Fiscal Research Program

**SINGLE-FACTOR SALES
APPORTIONMENT FORMULA
IN GEORGIA: WHAT IS THE
NET REVENUE EFFECT?**

Kelly D. Edmiston

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Introduction

A recent study by the Fiscal Research Center at the Andrew Young School of Policy Studies, Georgia State University, estimated the corporate income tax revenue impact of switching from a double-weighted sales, three-factor apportionment formula to a single factor apportionment formula based on sales for the State of Georgia.[1] The estimate from that study, which was based on 1997 tax returns (the latest year for which full data were available at the time the report was prepared) and prepared for the 2002 tax year, suggest that the move to single factor sales would cost the State of Georgia $60.3 million in corporate income tax collections.[2] While the study noted that recent research in the economics literature suggests that the state would likely enjoy a stimulative impact from the bill in terms of increased payroll and property for multistate firms,[3] and that resulting gains in personal income tax collections, for example, may offset some of this loss, the potential gain in off-setting revenues was not calculated as part of that study. This study is an effort first to update the corporate tax revenue impact estimate to account for the availability of a more recent set of tax return data (through 2000) and more recent economic conditions, and also to estimate the associated impact on the personal income tax base. Projections are made for tax years 2004 – 2008 for a change to single factor sales.

The Georgia property of multistate firms is likely to be stimulated by the move to single-factor as well, while the sales of multistate firms are likely to diminish

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[1] Kelly D. Edmiston, "A Single-Factor Sales Apportionment Formula in the State of Georgia," *Fiscal Research Program Report No. 55*, February, 2001. Reprinted in *State Tax Notes*, 20 (16), 2001, pp. 1367-1379.

[2] It is important to remember that it was not argued that corporate tax collections would actually *decline* in 2002 under a single-factor sales formula, but rather that corporate tax collections would be around $60 million *less* than what would likely have been the case if the state had not maintained its current double-weighted sales formula.

[3] See, for example: Kelly D. Edmiston, "Strategic Apportionment of the State Corporate Income Tax," *National Tax Journal*, 55 (2), 2002, pp. 239-262; Austan Goolsbee and Edward L. Maydew, "Coveting Thy Neighbor's Manufacturing: The Dilemma of State Income Apportionment," *Journal of Public Economics*, 75, January, 2000, pp. 833-839.

in Georgia, as noted in previous research.[4] Changes in Georgia property can be estimated for the present study, but because property ownership, especially for multistate firms, is worldwide rather than local (whereas payroll is local), the tax impact of increases in Georgia property cannot be reliably estimated. Of course, growth in payroll and property would not affect corporate income tax collections (except to the extent that it directly affects profits) under a sales-only formula. With sales, even the overall expected decline in sales cannot be estimated because the sales factor often includes some other measure of activity, such as miles (*e.g.*, airlines) or transactions (*e.g.*, credit card processing firms) rather than gross receipts, and the tax returns are sufficiently sanitized to prevent an isolation of these returns from those that actually use sales. Even if it were possible to calculate sales decline, and it is not, projections of potential sales tax losses would still be unreliable because of the many restrictions on the sales tax base (they are largely retail sales) and exemptions. Thus, here we present the net revenue impact of moving to a single factor sales formula, but note that estimated increases in property (positive effect) and decreases in sales (negative effect) would likely alter the end result in some way.

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[4] See Edmiston, 2002, *op cit*. See also Kelly D. Edmiston and F. Javier Arze, "Firm-Level Effects of Georgia's Shift to Double-Weighted Sales," *Fiscal Research Program Report No. 74*, October, 2002. Updated (from the Edmiston and Arze 2002 report) elasticity estimates, using more recent tax returns, are presented in this report and are used in the calculations.

Estimated Changes in Corporate Income Tax Collections

The first step in estimating the change in corporate income tax collections from moving to a single-factor sales formula was to project total corporate income tax collections under the current double-weighted sales formula for 2003-2008. This was accomplished using a first-order autoregression technique. Based on reported corporate income tax collections for 1970-2002, available from the Georgia Department of Revenue,[5] adjusted for inflation, we estimated that corporate income tax collections in any year are, on average, given by the sum of $99,289,131 and 83.325 percent of the previous year's corporate income tax collections. These inflation-adjusted numbers were then converted to nominal figures by projected inflation for 2003-2008. Actual corporate income tax collections for 1992-2002 and projected collections for 2003-2008 are reported in the Table 1 ("Total Collections").

