taxed as pass-through entities. Consequently, income distributions from the LLC are taxed under the individual income tax instead of the CIT.

The panel dataset comprises 43 states and spans 23 years from 1983 to 2005 (n=989).[8] The timeframe of the dataset extends four to six years beyond the end of the datasets utilized for the studies reviewed previously. This could potentially improve estimates of the effects of apportionment changes occurring in the mid- to late-1990s. In particular, we hope this will improve estimates of the effects of single sales factor apportionment schemes, the preponderance of which were initiated during the late 1990s.

REGRESSION RESULTS

The results of estimating the economic and policy determinants of *CIT Revenue* and the *CIT Base* are presented in Table 3. The regression models include state fixed-effects dummies although the coefficient estimates for these variables are not included in the table. The regression models also are corrected for first-order autocorrelation, with panel corrected standard errors specified in table.[9] The regression models explain about 92.5 percent of the variation in *CIT Revenue* and about 94.5 percent of the variation in the *CIT Base*. Less than 10 percent of the explained variation is attributable to state fixed-effects dummies, with *GSP* and *Tax Rate* being the dominant variables in the models.

National Corp. Profits and *GSP* are statistically significant determinants of both *CIT Revenue* and the *CIT Base*. While statistically significant, however, the coefficient on *National Corp. Profits* suggests only a very slight positive impact on CIT Revenue or CIT Base. This appears to confirm that CIT revenues and the CIT base are rather invariant to corporate profits growth. The model estimates suggest that GSP, by far, is the most important determinant of CIT performance. The elasticity on *GSP* suggests that a 1 percent increase in GSP results in a 1.6 percent increase in CIT revenue and a 1.7 percent increase in the CIT base. These estimates are far in excess of the elasticities estimated by Bruce et al. (2007), which ranged from 0.44 to almost 0.92.

The CIT rate structure is also a significant determinant of CIT revenue levels. The coefficient estimate on *CIT Rate* suggests that a one percentage point increase in the tax rate leads to a 9.4 percent increase in CIT revenue. The statistical significance and directionality of this relationship is consistent with estimates by Brunori and Cordes (2005), Cornia et al. (2005), and Fox and Luna (2005). We also specify a dummy variable to account for additional CIT revenue generated because a state imposes a flat rate CIT instead of a graduated CIT rate. The coefficient estimate on *Flat Tax* suggests that controlling for a state's GSP and top statutory CIT rate, a flat rate tax yields 9.2 percent more revenue

Table 2

Variable Descriptions and Sources

Variable	*Description*	*Source*
CIT Revenue	Annual state corporate income tax revenue (in millions).	U. S. Census Bureau, *Local Government Finances: 1980-2005*.
CIT Base	Annual state corporate income tax revenue (in millions) computed by dividing CIT by CIT Rate.	See CIT and CIT Rate.
National Corp. Profits	Annual national corporate profits (in millions).	U. S. Bureau of Economic Analysis, *National Economic Accounts: 1980-2005*.
GSP	Annual gross state product (in millions).	U. S. Bureau of Economic Analysis, *Regional Economic Accounts: 1980-2005*.
CIT Rate	Top statutory corporate income tax rate multiplied by 100.	U. S. Advisory Commission on Intergovernmental Relations, *Significant Features of Fiscal Federalism: 1982-1996;* Council of State Governments, *Book of the States: 1980-2005;* state tax forms and contacts with state legislative fiscal staff and state revenue department personnel.
Flat Tax	Dummy variable equal to 1 if state has a flat corporate income tax, equal to 0 if state has a graduated corporate income tax structure.	See CIT Rate.
Sales Factor Weight	State's sales factor weight multiplied by 100.	U. S. Advisory Commission on Intergovernmental Relations, *Significant Features of Fiscal Federalism: 1982-1996;* Council of State Governments, *Book of the States: 1980-2005;* state tax forms and contacts with state legislative fiscal staff and state revenue department personnel.
Sales Factor Weight (t-1)	State's sales factor weight one year prior multiplied by 100.	See Sales Factor Weight.
Sales Factor Weight (t-2)	State's sales factor weight two years prior multiplied by 100.	See Sales Factor Weight.
Sales Factor Weight (t-3)	State's sales factor weight three years prior multiplied by 100.	See Sales Factor Weight.
Combined Reporting	Dummy variable equal to 1 if state requires combined reporting by corporations, equal to 0 if otherwise.	Commerce Clearing House, *State Tax Reporter*, various years; Commerce Clearing House, *Multistate Corporate Income Tax Guide*, various years.
LLC	Dummy variable equal to 1 if state has LLC law, equal to 0 if otherwise.	*The Limited Liability Company Website,* <http://www.llcweb.com/State%20Comparison.htm>; Commerce Clearing House, *State Tax Reporter,* various years; Commerce Clearing House, *Multistate Corporate Income Tax Guide,* various years.
Manufacturing GSP Share	Annual share of gross state product attributable to manufacturing multiplied by 100.	See GSP.

