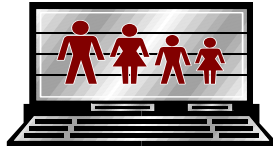




SPSD/M



Product Overview



Statistics
Canada

Statistique
Canada

Canada

Product Description

The Social Policy Simulation Database and Model (SPSD/M) is a tool designed to assist those interested in analyzing the financial interactions of governments and individuals in Canada. It can help one to assess the cost implications or income redistributive effects of changes in the personal taxation and cash transfer system. As the name implies, SPSPD/M consists of two integrated parts: a database (SPSD), and a model (SPSM). The SPSPD is a non-confidential, statistically representative database of individuals in their family context, with enough information on each individual to compute taxes paid to and cash transfers received from government. The SPSM is a static accounting model which processes each individual and family on the SPSPD, calculates taxes and transfers using legislated or proposed programs and algorithms, and reports on the results. A sophisticated software environment gives the user a high degree of control over the inputs and outputs to the model and can allow the user to modify existing programs or test proposals for entirely new programs. The model comes with full documentation including an on-line help facility.

Users and Applications

The SPSPD/M has been tested and used at more than fifty sites across Canada. These sites have diverse research interests in the area of income tax-transfer and commodity tax systems in Canada as well as varied experience in micro-simulation. Our growing client base includes federal departments, provincial governments, universities, interest groups, corporate divisions, and private consultants.

The diverse applications of the SPSPD/M can be seen in the following examples of studies and published research reports:

- Costing out proposals for amendments to the *Income Tax Act* affecting the tax treatment of seniors and the disabled
- Estimating the fiscal viability of major personal tax reform options, including three flat tax scenarios
- The comparison low income (poverty) measures and their effect on the estimates of the number of poor
- An Analysis of the Distributional Impact of the Goods and Services Tax
- Married and Unmarried Couples: The Tax Question
- Taxes and Transfers in Rural Canada
- Equivalencies in Canadian Public Policy
- When the Baby Boom Grows Old: Impact on Canada's Public Sector
- Taking Stock of Tory Tax Reform

Some potential uses of the model are illustrated by the following list of questions which may be answered using the SPSM:

- ... how large an increase in the federal Child Tax Benefit could be financed by allocating an additional \$500 million to the program?
- ... which province would have the most advantageous tax structure for an individual with \$45,000 earned income, 2 children and \$15,000 of investment income?
- ... what is the after-tax value of the major federal child support programs on a per child basis, and how are these benefits distributed across family types and income groups?
- ... how many individuals otherwise paying no tax would have to pay tax under various minimum tax systems, and what would additional government revenues be?
- ... how much money would be needed to raise all low income families and persons to Statistics Canada's low income cut-offs in 1996?
- ... how much would average household "consumable" income rise if a province eliminated its gasoline taxes?
- ... how much would federal government revenue rise by if there was an increase in the GST rate from 7% to 9%?

The Database

For the most part, microdata collected by different statistical surveys and various administrative procedures were designed for specific purposes. No one dataset from a given survey or administrative source provides a sufficiently detailed and integrated picture of Canadian households to support the analysis of costs and distributional impacts of the entire tax/transfer system as it moderates the flows of money between governments and individuals. The SPSD is the only such integrated database in Canada.

The SPSD was constructed by combining individual administrative data from personal income tax returns and unemployment claimant histories with survey data on family incomes, employment and expenditure patterns. The techniques used to create the database and avoid confidential data disclosure include various forms of categorical matching and stochastic imputation. While no one record on the database contains information for the same individual from the four bases, the database has been constructed in such a way as to provide a micro-statistically representative sample of Canadians.

Certain adjustments have been made to the data which force agreement between data and known control totals. For example, survey weights have been adjusted to ensure that the population by age and sex corresponds to Census data, and the number of high income Canadians corresponds to the number reported by Canada Revenue Agency. Further adjustments have been made to compensate for item non-response in the surveys (e.g. to increase the number of families receiving social assistance). It should be noted that the SPSD coverage does not extend to the Yukon, the Nunavut or Northwest Territories, persons residing on reservations, or armed forces personnel residing in barracks.

