Multi-Tax Incidence Analysis In a Microsimulation Environment

by Eric Cook

Eric Cook began his career as a revenue estimator with Congress's Joint Committee on Taxation in 1983. He joined PwC in 1987, where he assisted state government clients with revenue estimating issues. Cook continued his work for state government clients beginning in 1991 at KPMG LLP and at Chainbridge Software, which he formed in 2000.

In this article, Cook writes about the 2013 Minnesota Tax Incidence Study, focusing on the three steps the study presents for evaluating overall state tax incidence. He then applies those steps to evaluate the tax incidence of a hypothetical state.

I. Introduction

The concept of state and local tax incidence is significant. Who actually bears the burden of the state's taxes? Is the state's tax system relatively progressive or regressive? Is the tax ultimately paid by consumers, owners of capital, or workers?

A 2013 Minnesota tax incidence study explained that:

> Economists commonly distinguish between the initial impact of a tax and its incidence. The initial impact of a tax is on the taxpayer legally liable to pay the tax, while the incidence of a tax is the final resting place of the tax burden after any tax shifting has occurred.[1]

Most tax economists would agree that for a majority of state and local taxes, the burden of the tax is borne by the individual or household paying the tax. I believe that most tax economists would agree that the burden of individual income taxes, consumer-based sales and excise taxes, and owner-occupied residential property taxes are borne by the individuals or households remitting the tax. In many states, those types of taxes account for the lion's share of a state's total tax collections, and determining the distributions of those taxes by income classes or deciles is relatively straightforward.

Evaluating incidence for a state's business taxes is not so simple, and I do not believe there is consensus among most tax economists about how business taxes are effectively paid by individuals (business owners, consumers, and laborers). Businesses (at least in economic theory) are not the people who pay taxes. Accurately estimating the extent to which parties to business tax transactions bear the burden of the tax depends on subjective assumptions. In incidence analysis, hard science gives way to economic theory, and it is ultimately empirically impossible to pinpoint exactly who bears the burden of a particular business tax. Given the complexity and interconnectivity of a state's economic market, a single business tax causes ripple effects that shift the incidence of that tax to owners of capital, consumers, or laborers in that state and elsewhere. As part of the incidence analysis, it is necessary to distribute those business taxes to resident households so that the distribution of the tax by income class can be computed.

According to the 2013 Minnesota Tax Incidence Study, evaluating overall state tax incidence requires three steps. In the first step, the initial imposition of the tax is determined. In the second step, the effects of tax shifting are determined. In the third step, the incidence on specific state households is developed. Below I discuss each of those steps to illustrate the determination of multi-tax incidence for a hypothetical state.

II. Step 1: Determine the Initial Imposition of the Tax

Following, I provide brief descriptions for each of the tax modules that feed into the incidence module, which are:

- the individual income tax module;
- the sales and use tax module;
- the property tax module; and
- the corporate income and franchise tax module.

A. Individual Income Tax Module

The individual income tax module uses a microdatabase of all the households in a state, making it a microsimulation model. The model allows users to analyze the distributional effects of any number of tax policy changes on the state's residents. The individual income tax database is extrapolated into the future and:

- allows users to perform aggregate and distributional analyses of individual income tax policies;

[1]Minnesota Department of Revenue, "2013 Minnesota Tax Incidence Study" (Mar. 13, 2013), at 7.

- can be constructed by matching federal Individual Master File/Individual Return Transaction File data with state personal income tax data;
- uses the U.S. Census Bureau's American Community Survey five-year summary file, the U.S. Department of Labor, Bureau of Labor Statistics' Consumer Expenditure Survey, and the Travel Industry Association of America's (TIA) U.S. travel center data from the "Impact of Travel on State Economies"; and
- includes imputations of state consumption patterns from national data.

B. Sales and Use Tax Module

The sales and use tax module simulates sales tax transactions occurring within a state, and it allows users to analyze the effects of sales and use tax policy changes on consumers, businesses, and visitors to a state. The databases involved in the development of the sales and use tax module include the business purchases database, the consumer and visitors purchases database, and the elasticity assumptions database. This module of the system also allows for analysis for future years.