Table 3
Regression Results

Variable	*Ln CIT Revenue*		*Ln CIT Base*	
National Corp. Profits	4.23E-07***	4.27E-07***	4.33E-07***	4.37E-07***
LN GSP	1.628*	1.634*	1.713*	1.718*
CIT Rate	0.063**	0.064**		
Flat Tax	0.092****	0.092****		
Sales Factor Weight	-0.004	-0.002	-0.003****	-0.001
Sales Factor Weight (t-1)		-0.003****		-0.003****
Sales Factor Weight (t-2)		-0.002		-0.002
Sales Factor Weight (t-3)		0.003****		0.002****
CIT Rate * Sales Factor Weight	9.74E-05	7.87E-04		
Combined Reporting	0.115	0.116	0.049	0.049
CIT Rate * Combined Reporting	-0.009	-0.009		
LLC	-0.022	-0.024	0.057	0.057
CIT Rate * LLC	0.009	0.010		
Manufacturing GSP Share	-0.002	-0.002	1.02E-04	4.58E-04
Sales Factor Weight * Manufacturing GSP Share	3.89E-04*	3.85E-03*	3.21E-04*	3.17E-04*
Trend	-0.067*	-0.068*	-0.073*	-0.073*
Constant	-14.009*	-14.098*	-12.087*	-12.149*
R-Squared	0.9256	0.9258	0.9433	0.9436

*p<.01; **.01<=p<.05; ***.05<=p<.10; ****.10<=p<.15.

Models include state fixed-effects and are corrected for first-order autocorrelation. Standard errors are panel corrected standard errors.

Percentages are multiplied by 100 and dollar amounts are measured in millions.

on average than a graduated rate structure with the same rate as the top marginal tax rate. We control for policies such as combined reporting and LLC establishment. The estimation results are fairly consistent with prior literature (Bruce et al., 2007) suggesting that LLC laws have not diminished CIT revenue or the CIT base. The coefficient estimates on *LLC* are not statistically significant. As well, the coefficient estimates on *Combined Reporting* are intuitive but aren't statistically significant.

As to the focal CIT determinants, the variables examining the short- and long-run effects of sales factor changes are interesting. In the models without the lagged sales factor weights [*Sales Factor Weight (t-1)* et al.], the coefficient estimates on *Sales Factor Weight* have the expected sign but are not statistically significant. These may suggest that a one percentage point increase in the sales factor weight leads to a reduction in CIT revenue of 0.4 percent or the CIT base of 0.3 percent. These estimated effects are contrary to prior estimates suggesting a direct relationship between sales factor weights and CIT revenue (Fox and Luna, 2005) or the CIT base (Bruce et al., 2007). However, these are consistent with the findings of Brunori and Cordes (2005) suggesting that single sales factor apportionment reduces CIT revenue.

The models including the lagged sales factor weights [*Sales Factor Weight (t-1)* et al.], suggest short run and long run effects that would be consistent with the economic development literature (Goolsbee and Maydew, 1999; Gupta and Hofmann, 2003). With the lagged sales factor weights, the coefficient estimates on *Sales Factor Weight* are still not statistically significant, but remain negative. The lagged variables suggest that CIT revenues and the CIT base may experience reductions initially after the policy change to increase the sales factor weight is implemented. The negative coefficient estimate on the second year [*Sales Factor Weight (t-1)*] is statistically significant. Ultimately, the lagged variables turn positive and statistically significant after three years [*Sales Factor Weight (t-3)*]. This suggests that CIT revenue and the CIT base rebounds. We can only infer from these results that sales factor weight increases may lead to long-run corporate expansion increasing taxable income and generating additional CIT revenue that offsets the base reduction directly related to the change in the sales factor weight.

