

# MYGOVSPENDING, INC. TAX CALCULATOR MODEL: METHODOLOGY AND DATA SOURCES

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The tax distribution model developed for MyGovSpending, Inc. is based on a microsimulation tax model developed by Chamberlain Economics, L.L.C. The model features a statistically matched database of U.S. households that combines demographic, tax, income, and expenditure data from a variety of government sources into a single database that allows detailed estimation of family tax burdens.

The model is designed to produce estimates of total tax burdens based on three household characteristics—family size, age of the head of family, and annual cash income.<sup>1</sup> Based on these parameters, the model produces estimates of the annual cost of each federal, state and local tax for a typical U.S. family with this set of characteristics.

This memo outlines the methodology used to develop the MyGovSpending, Inc. tax model, and describes the data sources and definitions used.

## A. CORE MATCHED DATABASE

The model is based on a statistically matched database of U.S. households. The database merges actual tax return data from the most recently available 2004 Public Use File (PUF)<sup>2</sup> from the IRS's Statistics of Income (SOI) division with rich demographic data from the 2005 Current Population Survey (CPS) March Supplement<sup>3</sup> from the U.S. Census Bureau.

The matched database is developed through a widely used method known as “constrained statistical matching.” The technique matches hypothetically created tax units from the CPS to actual tax returns in the PUF. The process begins by developing comparable tax units in both

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<sup>1</sup> “Cash income” is defined by the U.S. Census Bureau, and consists of wages and salaries, self-employment income and other market-based income, as well as government cash transfer payments like Social Security payments, unemployment compensation and welfare. This definition of income is consistent with most lay audiences understanding of their own family's income.

<sup>2</sup> Information about IRS Individual Public-Use Microdata Files is available online at <http://www.irs.gov/taxstats/article/0..id=169090.00.html>. The IRS's Statistics of Income division provides access to the microdata files for a fee of \$4,000 per tax year.

<sup>3</sup> Background information on the Current Population Survey's March Supplement is available online at <http://www.bls.census.gov/cps/ads/adsdes.htm>.

files. These units are then partitioned into various categories based on elderly status, presence of business income, presence of capital income and filing and dependency status.

Once partitions are established, the data sets are statistically matched. First, we identify demographic and income variables that are common to both files. Next, we perform an ordinary least-squares regression inside the PUF. The common variables are the independent variables, and taxable income is the dependent variable. The resulting regression coefficients are then used to predict the taxable income for family units inside both files. Family unit records are then ranked based on their predicted income, and records in both files are statistically matched on this basis.

Once the matched database is complete, we project or “age” records in the file from 2004 through 2020 to allow estimation of tax burdens in various years. The statistical aging draws on various data sources, including: published individual income tax data from the IRS’s SOI division; summary tables from the most recent CPS microdata files; published aggregates from the U.S. Bureau of Economic Analysis (BEA); and official projections from the U.S. Congressional Budget Office (CBO). Using these sources, each quantitative variable in the database is aged through 2020, and records in the database are re-weighted to match various qualitative and quantitative targets from CBO and BEA sources.

As a final step, supplemental data from the U.S. Bureau of Labor Statistics’ Consumer Expenditure Survey (CEX) and the Federal Reserve Board’s Survey of Consumer Finances (SCF) is incorporated into the matched database. These data contain information on household wealth and spending patterns, which allow for estimation of each family unit’s share of consumption-style taxes such as sales, excise, airline transport and other taxes.

## **B. TAX DEFINITIONS AND TAX COLLECTIONS DATA**

The MyGovSpending, Inc. model includes all federal, state and local taxes as defined by the U.S. Bureau of Economic Analysis. All tax definitions and collections data are based on the National Income and Product Accounts (NIPA)<sup>4</sup> maintained by the BEA. Tables 1 and 2 below list the federal and state-local taxes included in the model, along with their corresponding NIPA tables.

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<sup>4</sup> Additional information about the BEA’s National Income and Product Accounts is available online at <http://bea.gov/national/nipaweb/Index.asp>.

**TABLE 1. FEDERAL TAXES INCLUDED IN THE MODEL**

<b>Federal Taxes</b>	<b>NIPA Table</b>
Federal Income Taxes	Table 3.4
Federal Payroll Tax (Contrib. for Govt. Social Insurance)	Table 3.2
Federal Corporate Income Tax	Table 3.2
Federal Customs Duties	Table 3.5
Federal Gasoline Tax	Table 3.5
Federal Estate Tax	Table 5.10
Federal Air Transport Tax	Table 3.5
Federal Diesel Fuel Tax	Table 3.5
Federal Alcohol Tax	Table 3.5
Federal Tobacco Tax	Table 3.5
Other Federal Excise Taxes	Table 3.5

Source: U.S. Bureau of Economic Analysis.