The business purchases database allows users to analyze the effects of tax policy changes on the following taxes: sales and use, alcoholic beverage, cigarette, motor vehicle fuel, tobacco products, and other sales and excise-type taxes. It includes data from the U.S. Bureau of Economic Analysis's (BEA's) input-output accounts intermediate business purchases (use) and the business capital flows table matrices. Data from the Census Bureau's county business patterns are used to scale the U.S. data from the BEA to state levels.

The consumer and visitors purchases database is constructed using aggregate data from the input-output accounts from the BEA calibrated to state levels. State-specific microdata allows users to perform distributional analysis of the sales tax on resident consumers by income class. Data from the TIA's U.S. travel center "Impact of Travel on State Economies" is used to estimate visitor consumption in the state.

The elasticity assumptions database includes elasticity assumptions for consumption-type taxes and allows for the analysis of cross-border effects.

C. Property Tax Module

The property tax module simulates property tax activity in a state and includes both a macroproperty tax database and a microproperty tax database. The macroproperty tax database allows users to analyze the effects of the changes to municipal property tax policies on state businesses and households at a macro level. It is usually constructed with data from the state on at least the following types of property: residential, personal, commercial, and industrial. The microproperty tax database allows users to perform distributional analyses by income class of the effects of changes to municipal property tax policies on state families at a micro level. It is constructed with data from the state household database.

D. Corporate Income and Franchise Tax Module

The corporate income and franchise tax module allows users to simulate corporate income tax policy changes. The database is a microdatabase that can be constructed by matching federal Business Master File/Business Return Transaction data with state corporate tax data.

III. Step 2: Determine the Effects of Tax Shifting

Numerous assumptions must be made by the analyst to determine the effects of tax shifting. Following are the household tax incidence assumptions from Appendix B of the 2013 Minnesota study:

A. Incidence of Taxes on Households

- The personal income tax is paid by individual taxpayers, and the incidence is the same as the initial impact of the tax.
- Taxes on purchases by consumers (sales and solid waste management, for example) are borne by consumers of the taxed items.
- The property tax on homeowners is borne by the homeowner.
- The motor vehicle registration tax on vehicles owned by households is borne by the owner of the vehicle.
- Mortgage registration and deed transfer taxes on homes are borne by homeowners.
- Excise taxes — those on motor fuels (bought by consumers), tobacco, and alcohol — are assumed fully shifted to consumers, as are the taxes on consumer purchases of insurance, MinnesotaCare taxes, and taxes on gambling. For purposes of this study, these are considered taxes on households, even though they are paid by businesses. The term "business taxes" in this study does not include these taxes.[2]

As stated above, I do not believe that there is much controversy among tax economists concerning the incidence assumptions relating to the taxes that are paid by a state's individuals and households — they are assumed to be borne by the individuals or households paying the tax.

B. Allocating Business Taxes

The study makes the following assumptions regarding tax shifting:

- Most taxes on business property, business purchases, and corporate income are partially shifted to consumers and workers.
- The amount of tax shifting varies by tax and by business sector, depending on the scope of the product market (local or national) and the magnitude of Minnesota's tax rates compared with those in other states.
- To shift a tax, the individual or business legally liable to pay the tax must alter its economic behavior because of the tax (for example, a property tax paid by a business

[2] *Id.* at 85.

firm may lead the firm to raise its prices, or lower its pay to employees, or the business owner may experience reduced profits).[3]

The study also concludes that for business taxes on capital, the tax paid by a particular economic sector is divided into three parts:

- the portion representing the national average tax rate on all capital;
- the portion representing the national sector differential; and
- the portion representing the Minnesota sector differential.

The 2013 Minnesota study outlines two methods for allocating business taxes to the owners of capital, consumers, and labor: one for taxes other than taxes on intermediate business purchases and another for taxes on intermediate business purchases. For both types of taxes, the same method is outlined for allocating the business taxes to a state's residents.