The next step was to estimate the share of total corporate income tax collections received from multistate firms, which are subject to apportionment. This step required the examination of corporate income tax returns, which were available in full only for the 1992-2000 period. Table 1 reports these shares ("multistate share"). For years 1992-1994, this share was determined by dividing multistate tax collections *as they would have been under a double-weighted sales apportionment scheme*, by total collections *as they would have been under a double-weighted sales apportionment scheme*. For 1995-2000, this share was calculated simply as multistate tax collections divided by total tax collections. Finally, based on trend over the 1992-2000 period, the multistate share was extrapolated to provide projections for 2001-2008. The multistate share is expected to decline from an estimated 71.61 percent in 2001 to an estimated 66.61 percent in 2008. This decline works to mitigate the loss in corporate income tax collections resulting from a move to a single-factor sales apportionment formula.

Again based on actual tax returns over the 1992-2000 period, the next step was to calculate multistate corporate tax collections under both a double-weighted sales scheme and a single-factor sales scheme. The ratios of these two numbers are

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[5] *Statistical Report*, various years.

reported in Table 1 ("SFS Taxable Income as a Share of DWS Taxable Income"). The ratios for 2001-2008 are projections based on the trend from 1992-2000. The ratio is expected to decrease from an estimated 80.64 percent in 2001 to an estimated 71.63 percent in 2008. Again, this decline works to mitigate the loss in corporate income tax collections resulting from a move to a single-factor sales apportionment formula.

The calculation of multistate corporate income tax collections under a single-factor sales formula for years 2001-2008 were then estimated as indicated in Box 1.

TABLE 1. ANALYSIS OF CORPORATE INCOME TAX COLLECTIONS

	Panel A (1992 – 1997)					
Item	Equally Weighted 3-Factor Formula			Double-Weighted Sales		
	1992	1993	1994	1995	1996	1997
Total Collections /a/	$367,290,147	$460,940,240	$519,929,665	$638,860,246	$696,606,823	$706,912,316
of which: multistate firms	300,160,795	354,415,501	440,544,186	445,444,537	453,222,429	502,919,080
multistate share	0.8132	0.7645	0.8434	0.6972	0.6506	0.7114
SFS Taxable Income as a Share of DWS Taxable Income	0.9245	0.9316	0.9064	0.8693	0.8069	0.8696
Estimated Multistate Tax Collections Under SFS				387,237,500	365,690,746	437,343,869
Difference (Gain/Loss from SFS)				(58,207,037)	(87,531,683)	(65,575,211)
	Panel B (1998 – 2003)					
Item	Double-Weighted Sales					
	1998	1999	2000	2001	2002	2003
Total Collections /a/	$749,442,510	$800,406,824	$667,320,938	$690,327,714	$564,982,009	$610,535,341
of which: multistate firms	591,409,011	618,832,523	450,432,381	494,323,904	400,534,878	428,471,485
multistate share	0.7891	0.7731	0.6750	0.7161	0.7089	0.7018
SFS Taxable Income as a Share of DWS Taxable Income	0.8738	0.8360	0.7650	0.8064	0.7935	0.7807
Estimated Multistate Tax Collections Under SFS	516,759,273	517,315,163	344,563,954	398,631,235	317,839,266	334,489,277
Difference (Gain/Loss from SFS)	(74,649,738)	(101,517,360)	(105,868,427)	(95,692,669)	(82,695,612)	(93,982,208)
	Panel C (2004 – 2008)					
Item						
	2004	2005	2006	2007	2008	
Total Collections /a/	$630,573,816	$649,469,096	$669,033,039	$688,183,368	$707,562,865	
of which: multistate firms	438,033,696	446,523,887	455,199,297	463,316,966	471,313,916	
multistate share	0.6947	0.6875	0.6804	0.6732	0.6661	
SFS Taxable Income as a Share of DWS Taxable Income	0.7678	0.7549	0.7420	0.7291	0.7163	
Estimated Multistate Tax Collections Under SFS	336,312,201	337,079,537	337,765,601	337,821,517	337,581,856	
Difference (Gain/Loss from SFS)	(101,721,495)	(109,444,350)	(117,433,696)	(125,495,449)	(133,732,061)	

