OFFICE OF THE PARLIAMENTARY BUDGET OFFICER
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BUREAU DU DIRECTEUR PARLEMENTAIRE DU BUDGET

# Personal Income Tax Tool User Guide

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**Key points:**

- The revenue impact arising from changes to federal tax rates, credits and brackets are among the most common questions posed by parliamentarians. The Parliamentary Budget Officer (PBO) annually prepares a reference table of the indicative revenue impacts arising from various changes to tax rates, brackets and benefits in the federal tax system.

- To supplement this work, the PBO has developed an online tax tool to allow for user-controlled hypothetical tax scenarios. The tool is intended to provide a starting point for parliamentarians to broadly estimate the revenue and distribution impacts of adjustments to the federal tax system.

- This document provides an overview of the tax tool's basic functionality and details the methods by which the estimates are generated. Users interested in more detailed analysis, or an investigation of another type of tax structure change, can refer to the Statistic Canada's free Social Policy Simulation Database and Model (SPSD/M).

**Prepared by:** Duncan MacDonald and Trevor Shaw*

* Please contact Mostafa Askari (mostafa.askari@parl.gc.ca) for further information.

## Overview

The Parliamentary Budget Officer (PBO) frequently receives requests pertaining to the potential revenue impacts arising from adjustments to the federal tax system.

In response to these requests, the PBO has developed an online tool to estimate the potential revenue and distribution impacts to the federal treasury that would arise from adjusting various tax brackets and rates during the 2014 calendar year.

PBO tax tool estimates of personal income tax (PIT) changes account for both primary and secondary effects of tax changes on federal revenue. Primary effects include the increase (decrease) in PIT revenue associated with a PIT rate or threshold change.

Secondary effects account for GST/HST revenues generated (lost) from individuals' expenditure of after-tax gains (losses) from a PIT change, as well as changes in taxable income resulting from taxpayer behavioural response. Stimulative or contractionary macroeconomic impacts of tax changes are not accounted for beyond the primary and secondary effects stated above.

Users can adjust the sliders or arrow keys on the bottom of the application to specify a hypothetical tax structure. Calculations are derived for both the current tax structure and the user defined hypothetical tax structure. A heat map will display the difference between the current and hypothetical scenarios, indicating the increase (or decrease) in tax revenue to be collected from each respective income and age group. Totals can be seen by clicking on the heat map cells. Figures can be estimated on an aggregate or per person basis.

## Model

These estimates are developed using the Statistics Canada Social Policy Simulation Database and Model (SPSD/M v. 21) and PBO calculations.[1]

The database draws upon four micro data sources[2]:

- Survey of Labour and Income Dynamics,
- Personal Income Tax Returns, 2009 tax year,
- Survey of Household Spending, and,
- Employment Insurance Claimant History Data.

The database is statistically representative of the personal income and commodity tax base.[3,4,5,6,7]

All projections are based on the 2009 tax year and scaled in SPSD/M to actual or PBO-projected nominal gross domestic product (GDP) levels. Gross domestic product data are available from Statistics Canada and projections are summarized in the PBO Economic and Fiscal Outlook 2014.[8,9]

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[1] http://www.statcan.gc.ca/microsimulation/spsdm-bdmsps/spsdm-bdmsps-eng.htm. Accessed June 2014.
[2] http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3889. Accessed June 2014.
[3] Personal income tax base is comprised of income from employment, old age security, CPP, dividends, self-employment and other sources. Details are provided on the Canada Revenue Agency website. http://www.cra-arc.gc.ca/E/pbg/tf/5006-r/5006-r-13e.pdf. Accessed June 2014.
[4] http://www.cra-arc.gc.ca/tx/bsnss/tpcs/gst-tps/gnrl/txbl/xmptgds-eng.html. Accessed June 2014.
[5] GST/HST rates, zero-rated supplies and exempt supplies are summarized on the Canada Revenue Agency website. http://www.cra-arc.gc.ca/tx/bsnss/tpcs/gst-tps/gnrl/txbl/txblxmpt-eng.html. Accessed June 2014.
[6] http://www.statcan.gc.ca/concepts/definitions/pers-eng.htm. Accessed June 2014.
[7] http://www.statcan.gc.ca/microsimulation/spsdm-bdmsps/overview-vuedensemble-02-eng.htm. Accessed June 2014.
[8] http://www5.statcan.gc.ca/cansim/a45?lang=eng&CORId=3764. Accessed June 2014.

The SPSD/M is a static accounting model, which estimates the primary effect a tax regime change has on government revenue, assuming that no actors in the economy change their behaviour in response to a tax change. Behavioural response effects are estimated using SPSD/M estimates and PBO calculations.

**Tax Rates and Bracket Thresholds**

Users can adjust any or all of the four personal tax rates, as well as the corresponding tax bracket thresholds.

The tax tool default settings reflect the 2014 federal tax rate structure:[10]

- 15% on the first $43,953 of taxable income,
- 22% on the portion of taxable income over $43,953 up to $87,907,
- 26% on the portion of taxable income over $87,907 up to $136,270, and,
- 29% of taxable income over $136,270.

The rate on federal non-refundable tax credits is based on the lowest federal tax rate (currently 15%). Where users generate a change in the lowest tax rate, tax tool estimates automatically account for an equal and corresponding change to the rate on non-refundable tax credits.

**Elasticity of Taxable Income**

Users also have an option to adjust the assumed elasticity of taxable income (ETI).[11]

This parameter accounts for taxpayers' behavioural response to a change in their marginal effective rate.