1. Allocating business taxes other than taxes on intermediate business purchases to capital, consumers, and labor.

In constructing the business portion of our multi-tax incidence module, I have tried to follow the Minnesota approach. I will now attempt to illustrate the application of that approach to allocating a sales tax on business capital purchases.

First, the average sales tax rate on all capital goods across all 50 states and the District of Columbia (the national average) is determined. It is assumed that this portion of the tax would be entirely borne by capital.

Second, to the extent that the national average sales tax rate rate by industry sector exceeds the national average sales tax rate on all capital goods, this portion of the business tax would be borne by consumers in the form of higher prices, which is termed the "national sector differential."

Third, the extent to which the average state sales tax exceeds the national average tax rate for a particular sector is termed the "state sector differential." If the state sector differential is associated with firms competing in local markets, that differential will result in higher prices for consumers (price-makers). On the other hand, products that compete in national markets would be borne by labor because those firms are price-takers.

To summarize, the overall average national tax rate is borne by the owners of capital. To the extent that the national average tax rate by sector exceeds the overall national average tax rate, that portion of the tax will be borne by consumers. Likewise, the extent to which the state average tax rate by sector exceeds that sector's national average tax rate, that portion of the tax will be borne by consumers if the state sector competes in local markets. If those firms compete in national markets, the tax will be borne by labor.

2. Allocating taxes on intermediate business purchases to capital, consumers, and labor.

Regarding taxes on intermediate business inputs, the Minnesota study concludes that:

> The incidence of a tax on short-lived intermediate business inputs like gasoline, business meals, lodging, or liquor is different from the incidence of a tax on capital. While a uniform national tax on all capital would be borne by capital, a uniform national tax on business purchases of gasoline, for example, would not. It would almost certainly be shifted forward to consumers in higher prices. Taxes on short-lived intermediate products raise the cost of production, but they do not raise the cost of capital.
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> As a result, the approach to the incidence of such taxes skips the first of the three questions asked about capital taxes. The tax on intermediate business purchases is divided into only two parts:
>
> 1. the portion representing the "average national tax rate" on this sector is shifted forward to consumers in higher prices; and
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> 2. the portion representing the "Minnesota differential" is borne by:
>
> a. consumers for products sold in "local markets"; and
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> b. labor and landowners for products sold in "national markets."[4]

Therefore, taxes on intermediate inputs are borne mostly by consumers in the form of higher prices and to a lesser extent by labor.

3. Allocating business taxes to nonresidents.

The following are descriptions of the Minnesota approach to determining the proportion of business taxes that are borne by nonresidents.

Exported Burden on Capital: As one would expect, because of sheer size, the owners of capital in moderate-size states would be highly dispersed across many states. For example, the Minnesota study assumed that nonresidents owned 90 percent of the stock in corporations subject to Minnesota tax. The study also assumed that 20 percent of most noncorporate businesses were owned by nonresidents. Those assumptions seem pretty reasonable for most moderate-size states. The result of those assumptions is that the vast majority of the tax burden on capital is shifted to nonresidents.

Exported Burden on Consumers: The study assumes that consumers located in other states will pay some of the

[3] *Id.*

[4] *Id.* at 95.

national sector differential on Minnesota firms that is shifted forward in higher prices and that nonresident visitors bear some of the tax as well. For each sector, the study estimated the proportion of sales made to out-of-state consumers and visitors.

Exported Burden on Labor: The study assumed that 0 percent of the burden on labor was shifted to nonresidents.[5]

IV. Step 3: Determine the Incidence on Specific State Households

The multi-tax incidence module of the PolicyLinks system allows analysts to combine revenue estimates for more than one tax type in order to see overall incidence on resident households. The database for this module includes a set of default incidence assumptions. Incidence assumptions are embodied in a set of boundaries that include both the proportion of business taxes borne by business owners who are not residents of the state and the proportion of business taxes paid by owners and laborers who are state residents.