Also included in the SPSD package are effective tax rates, including sales taxes, derived from data from Statistics Canada's Input/Output tables. These rates support the commodity tax model which facilitates the analysis of changes in commodity taxes on Canadian households and individuals.

Database Highlights

- Data for more than 200,000 composite individuals residing in over 80,000 households in ten Canadian provinces.
- Preserves the confidentiality of individual information without compromising statistical validity.
- Approximately 600 variables covering detailed socio-economic and demographic data as well as information on weekly employment histories, expenditure patterns and itemized tax deductions.
- Full family structure for each individual on the database allows one to identify the familial relationships between all household members.
- A series of weight files and growth parameters allow analysts to use the database to represent the population of other years.

Micro Data Sources

- Survey of Labour and Income Dynamics (SLID)
 - detailed information on income, family structure
 - Sample of over 70,000 individuals within 30,000 households
- Personal Income Tax Returns (GREENBOOK)
 - detailed distributions derived from over 400,000 records
 - synthetic information on high income Canadians to supplement SLID
 - over fifty deduction/tax credit items for each synthetic individual
- EI Claimant History Data
 - 200,000 individuals; over 250,000 claims
 - Human Resources Development Canada administrative claim data
 - Benefit type, duration, phase, and repeater status
- Survey of Household Spending (SHS)
 - Household expenditure data for 48 categories (coinciding with I/O concepts)
 - 15,000 households

SPSD Selected List of Variables

Household Structure

Household Weight
Household Type
Relationship to Household Head
Relationship to Economic Family Head
Relationship to Census Family Head

Income - Market

Employment Earnings
Self-employment, Non-farm Earnings
Self-employment, Farm Earnings
Retirement Pension Income
Other Income
Interest and Other Investment Income
Dividend Income
Capital Gains/Losses

Income - Transfers

Family Allowances/Child Tax Benefit
Old Age Security Benefits (OAS)
Guaranteed Income Supplement Benefits
Spouse's Allowance Benefits
Provincial GIS Top-ups
Canada/Quebec Pension Plan
Other Transfers
Social Assistance Income
Unemployment Insurance/Employment Insurance Benefits
Worker's Compensation Benefits

Tax Credits

Child Tax Credit
Federal Political Contribution
Investment Tax Credit
Labour-sponsored Funds
Provincial Tax Credits

Income/Payroll Taxes

UI/EI Contributions
CPP/QPP Contributions
Federal Income Taxes
Provincial Income Taxes

Housing Characteristics

Tenure (including institutionalized)

Commodity Taxes

Federal Custom Import Duties
Federal Excise Taxes and Duties
Federal GST
Total Federal Commodity Taxes
Provincial Liquor Gallonage Taxes
Provincial Profits on Liquor Commissions
Provincial Gasoline Tax
Provincial Amusement Tax
Provincial Tobacco Tax
Provincial Retail Sales Tax

Total Provincial Commodity Taxes

Individual Social Characteristics

Province
Urbanization
Age
Sex
Marital Status
Occupation
Industry of Occupation
Years Since Immigration
Labour Force Status (Last Week)
Level of Education
School Type
Educational Status
Weeks Worked Last Year
Weeks Unemployed Last Year
Last Year Full Time, Part Time

Income Components - Deductions

RPP Contributions
RRSP Contributions
Professional and Union Dues
Child Care Expenses
Alimony Paid
Business Investment Losses
Moving Expenses
Carrying Charges
Exploration and Development Expenses
Employee Home Relocation Deduction
Stock Option and Shares Deductions
Limited Partnership Losses
Non-Capital Losses of Other Years
Other Deductions
Capital Gains Deduction
Northern Residents Deductions
Allowable Employment Expenses

Household Expenditures

Food and Non-Alcoholic Beverages
Alcoholic Beverages
Tobacco Products
Men's and Boy's Clothing
Women's and Children's Clothing
Footwear
Gross Imputed Rent
Gross Paid Rent
Electricity
Natural Gas
Other Fuels
Furniture and Floor Covering
Household Appliances
Semi-Durable Household Furnishings
Non-Durable Household Supplies
Domestic and Child Care Services
Medical Care
Hospital Care and the Like
Drugs and Pharmaceutical Products
New and Used Motor Vehicles
Motor Vehicle Parts and Accessories