Notes:
/a/ For 1992-2002, as reported by the Georgia Department of Revenue, *Statistical Report*, various years; for 2003 and beyond total collections are estimated as explained in the report
SFS: Single Factor Sales
DWS: Double Weighted Sales

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Box 1
Estimating the Change in Corporate Income Tax Collections Under a Sales-Only Apportionment Formula

(1)   **Estimated Multistate Tax Collections Under Current System** (TCDWS) =
(Total Estimated Tax Collections) X (Ratio: Multistate to Total)

(2)   **Estimated Multistate Tax Collections Under Sales-Only System** (TCSFS) =
(TCDWS) X (Ratio: SFS to DWS)

(3)   **Estimated Change in Collections Under a Sales-Only Scheme** =
(TCSFS) – (TCDWS)

As noted in Table 1, a move to a sales-only apportionment formula beginning in tax year 2004 is expected to result in a decline in corporate income tax collections of $101.7 million in tax year 2004, which is projected to increase slightly in magnitude to $133.7 million per year by 2008. Figure 1 illustrates projected corporate income tax collections under the current system *versus* a sales only scheme.

FIGURE 1. ESTIMATED CORPORATE INCOME TAX COLLECTIONS UNDER DOUBLE-WEIGHTED SALES AND SALES ONLY APPORTIONMENT SCHEMES
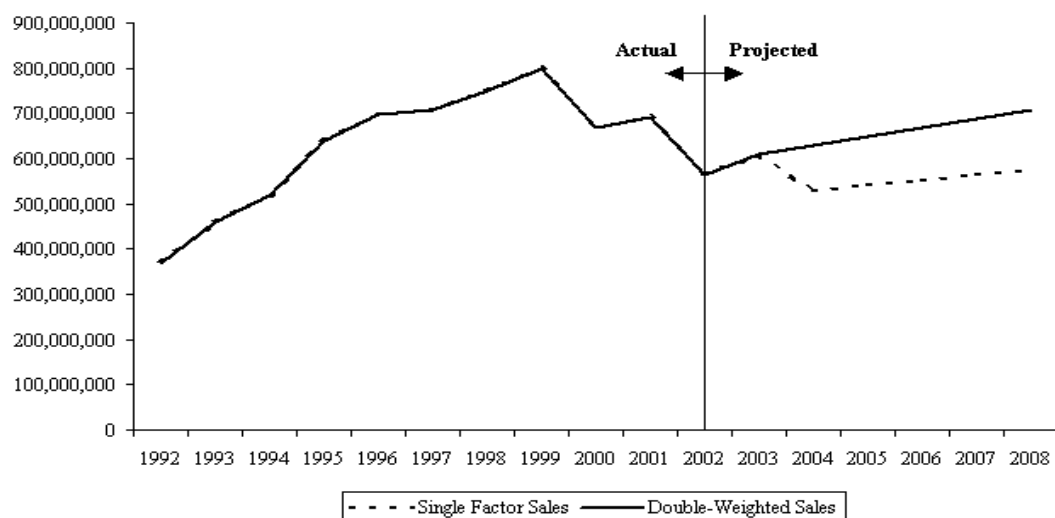
Estimated Changes in Personal Income Tax Collections

The 2002 Edmiston and Arze paper used 1992-1997 corporate income tax returns to estimate an elasticity of the total Georgia payroll with respect to the payroll tax differential associated with formula apportionment of – 0.04, which means that a 10 percent reduction in the effective tax rate on payroll arising from the formula-apportioned corporate income tax would, on average, lead to a 0.4 percent increase in the state-wide payroll of multistate corporations. After updating the data with additional tax returns through calendar year 2000, and using the same technique as used in the prior study, the revised estimate is a significantly larger (in magnitude) elasticity of – 0.069. Based on this estimate, a move to a sales only formula, which represents a 100 percent decline in the effective tax rate on payroll, would increase multistate corporate payroll in the state by 6.9 percent. For this analysis, we assume that payroll would adjust over a three-year period, thus increasing at a compound annual rate of 2.367 percent per year for three years.[6]