After estimating the share of a state's business taxes borne by its owners of capital and land, resident consumers, and labor, the final step is to allocate those taxes to specific households based on each household's characteristics in the microdatabase.

The Minnesota study allocates business taxes to households using the following method:

> **Burden on Consumers:** Taxes shifted forward to consumers in higher prices were allocated based on their share of total consumer expenditures, as estimated from the Consumer Expenditure Survey. Total expenditures for a particular household were estimated based on household income and size.
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> **Burden on Renters:** Renters are the consumers of rental housing, so the proportion of the total rental property tax shifted forward to renters in higher rents is estimated using the same method used for other business taxes. That portion of total taxes on rental housing is distributed across renter households in proportion to each household's annual rent. For renter households receiving a property tax refund, annual rent is known. For others, rent is estimated based on the most recent information from the Census Bureau.
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> **Burden on Corporate Capital:** The burden on corporate capital was allocated to households in proportion to taxable dividends received. This allocator was used to estimate the total income received by owners of corporate stock, both as dividends and as capital gains on appreciated stock. Although dividends received may not be a good measure of corporate ownership for particular individuals, the decile-by-decile distribution of dividend income should match the distribution of corporate capital fairly closely.
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> **Burden on Noncorporate Capital:** Noncorporate business capital includes capital owned by sole proprietors, partnerships, and S corporations. This study used a variety of information from schedules C and E to develop a reasonable estimate of each household's ownership of noncorporate capital. The construction of this measure guaranteed that: (1) households with large business losses are assigned some capital ownership (based on either claimed depreciation or the size of claimed losses); and (2) the shares of capital ownership imputed to those with sole proprietor income, rental income, and partnership and S corporation income are roughly proportional to each income source's aggregate share of claimed depreciation.
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> **Burden on Farmers:** Rental land accounts for about one-third of Minnesota farm land. Approximately half of all farm property taxes were paid on rented land, reflecting higher classification rates on nonhomestead farms. Therefore, about half of the farm property tax burden was allocated in proportion to farm rents (reported on Schedule E), with the rest allocated in proportion to farm homestead property taxes.
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> **Burden on Labor:** The burden on labor (through lower wages) was allocated based on each household's share of earned income, defined as the sum of wages and salaries, plus three-fourths of income reported by sole proprietors and farmers.[6]

My method for allocating business taxes to a state's households follows the Minnesota approach.

I bring together results from each of the separate tax modules described above to generate a distribution of baseline tax incidence by tax type by income decile (meaning equal income in each decile), as presented in Table 1 (note that the property tax is not in this illustration for a hypothetical state):

> If, as Oliver Wendell Holmes once said, taxes are the price we pay for civilized society, then the progressivity of taxes largely determines how that price varies among individuals. A progressive tax structure is one in which an individual or family's tax liability as a fraction of income rises with income. If, for example, taxes for a family with an income of $20,000 are 20 percent of income and taxes for a family with an income of $200,000 are 30 percent of income, then

[5] *See id.* at 94.

[6] *Id.* at 96-97. (Bold added.)