Motor Vehicle Repairs
Motor Fuels and Lubricants
Other (Motor Vehicle) Related Services
Purchased Transportation
Communications
Recreation, Sports and Camping Equipment
Recreation Equipment Repair and Rentals
Reading and Entertainment Supplies
Recreational Services
Educational and Cultural Services
Jewelry and Watches
Toilet Articles, Cosmetics, etc.
Personal Care
Restaurants and Accommodation Services
Repairs Paid
Real Estate Commissions
Registration and License Fees
Household Savings
Net Change in Assets/Liabilities
Household Expenditures Net of Taxes

Non-Refundable Tax Credits

Basic Personal Amount
Age Amount
Married Amount
Amounts for Dependent Children
Medical Expense Deduction Allowed
Pension Income
Disability Deduction
Tuition Fees - self
Education Amount - self
Tuition Fees and Education Amount Transferred from Child
Amount Transferred from Spouse
Interest Paid on Student Loans
Caregiver Amount
Charitable Donations
Gifts to Canada/Provinces

EI Claim Data (EI Claimants Only)

Claim Type
Insurable Weekly Earnings
Effective Weekly Rate
Weeks on EI in Last Five Years Before Claim
Repeat Claim Flag
Week Claim Established
Weeks of Benefits
Weeks of Work Prior to Claim
Benefits Paid in Calendar Year
Local Unemployment Rate
Exhaustee Flag
Weeks of Training Benefits
Training Benefit Weekly Rate
Benefits Paid on Claim
Received Parental Benefits
Weeks of Past EI Benefits
New Entrant Re-Entrant Flag
Modeled Insurable Weekly Earnings

The Model Algorithms

The SPSD/M comes with the necessary algorithms and parameters to simulate over 20 years of the Canadian tax/transfer system.

The central program, the SPSM, is a micro-simulation based model which calculates taxes and transfers for individuals and families as appropriate. These calculations are performed for everyone on the SPSD and then aggregated to obtain estimates. The SPSM is a static impact model and is therefore not intended to simulate how an individual's behaviour is likely to change in response to various policy options. A second program, the commodity tax model (COMTAX) is a macro-economic Input/Output based model. COMTAX is intended to provide estimates of effective federal and provincial tax rates by province and commodity type. This model is required because many commodity taxes are levied at intermediate stages of production, not at the final retail stage. Rates calculated by the COMTAX model can be input as parameters into the SPSM to obtain estimates of the commodity taxes paid by any given household.

The SPSM is driven by over 1,000 parameters that control three main processes. Control parameters specify input and output files for a specific model run and are used to activate model software facilities. Database adjustment parameters control the inflation or deflation of money items on the database. Tax/transfer parameters control the specific functioning of the tax and transfer programs. Perusing the included lists of the tax/transfer parameters can give the user a feel for the scope of options available in the tax/transfer algorithms.

The SPSM is written and compiled using the C++ programming language. Changes to the tax/transfer system can be made in two distinct ways: the "black-box" or the "glass box" mode. When using the model in the black-box mode, changes to one or more parameters are specified during a user-friendly dialogue. In this mode the user can change levels and rates affecting various benefits, taxes, and eligibility requirements, and can also specify the population that will be modeled. Most applications are developed using this black-box mode. The glass-box mode is designed for use by persons who wish to develop entirely new algorithms or adjust existing algorithms. Glass-box users can write a new, (or modify an existing) algorithm in the C++ programming language and then recompile the complete system using a simple one word command. The user need not be a C++ language expert in order to use the model in glass-box mode, but should be experienced with some high level computer language. The user requires Microsoft C++ to use the model in glass-box mode.

A set of database adjustment algorithms are included with the model. These algorithms allow the user to "grow" the money items on the current database to some future or past year. The user can select a series of growth rates which are then applied by the model. For most variables a set of province specific growth rates are applied. However for certain important or complex variables more complicated rates are applied. For example, employment earnings are grown by rates specific to the province of employment and sex of the individual. These algorithms can be used independently of or in conjunction with alternate yearly demographic weights included with the database.

In the historical time period, the growth factors reproduce, on a provincial basis, the growth of the conceptually closest benchmark series in the System of National Accounts (SNA). In future years, the growth factors reproduce the growth seen in an average of public and private sector forecasts at a Canada level.