**TABLE 2. STATE-LOCAL TAXES INCLUDED IN THE MODEL**

<b>State-Local Taxes</b>	<b>NIPA Table</b>
State-Local Property Tax	Table 3.4
State-Local Income Tax	Table 3.4
State-Local General Sales Tax	Table 3.5
Other State-Local Taxes on Production and Imports	Table 3.5
State-Local Corporate Income Tax	Table 3.3
State-Local Gas Tax	Table 3.5
Other State-Local Sales Taxes	Table 3.5
State-Local Public Utilities Tax	Table 3.5
State-Local Payroll Tax (Contrib. for Govt. Social Insurance)	Table 3.3
State-Local Personal Property Tax	Table 3.4
State-Local Tobacco Tax	Table 3.5
State-Local Insurance Tax	Table 3.5
State-Local Severance Tax	Table 3.5
State-Local Business Motor Vehicles Tax	Table 3.5
State-Local Special Assessments	Table 3.5
Other Personal State-Local Taxes	Table 3.4
State-Local Alcohol Tax	Table 3.5
State-Local Estate Tax	Table 5.10

Source: U.S. Bureau of Economic Analysis.

Collections for each tax are projected through Calendar Year 2009 using official U.S. Congressional Budget Office forecasts. These aggregate collections are then allocated to family units within the matched database based on various assumptions of economic incidence and statistical allocators in the file. For a complete list of tax incidence assumptions and statistical allocators, see Tables 3 and 4 below.

### C. UNIT OF ANALYSIS AND TIME PERIOD

The basic unit of analysis in the model is “family economic units.” This measure is similar to the unit previously employed by the U.S. Treasury Department’s Office of Tax Analysis.<sup>5</sup> A family economic unit is a group of individuals that would normally file a federal tax return together, assuming that all U.S. individuals are required to file some type of tax return. This generally corresponds to the conventional definition of “family” as understood by most laypersons. The time period for the tax burden estimates is Calendar Year 2009.

### D. COMPREHENSIVE FAMILY INCOME CONCEPT

It is important for tax distribution studies to use a broad measure of household income. Because all taxes in the economy are attributed to households—including business taxes as well as personal taxes—it becomes important to also attribute to households as income all the resources in the economy that are available to pay those taxes. The comprehensive family economic income concept used in the model is a broad measure that begins with each family’s Personal Income as defined by the Bureau of Economic Analysis.<sup>6</sup> To arrive at a comprehensive income measure, we subtract any pension contributions made, add pension benefits received, add capital gains earned, and add corporate income taxes paid.<sup>7</sup>

This measure best represents the real economic resources available to households to bear total tax burdens in the economy. Whenever family tax burdens are expressed as a percentage of income, this income measure—rather than the narrower measure of cash income—is used as the denominator.

### E. TAX INCIDENCE ASSUMPTIONS

Allocating aggregate tax collections to households requires various assumptions about the economic incidence of taxes. The MyGovSpending, Inc. tax model broadly follows the economic incidence assumptions from a comprehensive 2007 study of U.S. tax burdens from the Tax Foundation.<sup>8</sup> Tables 3 and 4 present the incidence assumptions and statistical allocators used to distribute each tax to families within the core matched database.

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<sup>5</sup> See Cronin, Julie-Anne (1999), “U.S. Treasury Distributional Analysis Methodology.” U.S. Treasury *Office of Tax Analysis Paper 85*. Washington, D.C., U.S. Department of Treasury.

<sup>6</sup> BEA defines Personal Income as “[I]ncome received from participation in production as well as from government and business transfer payments.” Additional detail is available online at <http://bea.gov/glossary/glossary.cfm>.

<sup>7</sup> Corporate income taxes paid represent a portion of business income throughout the economy that is available to pay those corporate taxes, and must therefore be added to Personal Income to arrive at a comprehensive economic income measure.

<sup>8</sup> See Chamberlain, Andrew and Gerald Prante (2007), “Who Pays Taxes and Who Receives Government Spending? An Analysis of Federal, State and Local Tax and Spending Distributions, 1991-2004,” Tax Foundation *Working Paper No. 1*. Washington, D.C., Tax Foundation.