Table 1.
Distributed Individual, Corporate, and Sales by Deciles

Number of Households	Expanded Income	Individual Income Tax	Percent Distribution	Corporate Income Tax	Percent Distribution	Sales Tax	Percent Distribution	Total Tax	Percent Distribution
$262,528	$3,227,614	$42,810,426	5%	$17,471,195	12.5%	$603,083,373	33.3%	$663,364,994	23.7%
$87,505	$3,227,616	$58,895,961	6.9%	$14,231,937	10.2%	$239,035,991	13.2%	$312,163,889	11.1%
$60,304	$3,227,638	$71,903,647	8.4%	$14,400,034	10.3%	$191,102,972	10.6%	$277,406,652	9.9%
$45,702	$3,227,617	$81,532,701	9.5%	$14,876,623	10.6%	$164,302,337	9.1%	$260,711,662	9.3%
$38,254	$3,227,671	$88,151,233	10.3%	$15,803,738	11.3%	$150,321,608	8.3%	$254,276,579	9.1%
$32,769	$3,227,643	$90,009,252	10.5%	$16,033,833	11.4%	$135,982,434	7.5%	$242,025,520	8.6%
$25,722	$3,227,661	$94,247,703	11%	$15,433,815	11%	$120,733,672	6.7%	$230,415,189	8.2%
$18,407	$3,227,766	$104,285,976	12.2%	$14,774,102	10.5%	$96,323,319	5.3%	$215,383,397	7.7%
$10,088	$3,228,155	$106,296,886	12.4%	$11,411,171	8.1%	$70,175,181	3.9%	$187,883,238	6.7%
$2,348	$3,226,739	$115,759,037	13.6%	$5,696,639	4.1%	$37,785,899	2.1%	$159,241,575	5.7%
$583,627	**$32,276,120**	**$853,892,821**	**100%**	**$140,133,088**	**100%**	**$1,808,846,786**	**100%**	**$2,802,872,695**	**100%**

Table 2.
Distributed Corporate Tax by Labor, Capital, Consumption, and Land by Deciles
(thousands of dollars)

Labor	Percent Distribution	Capital	Percent Distribution	Consumption	Percent Distribution	Land	Percent Distribution	Total Tax	Percent Distribution
$11,068	11.7%	$2,313	7.3%	$3,965	32%	$126	12.1%	$17,472	12.5%
$10,366	10.9%	$2,154	6.8%	$1,613	13%	$100	9.6%	$14,233	10.2%
$10,497	11.1%	$2,524	8%	$1,281	10.3%	$97	9.3%	$14,399	10.3%
$10,734	11.3%	$2,934	9.3%	$1,109	8.9%	$99	9.5%	$14,876	10.6%
$10,973	11.6%	$3,697	11.7%	$1,030	8.3%	$104	10%	$15,804	11.3%
$10,603	11.2%	$4,387	13.8%	$940	7.6%	$104	10%	$16,034	11.4%
$10,053	10.6%	$4,408	13.9%	$871	7%	$103	9.9%	$15,435	11%
$9,421	9.9%	$4,524	14.3%	$729	5.9%	$100	9.6%	$14,774	10.5%
$7,299	7.7%	$3,429	10.8%	$585	4.7%	$98	9.4%	$11,411	8.1%
$3,978	4.2%	$1,321	4.2%	$284	2.3%	$114	10.9%	$5,697	4.1%
$94,991	**100%**	**$31,691**	**100%**	**$12,406**	**100%**	**$1,045**	**100%**	**$140,133**	**100%**

Table 3.
Distributed Sales Tax on Capital Goods by Labor, Capital, Consumption, and Land by Deciles
(thousands of dollars)

Labor	Percent Distribution	Capital	Percent Distribution	Consumption	Percent Distribution	Land	Percent Distribution	Total Tax	Percent Distribution
$1,349	11.7%	$1,198	7.3%	$11,255	32%	$8	12.1%	$13,810	21.8%
$1,263	10.9%	$1,115	6.8%	$4,578	13%	$6	9.1%	$6,962	11%
$1,279	11%	$1,307	8%	$3,638	10.3%	$6	9.1%	$6,230	9.8%
$1,308	11.3%	$1,519	9.3%	$3,147	8.9%	$6	9.1%	$5,980	9.5%
$1,337	11.5%	$1,914	11.7%	$2,925	8.3%	$7	10.6%	$6,183	9.8%
$1,292	11.2%	$2,271	13.8%	$2,669	7.6%	$7	10.6%	$6,239	9.9%
$1,225	10.6%	$2,282	13.9%	$2,472	7%	$7	10.6%	$5,986	9.5%
$1,148	9.9%	$2,342	14.3%	$2,070	5.9%	$6	9.1%	$5,566	8.8%
$890	7.7%	$1,776	10.8%	$1,660	4.7%	$6	9.1%	$4,332	6.8%
$485	4.2%	$684	4.2%	$805	2.3%	$7	10.6%	$1,981	3.1%
$11,578	**100%**	**$16,409**	**100%**	**$35,218**	**100%**	**$66**	**100%**	**$63,271**	**100%**

the tax structure over that range of incomes is progressive. One tax structure is more progressive than another if its average tax rate rises more rapidly with income.[7]