Model Algorithm Highlights

Personal Income Taxes

- Taxation algorithms to represent more than 20 tax years
- Major deduction/tax credit items
- Payroll deductions (CPP/QPP, UI/EI contributions)
- Provincial tax algorithms (Tax on Tax and Tax on Income)

Cash Transfers

- Unemployment/Employment Insurance Benefits
 - Detailed treatment of eligibility and benefits by:
 - type (regular, maternity, fishing, sickness, parental) and
 - phase (regular, labour force extended, regional extended)
- Old Age Security benefits including partial benefits
- Guaranteed income supplement benefits including partial benefits
- Provincial GIS supplement programs
- Child Tax Credit and Child Tax Benefit
- Goods and Services Tax Credit
- Provincial tax credit programs

Database Adjustment Algorithms

- Scaling available for all income and expenditure variables by province
- Wages and Salaries by province and sex
- CPP/QPP Income by age

Commodity Tax Model

- Ten different tax types accounted for including:
 - Federal Custom Import Duties
 - Federal Goods and Services Tax
 - Provincial profits on liquor commissions and liquor gallonage tax
 - Federal Excise Taxes and Duties
 - Provincial Amusement Taxes
 - Provincial Gasoline Taxes
 - Provincial Retail Sales Taxes
 - Provincial Tobacco Taxes
- Determination of expenditures net of "original" taxes

Selected Parameters Controlling Government Transfer Algorithms

Employment Insurance

- EI contribution rate on earnings
- Maximum insurable earnings
- Minimum waiting period all claims
- Maximum number of weeks - regular
- Maximum number of weeks - maternity
- Maximum duration of a UI claim
- UI reform option

Benefit Rates

- Benefit rate for basic phase
- Benefit rate for quitters in basic phase
- Benefit rate for labour force extended phase
- Benefit rate for regional extended phase

Repayment (through tax system)

- UI benefit recovery base amount factor
- UI benefit recovery portion

Federal Goods and Services Tax Credit

- GST credit amount for filer
- GST credit amount
- GST credit reduction rate
- GST additional credit amount
- GST additional credit rate of net income

Federal Child Tax Credit

- Child tax credit option
- Child tax credit per child
- Family income child tax credit turndown
- Child tax credit reduction rate
- Child tax credit SA income inclusion flag

Federal Child Tax Benefit

- Basic child benefit (per child)
- Child care expense reduction rate
- Federal child benefits family income turndown
- Family income reduction rate
- Child benefits earned income supplement rate
- Child benefits earning supplement reduction rate
- Child benefits earned income supplement
- Child benefits earning supplement cut-in level
- Child benefits earning supplement turndown level
- Flag for WIS dependent on number of children
- Earnings where WIS phase-in is at maximum
- Enriched WIS for each children
- WIS reduction rate for families with children
- Deflator to calculate previous year income

Old Age Security (OAS)/

Guaranteed Income Supplement (GIS)

- Old age security flag
- OAS take-back phase in
- Basic OAS
- OAS reduction rate
- Family income OAS turndown
- Federal GIS/SPA/ESPA flag
- Basic GIS supplement - single
- Basic GIS supplement - married
- Basic GIS portion of extended SPA
- CPI deflator to calculate previous year income
- Basic GIS reduction level: single pensioners
- Basic GIS reduction level: married pensioners
- SPA reduction point: one married/widowed
- Basic GIS reduction rate: single pensioners
- Basic GIS reduction rate: married pensioners
- OAS portion of SPA taxback rate
- Take-up Rates by Income Group
- GIS take-up rate: single pensioner
- GIS take-up rate: pensioner couple
- GIS take-up rate: one pensioner couple
- SPA take-up rate by income group
- Extended SPA take-up rate by income group

Provincial GIS Supplementation Programs

- Provincial GIS top-up flag
- Ontario GIS supplement: single pensioners
- Ontario GIS supplement: married pensioners
- Manitoba GIS supplement: single pensioners
- Manitoba GIS supplement reduction point: single
- Saskatchewan GIS supplement: single pensioners
- Alberta GIS supplement maximum annual benefit
- Alberta widow's pension maximum annual benefit
- British Columbia GIS supplement: single
- British Columbia GIS supplement married