Table 2 gives projected Georgia payroll amounts for multistate corporations under the current double-weighted sales scheme ("Payroll (Benchmark)") and under the proposed sales only apportionment scheme ("Payroll (SFS)"). A move to a sales only apportionment formula in 2004 would lead to a projected $1.3 billion increase in the Georgia payroll of multistate corporations in 2004, growing to $2.9 billion in 2005, and $4.6 billion in 2006. For 2007 – 2008, the gain in payroll would begin to grow more slowly, as the assumption underlying the projections is that the payroll boost from the policy change would take full effect over three years (2004 – 2006). In 2007, payroll would be expected to be higher by $4.8 billion under a sales only scheme, growing to $5.0 billion by 2008.

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[6] The formula for computing the compound annual growth rate for three years is
$-0.02367 = \sqrt[3]{(1-0.069)} - 1$.

TABLE 2. ANALYSIS OF PERSONAL INCOME TAX COLLECTIONS (FROM PAYROLL)

Item	2004	2005	2006	2007	2008
Payroll (Benchmark)	58,026,299,561	60,706,644,368	63,386,989,176	66,067,333,983	68,747,678,791
Payroll (SFS)	59,399,732,259	63,614,402,264	67,995,310,102	70,870,519,648	73,745,729,194
Payroll Gain	1,373,432,698	2,907,757,896	4,608,320,926	4,803,185,665	4,998,050,403
Additional PIT (Low)	32,413,012	68,623,086	108,756,374	113,355,182	117,953,990
Additional PIT (High)	65,883,567	139,485,146	221,061,155	230,408,816	239,756,478

The Fiscal Research Program utilizes a couple of estimates of the effective personal income tax rate in Georgia, depending on whether the gain in income represents increases in income for existing workers, who would face a relatively high average tax rate because of the high marginal rate (additional income would be taxed near or at 6 percent), or represents income to a new worker, who would pay relatively low rates of tax because of deductions. In this analysis, both a "low" estimate and a "high" estimate of personal income tax collections generated by projected payroll increases are provided, based on the low and high average effective personal income tax rates of 2.36 percent and 4.797 percent, respectively.

As shown in Table 2, in 2004, it is projected that a sales only apportionment scheme would generate between $32.4 million (low) and $65.9 million (high) in additional personal income tax collections. By 2008, projected increases in personal income tax collections range from $118.0 million (low) to $239.8 million (high). These gains will mitigate any corporate income tax revenue losses resulting from a move to a sales only apportionment formula, and in later years, would lead to net revenue gains if the realized average personal income tax rate is on the high end of the range used in this analysis.

Estimated Net Revenue Effects

Table 3 combines the revenue changes estimated for corporate and personal income tax collections for 2004 – 2008 and projects the net revenue impact of moving to a sales only formula accordingly. Assuming that the realized average personal income tax rate will fall at the mid-point of the low and high estimates, the most likely net revenue effect is also provided under the label "likely scenario."

TABLE 3. NET REVENUE EFFECTS

Item	2004	2005	2006	2007	2008
Corporate Income Tax	(101,721,495)	(109,444,350)	(117,433,696)	(125,495,449)	(133,732,061)
Personal Income Tax (low)	32,413,012	68,623,086	108,756,374	113,355,182	117,953,990
Personal Income Tax (high)	65,883,567	139,485,146	221,061,155	230,408,816	239,756,478
Net Revenue Effect (low)	(69,308,484)	(40,821,264)	(8,677,322)	(12,140,267)	(15,778,071)
Net Revenue Effect (high)	(35,837,929)	30,040,796	103,627,459	104,913,367	106,024,417
Net Revenue Effect (likely)	**(52,573,206)**	**(5,390,234)**	**47,475,069**	**46,386,550**	**45,123,173**

The move to a sales only scheme would almost certainly be a net revenue loser in 2004, with the likely result being a loss of $52.6 million. The loss arises from the fact that the change in corporate income tax collections will be immediate, while the effect on personal income tax collections will be dynamic, and for this analysis, is projected to accumulate over a three-year period ending in 2006. The likely scenario for net revenue effects in 2005 is a loss of $5.4 million. From 2006 and beyond, the net revenue effect will almost certainly be positive, with expected gains of around $45 million per year.