As shown in Table 1, for a hypothetical state, the burden of the individual income tax increases as income increases, indicating relative progressivity. The corporate income tax is moderately regressive, and the sales tax is highly regressive, with the overall burden of the three taxes moderately regressive.

Table 2 presents the distributed corporate tax by capital, consumers, labor, and land by income decile.

As shown in Table 2, labor bears a significant burden of the total tax, with the tax being regressive. Capital's portion

Table 4.
Distributed Sales Tax on Intermediate Goods by Labor, Capital, Consumption, and Land by Deciles
(thousands of dollars)

Labor	Percent Distribution	Capital	Percent Distribution	Consumption	Percent Distribution	Land	Percent Distribution	Total Tax	Percent Distribution
$2,989	11.6%	$0	0%	$97,411	32%	$30	12%	$100,430	30.4%
$2,800	10.9%	$0	0%	$39,622	13%	$24	9.6%	$42,446	12.8%
$2,835	11.%	$0	0%	$31,485	10.3%	$23	9.2%	$34,343	10.4%
$2,899	11.3%	$0	0%	$27,240	8.9%	$24	9.6%	$30,163	9.1%
$2,964	11.6%	$0	0%	$25,313	8.3%	$25	10%	$28,302	8.6%
$2,864	11.2%	$0	0%	$23,097	7.6%	$25	10%	$25,986	7.9%
$2,715	10.6%	$0	0%	$21,392	7%	$25	10%	$24,132	7.3%
$2,545	9.9%	$0	0%	$17,919	5.9%	$24	9.6%	$20,488	6.2%
$1,972	7.7%	$0	0%	$14,370	4.7%	$23	9.2%	$16,365	4.9%
$1,074	4.2%	$0	0%	$6,971	2.3%	$27	10.8%	$8,072	2.4%
$25,658	**100%**	**$0**	**0%**	**$304,821**	**100%**	**$250**	**100%**	**$330,729**	**100%**

Table 5.
Distributed Individual, Corporate, and Sales Taxes by Deciles
(thousands of dollars)

Individual	Percent Distribution	Corporate	Percent Distribution	Investment Sales	Percent Distribution	Intermediate Sales	Percent Distribution	PCE Sales	Percent Distribution	Total Sales	Percent Distribution	Total Tax	Percent Distribution
$42,810	5.0%	$17,471	12.5%	$13,809	21.8%	$100,431	30.4%	$488,843	34.6%	$603,083	33.3%	$663,365	23.7%
$58,896	6.9%	$14,232	10.2%	$6,963	11%	$42,446	12.8%	$189,628	13.4%	$239,036	13.2%	$312,164	11.1%
$71,904	8.4%	$14,400	10.3%	$6,230	9.8%	$34,343	10.4%	$150,529	10.6%	$191,103	10.6%	$277,407	9.9%
$81,533	9.5%	$14,877	10.6%	$5,981	9.5%	$30,163	9.1%	$128,158	9.1%	$164,302	9.1%	$260,712	9.3%
$88,151	10.3%	$15,804	11.3%	$6,183	9.8%	$28,302	8.6%	$115,837	8.2%	$150,322	8.3%	$254,277	9.1%
$90,009	10.5%	$16,034	11.4%	$6,239	9.9%	$25,986	7.9%	$103,758	7.3%	$135,982	7.5%	$242,026	8.6%
$94,248	11%	$15,434	11%	$5,986	9.5%	$24,132	7.3%	$90,616	6.4%	$120,734	6.7%	$230,415	8.2%
$104,286	12.2%	$14,774	10.5%	$5,567	8.8%	$20,487	6.2%	$70,269	5%	$96,323	5.3%	$215,383	7.7%
$106,297	12.4%	$11,411	8.1%	$4,332	6.8%	$16,365	4.9%	$49,478	3.5%	$70,175	3.9%	$187,883	6.7%
$115,759	13.6%	$5,697	4.1%	$1,982	3.1%	$8,073	2.4%	$27,731	2%	$37,786	2.1%	$159,242	5.7%
$853,893	**100%**	**$140,133**	**100%**	**$63,271**	**100%**	**$330,729**	**100%**	**$1,414,847**	**100%**	**$1,808,847**	**100%**	**$2,802,873**	**100%**