Social Assistance Parameters

- SA for elderly calculation method
- Federal social assistance flag
- Proportion of federal social assistance to eliminate
- Federal share of social assistance

Selected Parameters Controlling Federal Personal Tax and Commodity Tax Algorithms

Calculation of Total Income

- Capital gains inclusion rate
- Federal dividend gross-up rate

Deductions from Total Income

- Employment Expense Deduction
- Child Care Expense Deduction

Non-refundable Tax Credits

- Basic Personal Amount
- Age Amount
- Married Amount
- Married Equivalent Amount
- Pension Income Amount
- Caregiver Amount
- CPP/QPP Contributions
- Employment Insurance Contributions
- Medical Expenses
- Interest on Student Loans Amount
- Tuition and Education Amounts
- Charitable Donation Amount

Deductions from Net Income

Capital Gains Deduction

Federal Taxes

- Federal tax table
- Federal non-refundable tax credit rate
- Federal dividend tax credit rate
- Federal Surtax
- Federal Tax Reduction
- Federal Alternate Minimum Tax
- Quebec Tax Abatement

Commodity Taxes

- Federal custom import duties
- Federal excise duties
- Federal goods and services tax
- Federal excise taxes
- Provincial liquor gallonage tax
- Provincial profits on liquor commissions
- Provincial gasoline tax
- Provincial amusement tax
- Provincial tobacco tax
- Provincial retail sales tax

Selected Parameters for Provincial Tax Algorithms

Parameters Common to all Provinces

(excluding Quebec)

- Provincial tax fraction
- Provincial tax on taxable income table
- Provincial alternative minimum tax
- Provincial dividend tax credit
- Provincial non-refundable tax credits
 - Basic Personal Amount
 - Age Amount
 - Married Amount
 - Married Equivalent Amount
 - Pension Income Amount
 - Caregiver Amount
 - CPP/QPP Contributions
 - Employment Insurance Contributions
 - Medical Expenses
 - Interest on Student Loans Amount
 - Tuition and Education Amounts
 - Charitable Donation Amount

Newfoundland

- Sales Tax Credit
- Political Contribution tax credit
- Provincial surtax
- Low-income tax reduction
- Labour-sponsored funds tax credit

Prince Edward Island

- Political contribution tax credit
- Provincial surtax
- Low-income tax reduction
- Labour-sponsored funds tax credit

Nova Scotia

- Political Contribution tax credit
- Provincial surtax
- Low-income tax reduction
- Labour-sponsored funds tax credit

New Brunswick

- Political Contribution tax credit
- Provincial surtax
- Low-income tax reduction
- Labour-sponsored funds tax credit

Quebec

- Child care expenses
- Living alone exemption/amount
- Disability deduction/amount
- Income tax table
- Dividend tax credit
- Quebec sales tax credit
- Child Assistance refundable tax credit
- Work Premium refundable tax credit
- Basic Personal Amount
- Age Amount
- Married Amount
- Married Equivalent Amount
- Pension Income Amount
- CPP/QPP Contributions
- Employment Insurance Contributions
- Interest on Student Loans Amount
- Tuition and Education Amounts
- Charitable Donation Amount
- Premium payable under the Quebec prescription drug insurance plan
- Tax credit respecting the housing of a parent
- Property tax credit
- Political contribution tax credit
- Medical expense tax credit
- Alternative Minimum Tax
- Contribution to the Health Services Fund

Ontario

- Political Contribution tax credit
- Provincial surtax
- Tax reduction
- Labour-sponsored funds tax credit
- Property tax credit
- Seniors property tax credit
- Sales tax credit
- Seniors sales tax credit
- Ontario Health Premium

Manitoba

- Political Contribution tax credit
- Provincial surtax
- Tax reduction
- Labour-sponsored funds tax credit
- Personal tax credit
- Property tax credit

Saskatchewan

- Political Contribution tax credit
- Provincial surtax
- Tax reduction
- Labour-sponsored funds tax credit
- Sales tax credit

Alberta

- Political Contribution tax credit
- Provincial surtax
- Tax reduction
- Labour-sponsored funds tax credit
- Sales tax credit
- Alberta Health Care Insurance Plan premium

British Columbia

- Political Contribution tax credit
- Provincial surtax
- Tax reduction
- Labour-sponsored funds tax credit
- Sales tax credit
- British Columbia Medical Services Plan premium

The Model Software

The SPSD/M comes with a powerful software support environment designed to enhance the range, speed and ease of policy analysis in both black-box and glass-box modes of use. The comprehensive and flexible set of outputs allow for detailed verification of algorithms and results. The software has been designed to work in an integrated fashion at many different family levels (e.g. household, census family, individual,etc.). A user-friendly interface allows the analyst to view and modify parameters, run simulations and examine results. An on-line help facility provides information on the use of the model dialogue as well as a handy reference to variable and parameter descriptions and lists. Some highlights of the model software are given below.