If the State of Georgia is of a mind to take advantage of the positive economic development effects that are expected to arise with a move to place additional weight on sales (and future estimated public revenue gains), but is understandably reluctant to give up much-needed revenues during the initial year or two (especially now, given the current fiscal crisis), a delayed implementation may allow for gains in both the short-term and long-term.

Corporations (if they are smart) make plans over the long-term. Thus, they would be expected to respond immediately to a policy change known *with certainty* to come in the future. Thus, if 2004 legislation enacted a sales only apportionment scheme to take effect in 2005 or 2006, corporations should be expected to adjust to

the new tax environment in 2004. Keeping this in mind, Table 4 presents projected net revenue effects if a sales only apportionment scheme were imposed in 2004, 2005, or 2006. The assumption underlying these estimates is that *in making personnel decisions*, corporations would behave as if the sales only scheme were operational in 2004, even though its implementation is delayed until a later date.

TABLE 4. NET REVENUE EFFECTS FOR VARIOUS IMPLEMENTATION DATES

Item	2004	2005	2006	2007	2008
Panel A (Implementation in 2004)					
Net Revenue Effect (low)	(69,308,484)	(40,821,264)	(8,677,322)	(12,140,267)	(15,778,071)
Net Revenue Effect (high)	(35,837,929)	30,040,796	103,627,459	104,913,367	106,024,417
Net Revenue Effect (likely)	**(52,573,206)**	**(5,390,234)**	**47,475,069**	**46,386,550**	**45,123,173**
Panel B (Implementation in 2005)					
Net Revenue Effect (low)	32,413,012	(40,821,264)	(8,677,322)	(12,140,267)	(15,778,071
Net Revenue Effect (high)	65,883,567	30,040,796	103,627,459	104,913,367	106,024,417
Net Revenue Effect (likely)	**49,148,289**	**(5,390,234)**	**47,475,069**	**46,386,550**	**45,123,173**
Panel C (Implementation in 2006)					
Net Revenue Effect (low)	32,413,012	68,623,086	(8,677,322)	(12,140,267)	(15,778,071)
Net Revenue Effect (high)	65,883,567	139,485,146	103,627,459	104,913,367	106,024,417
Net Revenue Effect (likely)	**49,148,289**	**104,054,116**	**47,475,069**	**46,386,550**	**45,123,173**

One could reasonably argue that the payroll effects would not be as strong under delayed implementation, which means that personal income tax collections would be lower in 2004 (or 2005, as the case may be) than what is projected in Table 4. That being the case, we might expect the 2004 net effect to be lower than in panel B for a 2005 implementation, and for the net revenue effects in 2004 and 2005 to be lower than in panel C for a 2006 implementation. Nevertheless, because there are no negative effects for corporate income tax collections in the years prior to implementation, the net revenue effect would be *positive* with certainty in those years, if not at the level projected in Table 4. Even in those cases, we might expect for firms to have had time to fully incorporate the policy change in their personnel plans, which suggests that net revenue effects for 2006 – 2008 would be unaffected by the delay in implementation of the sales only apportionment scheme.

Caveats

In ending, it should be reemphasized that a move to a sales only apportionment formula would have positive effects on property in the state, which would make the net revenue effects higher (more positive) than projected here, and negative effects on sales of multistate corporations in the state, which would make the net revenue effects lower (more negative) than projected here. Unfortunately, it is not possible to make projections of the tax effects arising from changes in property and sales with any reasonable degree of accuracy. Revised elasticity estimates (based on additional tax return data) for property and sales are -0.035 and -0.116, respectively.

It should also be noted that revenue gains and losses are for a sales only apportionment scheme relative to a double-weighted apportionment scheme (the current system), not for actual collections. Thus, the $52.6 million figure for 2004 (Table 3) suggests that tax collections in 2004 would be $52.6 million lower under a sales only apportionment formula than under the current system, *not* that 2004 collections would be $52.6 million less than 2003 collections.

About the Author

Kelly D. Edmiston is an Assistant Professor of Economics and Senior Associate with the Fiscal Research Center of the Andrew Young School of Policy Studies at Georgia State University. Dr. Edmiston received his Ph.D in economics from the University of Tennessee. His research interests include state and local public finance, state and local economic development, tax modeling, and taxation in federal systems.

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