The estimation results relating to the effects of a state's industry mix are less than definitive. The coefficient estimates on *Manufacturing GSP Share* have the expected sign in the CIT base model only, indicating that a state's CIT base is increasing in manufacturing share. However, the coefficients are not statistically significant. The interaction effects are statistically significant but are not intuitive. Literature by Goolsbee and Maydew (1999), Gupta and Hofmann (2003), Hassell and Sanders (2005) and Cornia et al. (2005) suggest that the preponderance of tax liability reductions from overweighting the sales factor tend to flow to manufacturing firms. Thus, we expected the coefficient on the interaction term to be negative, indicating that the negative effects of sales factor weight increases would be larger in states with a high manufacturing share. The coefficient estimates, however, suggest that sales factor weight increases positively affect CIT revenue and the CIT base in high manufacturing states.

CONCLUSION

In this paper, we employ fixed-effects regression models to estimate the impact of sales factor weight changes on state-level CIT revenues and CIT bases. We attempt to estimate the long-run effects of sales factor weight changes and the potential variation in these effects depending on the levels of manufacturing a state may contain. Some of the regression results are intuitive. The estimation results suggest that increases in the sales factor weight may, on average, reduce CIT revenues and diminish the CIT base. The analysis also suggests that these reductions may be short-lived, with the potential, in the long run, for CIT revenue and the CIT base to rebound within a few years of the policy change. The analysis provides some evidence that CIT yields are higher in states with a larger share of its economy attributable to manufacturing. This analysis does not confirm that the revenue effects of sales factor weight increases will be larger in states with a higher manufacturing share.

While the analytical findings may provide a level of insight to policy makers as to the potential effects of policies to alter corporate income apportionment schemes, the analysis may provide some food for thought to policy analysts. Future modeling of the CIT effects of sales factor weight changes should investigate the potential impact of different state industry distributions on the sales factor effects. This analysis suggests that controlling for manufacturing sector strength and its interaction with sales factor weight levels may assist in fleshing out the impact of sales factor weight increases. Thus, future research should involve additional modeling of state economies to ensure that effects of sales factor weight changes are not overwhelmed in the aggregate.

Notes

1 Brunori and Cordes (2005) estimate fixed-effects regression models employing a 45-state panel spanning 1980 to 2000.

2 Cornia et al. (2005) estimate fixed-effects regression models utilizing a 44-state panel spanning 1980 to 1999.

3 Fox and Luna (2005) estimate random and fixed-effects models utilizing a 44-state panel spanning 1988 to 2000.

4 Bruce et al. (2007) utilize a 50-state panel spanning 1980 to 2001. Panel regressions employ state fixed-effects controls with a time trend variable.

5 Goolsbee and Maydew (1999) utilize fixed-effects regression models to estimate the determinants of state employment levels. Payroll burden (the top statutory corporate tax rate multiplied by the payroll factor weight) and payroll factor weight are specified as determinants of state-level employment. The sample is a 44-state panel spanning 1978 to 1994.

6 Gupta and Hoffman (2003) utilize pooled and fixed-effects regression models to estimate the determinants of capital expenditures by manufacturers. Property burden (the top statutory corporate tax rate multiplied by the property factor weight) is specified as a determinant of state-level capital expenditures by manufacturers. The sample is a 44-state panel spanning 1983 to 1996.

7 A 1 percent reduction in property burden, for instance, would result from double-weighting the sales factor for a state with a top statutory rate of 12 percent.

8 Six states are excluded from the panel for lack of a corporate net income tax. These states are Michigan, Nevada, South Dakota, Texas, Washington, and Wyoming. Alaska is also excluded from the panel due to its revenue volatility and significant influence on statistical outcomes. Descriptive statistics are available from the authors upon request.

9 The Woolridge (2002) test for serial correlation in panel data models is statistically significant for first-order autocorrelation.

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