- A generalized expression facility allows the user to create new variables.
- The user can specify a database subset in terms of any combination of database or modeled variables (e.g. all Ontarians with income below \$40,000).
- Marginal tax rate analyses can be performed in a single execution of the model.
- Two distinct tax/transfer systems can be run simultaneously. Base and variant runs may be differentiated on the basis of parameter inputs, alternate algorithms (glass-box), or both.
- Comprehensive set of default tables includes dollar amounts and persons reporting for over 40 variables with breakdowns by province, income class, family type, and proportion above or below specified income levels.
- Built-in custom tabulation routines allow users to specify custom n-dimensional tables with database, model, or user defined variables and statistics. The user is given full control over formats, precision and labeling of the tables.
- Database output interfaces allow the user to create custom files in compressed binary format, ASCII format or as a documented SAS file. These files are for subsequent analysis using the SPSM or other software packages and may contain any database or modeled variables.
- Performance has been given high priority but varies depending on the hardware environment, the simulation request, and the types of output specified. A full model run can be performed in under 10 seconds on the fastest class of Pentium microcomputers. The SPSM can be run in batch mode to allow a series of simulations to run unattended.

Documentation

The documentation for the SPSD/M is necessarily extensive due to the complex nature of the database and model. The majority of the documentation is of a reference nature providing definitions of parameters and variables or descriptions of algorithms and programs. The documentation is written and organized in such a way as to provide the analyst first with a conceptual and functional understanding of the product and its use, and then where to find and how to use the detailed operational specifications included in the manuals. The documentation is consequently organized into fourteen separate guides and grouped into three volumes as follows:

Introduction Manual

Introduction and Overview	Basic concepts and tutorial examples
How to Run the SPSM	Description of the operation of the SPSM
Addendum	Modifications since the last version
How to Use SPSD/M Help	Information relating to the use of the on-line help facility

SPSD/M User's Manual

Commodity Tax User's Guide	Description and utilization of the commodity tax (COMTAX) Input/Output model
SPSM User's Guide	Reference manual for black-box use
X-tab User's Guide	Reference manual and tutorial
SPSM Programmer's Guide	Reference manual for glass-box use
Growth and Validation Guide	Reference for Aging and Benchmarking SPSD/M
Tools User's Guide	How to use various included software aids

SPSD/M Reference Manual

Algorithm Guide	Description of the tax/social programs and their specific implementation in the SPSM
Parameter Guide	Detailed descriptions of all parameters
Variable Guide	Detailed description of all variables
Database Creation Guide	Detailed description of the creation and contents of the database

Package Contents and Ordering Details

Full SPSD/M

Cost: \$5,000 for a Basic Licence
\$12,500 for a Site Licence

A basic licence includes the current database, software and documentation plus all updates during the product cycle. A new cycle begins with the creation of a new SPSD (database) based on the most recent data (every one to two years). For the basic licence, the product may only be used on one computer at a time by one person at a time. Only backup copies are permitted. The product may be used for socio-economic or policy research and statistical or policy analysis for all purposes including, but not limited to teaching, consulting, publication and training.

A site is defined as a corporation, organization, federal department or provincial government. A site licence allows the product to be freely copied to any computer at a given site and may be used by any number of persons at that site.

Educational institutions can access the SPSD/M through the library under Data Liberation Initiative (DLI).

Contents: 1 CD-ROM (current model version)
Full On-line documentation
Price does not include consultation or training.

System Requirements: Windows 2000 or XP compatible microcomputer
(Users of other operating systems should contact the SPSD/M team for more details)
Minimum 240 megabytes free on your hard disk
For access to “Glass Box”, Visual C++ is needed

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