Taxation changes may cause individuals to change their behaviour by choosing to work more (or fewer) hours, reallocate resources between potential income sources or alter tax avoidance strategies. Individuals' behavioural reaction to a new tax brings into question the prospective size of the tax base and hence, anticipated government revenues.[12] Recently, estimates of the fiscal impacts of tax policies have increasingly incorporated behaviour response, in Canada and in other jurisdictions.[13,14,15,16,17,18]

The default setting in the PBO tax tool is an ETI = 0.2. Elasticity less than 0.2 would imply less responsiveness, generally resulting in larger estimates of the government's net revenue loss (gain) resulting from a tax reduction (increase). Alternatively, elasticity higher than 0.2 would imply greater responsiveness to

[9] http://www.pbo-dpb.gc.ca/files/files/EFO2014_EN.pdf. Accessed June 2014.
[10] http://www.cra-arc.gc.ca/tx/ndvdls/fq/txrts-eng.html. Accessed June 2014.

[11] Taxable income, as defined on line 260 of the CRA T1 form. http://www.cra-arc.gc.ca/E/pbg/tf/5006-r/5006-r-13e.pdf. Accessed June 2014.
[12] Other tax bases, such as consumption (GST/HST) or investment income may also be affected by behavioural changes. Additionally, economic effects may result from increased (decreased) labour input in real economy.
[13] http://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/99xx/doc9917/2008-11.pdf. Accessed June 2014.
[14] http://www.cbo.gov/sites/default/files/cbofiles/attachments/43334-TaxElasticityCapGains.pdf. Accessed June 2014.
[15] http://www.ifs.org.uk/bns/bn84.pdf. Accessed June 2014.
[16] Canadian Centre for Policy Alternatives, Alternative Federal Budget 2014. https://www.policyalternatives.ca/sites/default/files/uploads/publications/National%20Office/2014/02/AFB2014_MainDocument.pdf. Accessed June 2014.
[17] http://www.cdhowe.org/pdf/Working_Paper_324.pdf. Accessed June 2014.
[18] http://www.cdhowe.org/pdf/e-brief_155.pdf. Accessed June 2014.

change and will generally lead to lower net revenue loss (gain) estimates for a tax reduction (increase).

The PBO's preferred estimate of ETI is drawn from three studies of the tax-induced behavioural response of individual taxpayers in Canada:

- Sillamaa and Veall[19]
- Saez and Veall[20]
- Finance Canada[21]

Each examination found the ETI on personal income in Canada to be between 0.2 and 0.25. These measurements are approximations, so the PBO tax tool permits users to alter the ETI to observe the sensitivity of results to various ETI rates.

Estimates commonly cited in key federal government budgeting documents generally use static tax estimation (ETI=0.0). This includes the federal Budget, the Update of Economic and Fiscal Projections, and Finance Canada's Tax Expenditures and Evaluations.[22]

**Box 1**

**Elasticity of Taxable Income and Behavioural Response Impact on the Taxable Income Base**

The elasticity of taxable income (ETI) follows the standard economic definition of elasticity, measuring the per cent change in reported income when the net-of-tax rate increases by 1 per cent.

$$ETI = \frac{(1-t)}{y} \times \frac{\Delta y}{\Delta t}$$

Alternatively,

$$\Delta y = ETI \times \frac{y}{(1-t)} \times \Delta t$$

Where,

$y$= taxable income;
$\Delta y$= change in taxable income resulting from a tax change;
$t$= effective marginal tax rate;
$\Delta t$= change in effective marginal tax rate resulting from a tax change.

Sources: Office of the Parliamentary Budget Officer, Saez, E., J. Slemrod and S.H. Giertz, The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review, Journal of Economic Literature 2012, 50:1, 3-50.

[19] Sillamaa, M.A. and M. Veall, The effect of marginal tax rates on taxable income: a panel study of the 1988 tax flattening in Canada. Journal of Public Economics 80(3), June 2001, 341-356. http://ideas.repec.org/a/eee/pubeco/v80y2001i3p341-356.html#biblio. Accessed June 2014.

[20] Saez, E. and M. Veall, The Evolution of High Incomes in North America: Lessons from Canadian Evidence, The American Economic Review, 95(3), June 2005, 831-849. http://elsa.berkeley.edu/~saez/saez-veallAER05canada.pdf. Accessed June 2014.

[21] Finance Canada, *Tax Expenditures and Evaluations 2010*. https://www.fin.gc.ca/taxexp-depfisc/2010/TEE2010_eng.pdf. Accessed May 2014.

[22] The 'no behavioural impact' assumption is noted as a caveat in Finance Canada projections, and described as an assumption that is unlikely to be true in practice in some cases.

**Tax Change Interactions**

The estimated interaction between tax measures captures the effect a change in one tax measure has on the fiscal cost of another change (and vice versa), when introduced to (or removed from) the tax system simultaneously.

For example, an isolated decrease in the personal income tax rate will have a negative fiscal impact, as will an isolated increase in the maximum thresholds for each personal income tax bracket. However, when both tax measures are changed simultaneously, the 'new' higher bracket thresholds will reduce a portion of the negative fiscal costs of a PIT rate change.

The PBO tax tool estimates account for these interaction effects, including multiple, simultaneous parameter changes. However, revenue impacts of various combinations become increasingly difficult to approximate where there are many deviations from the status quo tax structure. For scenarios which greatly deviate from the tax tool's default settings, users should exercise caution in interpreting the results. Tax tool estimates are meant to be indicative, particularly when multiple tax parameter changes are estimated.