Table 6.
Suits Index by Type of Tax

Tax Type	Sample	User Brackets	Population Deciles	Income Deciles	Total State Tax Burden
Individual	14.1%	13.8%	13.1%	13.9%	$853,892,821
Corporate	-9.1%	-8.9%	-6.5%	-8.7%	$140,133,088
Sales — Investment	-21.4%	-20.5%	-19%	-20.2%	$63,271,137
Sales — Intermediate	-35.1%	-33.6%	-33.1%	-33.4%	$330,728,526
Sales — Consumer	-42%	-40.3%	-40.1%	-40%	$1,414,847,123
Sales — Totals	-39.4%	-38.4%	-38%	-38.1%	$1,808,846,786
Totals	-22%	-21%	-20.9%	-20.8%	$2,802,872,695

is moderately progressive, the consumer portion is highly regressive, and land's portion is proportional. Overall, the total corporate tax burden of the hypothetical state is nearly proportional.

Table 3 presents the distributed sales tax on business purchases of capital goods by capital, consumers, labor, and land by income decile.

As shown in Table 3, the portion of the sales tax on business purchases of capital goods attributed to labor is fairly proportional, the portion attributed to capital is progressive, the portion attributed to consumers is regressive,

[7]Joel Slemrod, The Concise Encyclopedia of Economics, *available at* http://www.econlib.org/library/Enc1/ProgressiveTaxes.html.

and land portion is again proportional. Overall, the total sales tax on business purchases of capital goods is regressive.

Table 4 presents the distributed sales tax on business purchases of intermediate goods by capital, consumers, labor, and land by income decile.

As shown in Table 4, the portion of the sales tax on business purchases of intermediate goods attributed to labor is fairly proportional, the portion attributed to capital is zero (following the Minnesota study assumptions), the portion attributed to consumers is regressive, and land portion is again proportional. The total sales tax on business purchases of intermediate goods is regressive.

Table 5 presents the distributed individual income, corporate (including corporate tax, tax on business investment purchases, and tax on intermediate business purchases), and sales taxes on personal consumption expenditures, and the total of those taxes by income decile.

The Minnesota study notes:

> It is sometimes difficult to summarize the overall distribution of a tax (progressive, proportional, or regressive) from the individual effective tax rates. The Suits index is often used as a summary measure of progressivity or regressivity.
>
> The Suits index has numerical properties that make it easy to identify the degree of progressivity or regressivity of a tax. A proportional tax has a Suits index equal to zero; a progressive tax has a positive index number in the range between 0 and +1. In the extreme case, if the total tax burden were paid by the richest household, the index would be a value of +1. For a regressive tax, the Suits index has a negative value between 0 and -1, with -1 being the most regressive value.[8]

Table 6 presents the Suits index by type of tax for a hypothetical state.

V. Summary

According to the Minnesota Tax Incidence Study, there are three steps involved in evaluating overall state tax incidence. In the first step, the initial imposition of the tax is determined. In the second step, the effects of tax shifting are determined. In the third step, the incidence on specific state households is developed. This paper has discussed each of these steps and presented a multi-tax incidence analysis for a hypothetical state. ☆

[8] *Id.* at 13.