**TABLE 3. FEDERAL TAX INCIDENCE ASSUMPTIONS AND STATISTICAL ALLOCATORS**

Federal Taxes	Incidence Theory	Statistical Allocator
Individual Income Taxes	Assumed to fall on individual income earners	Federal Income Tax Liability (simulated)
Payroll Taxes (Contributions to Government Social Insurance)	Assumed to fall entirely on workers earning wages and salaries	Federal Payroll Taxes (simulated)
Corporate Income Taxes	Assumed to fall 70 percent on wages and salaries, 30 percent on owners of capital <sup>9</sup>	Business Tax Allocator (70 percent on wages and salaries, 30 percent on capital income)
Federal Excise Taxes – Gasoline	Assumed to fall on consumers of gasoline, and on all consumers in proportion to their total consumption expenditures	Fraction of national consumption for consumers borne by gasoline consumers; fraction of national consumption for business borne by all consumers
Federal Excise Taxes -- Alcoholic Beverages	Assumed to fall on consumers of alcoholic beverages	Alcoholic Beverages (CEX)
Federal Excise -- Tobacco	Assumed to fall on consumers of tobacco products	Tobacco and Smoking Related Products (CEX)
Federal Excise -- Diesel Fuel	Assumed to fall on consumers in proportion to their total consumption expenditures	Expenditures (CEX)
Federal Excise -- Air Transport	Assumed to fall on consumers of air travel, and on all consumers in proportion to their total consumption expenditures	Fraction of national consumption for consumers borne by airline consumers; fraction of national consumption for business borne by all consumers
Federal Excise -- All Other Excise Taxes	Assumed to fall on consumers in proportion to their total consumption expenditures	Expenditures (CEX)
Federal Customs Duties, etc.	Assumed to fall on consumers in proportion to their total consumption expenditures	Expenditures (CEX)
Estate and Gift Taxes	Assumed to fall on decedents	Federal Estate Tax Liability (simulated)

Source: Chamberlain Economics, L.L.C.

**TABLE 4. STATE-LOCAL TAX INCIDENCE ASSUMPTIONS AND STATISTICAL ALLOCATORS**

State and Local Taxes	Incidence Theory	Allocator
Individual Income Taxes	Assumed to fall on individual income earners	State Income Tax liability (simulated)
Corporate Income Taxes	Assumed to fall 70 percent on wages and salaries, 30 percent on owners of capital	Business Tax Allocator (70 percent on wages and salaries, 30 percent on capital income)
Personal Property Taxes	Assumed to fall on payers of personal property taxes	Other Personal Taxes (CEX)
Other State and Local Personal Taxes	Assumed to be proportional to total household money income	Household Cash Money Income (CPS)
General Sales Taxes	Assumed to fall on consumers in proportion to their expenditures on taxable goods and services	Taxable General Sales (CEX) = Expenditures Less: Food at Home, Housing (except for "Other Lodging"), Utilities, Fuels and Public Services, Gas and Motor Oil, Public Trans., Healthcare, Education, Cash Contributions, Personal Insurance and Pensions.

<sup>9</sup> Follows the empirical estimate of the economic incidence of the corporate income tax in an open economy from William Randolph, "International Burdens of the Corporate Income Tax," CBO Working Paper 2009-09 (August 2006).

State and Local Taxes	Incidence Theory	Allocator
Payroll Taxes (Contributions for Government Social Insurance)	Assumed to fall entirely on workers earning wages and salaries	Federal Payroll Taxes
Gasoline Excise Taxes	Assumed to fall on consumers of gasoline, and on all consumers in proportion to their total consumption expenditures	Fraction of national consumption for consumers borne by gasoline consumers; fraction of national consumption for business borne by all consumers
Alcoholic Beverages Excise Taxes	Assumed to fall on consumers of alcoholic beverages	Alcoholic Beverages (CEX)
Tobacco Excise Taxes	Assumed to fall on consumers of tobacco products	Tobacco and Smoking Related Products (CEX)
Public Utilities Taxes	Assumed to fall on consumers of utility services and on all consumers in proportion to their total consumption expenditures	Fraction of national consumption for consumers borne by utility consumers (CEX); fraction of national consumption for business borne by all consumers
Insurance Receipts Taxes	Assumed to fall on consumers of insurance services	Fraction of national consumption for consumers borne by insurance consumers (CEX); fraction of national consumption for business borne by all consumers
Other Selective Sales Taxes	Assumed to fall on consumers in proportion to their total consumption expenditures	Expenditures (CEX)
Motor Vehicle Licenses on Production & Imports	Assumed to fall on consumers in proportion to their total consumption expenditures	Expenditures (CEX)
Severance Taxes	Assumed to fall on consumers of energy services and on all consumers in proportion to their total consumption expenditures	Fraction of national consumption for consumers borne by energy consumers (CEX); fraction of national consumption for business borne by all consumers
Property Taxes	Assumed to fall 70 percent on wages and salaries, 30 percent on owners of capital	Business Tax Allocator (70 percent on wages and salaries, 30 percent on capital income)
Special Assessments Taxes	Assumed to fall 70 percent on wages and salaries, 30 percent on owners of capital	Business Tax Allocator (70 percent on wages and salaries, 30 percent on capital income)
Other Taxes on Production and Imports	Assumed to fall on consumers in proportion to their total consumption expenditures	Expenditures (CEX)
Estate and Gift Taxes	Assumed to fall on decedents	Federal Estate Tax Liability

Source: Chamberlain Economics, L.L.C.

Technical questions about the MyGovSpending, Inc. model may be directed to the following:

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