

“Stealth Tax Rates”: Effective Versus Statutory Personal Marginal Tax Rates

—————Alan Macnaughton, Thomas Matthews, and Jeffrey Pittman*

PRÉCIS

Le taux marginal d'imposition d'un particulier prévu par la loi comprend le taux marginal fédéral approprié de l'article 117 (soit 17 pour cent, 26 pour cent ou 29 pour cent), la surtaxe fédérale, le taux provincial sur l'impôt fédéral de base, et les surtaxes et impôts uniformes qui s'appliquent au niveau provincial. Les dispositions de réduction progressive de crédits d'impôt et de récupération de prestations dans le cadre de certains programmes sociaux peuvent créer une différence entre ce taux et le taux d'imposition réel du particulier. Ce dernier taux mesure l'effet qu'un changement dans le revenu d'un individu exerce sur les paiements nets que sa famille verse au gouvernement (impôts payés moins paiements de transfert reçus).

Cet article a pour but de procéder à une analyse des taux marginaux d'impôt réels au Canada semblable à une étude entreprise récemment par le comité mixte sur la fiscalité aux États-Unis. Plutôt que d'étudier des profils fiscaux représentatifs, cette analyse se sert d'une base de données fiscales provenant de Statistique Canada qui contient des informations sur 200,000 individus, c'est-à-dire la Base de données et modèle de simulation de politique sociale.

Nous avons classé dix-neuf sources de différences entre les taux réels et ceux prévus par la loi en termes de leur effet sur les taux marginaux d'impôt réels au Canada. La disposition de récupération du supplément de revenu garanti se trouve au premier rang. Nous avons constaté également que 16,6 millions de Canadiens, soit 56 pour cent de la population, connaissent au moins une certaine

* Of the School of Accountancy, University of Waterloo. This analysis is based on Statistics Canada's Social Policy Simulation Database and Model. The assumptions and calculations underlying the simulation results were prepared by the authors, and the responsibility for the use and interpretation of these data is entirely theirs. Alan Macnaughton gratefully acknowledges financial support from KPMG and the Deloitte & Touche Centre for Tax Education and Research at the University of Waterloo. Helpful comments were received from Chantal Hicks and Brian Murphy of Statistics Canada, Jon Kesselman, and Doug Christie, and from participants at the Second Biennial Canadian Tax Education and Research Conference held at Wilfrid Laurier University in July 1998.

différence entre leur taux marginal d'imposition réel et celui prévu par la loi. Pour plus d'un cinquième de la population, cette différence atteint au moins 10 points de pourcentage; la part de la population touchée est particulièrement élevée au Québec. En nous basant sur l'étude du comité mixte des États-Unis, ces chiffres semblent plus élevés que ceux que l'on a obtenus dans le cas des contribuables américains. Les taux d'impôt réels élevés se retrouvent surtout parmi ceux qui sont dans la tranche d'imposition de 17 pour cent prévus par le gouvernement fédéral; il y a plus de contribuables dont le taux réel dépasse 45 pour cent dans cette tranche d'imposition que dans la tranche soi-disant supérieure de 31,32 pour cent. Près d'un million de Canadiens, dont deux tiers sont des personnes âgées, ont un taux marginal d'impôt réel de 60 pour cent ou plus.

ABSTRACT

An individual's statutory marginal tax rate is the widely publicized rate consisting of the relevant section 117 federal marginal rate (17 percent, 26 percent, or 29 percent), the federal surtax, the provincial rate on basic federal tax, and provincial surtaxes and flat taxes. Tax credit phaseouts and benefit reduction rates under government transfer payments can create a difference between this rate and an individual's effective marginal tax rate. This latter rate measures the effect that a change in an individual's income has on his or her family's net payments to government (taxes paid less transfer payments received).

The purpose of this article is to perform an analysis of effective marginal tax rates in Canada similar to a recent study by the Joint Committee on Taxation in the United States. Instead of studying hypothetical "typical" individuals, this study uses a database of tax information on 200,000 individuals from Statistics Canada, the Social Policy Simulation Database and Model.

Nineteen separate sources of differences between effective and statutory rates are ranked in terms of their impact on effective marginal tax rates in Canada, with the benefit reduction under the guaranteed income supplement heading the list. It is also found that 16.6 million Canadians, or 56 percent of the population, experience at least some difference between effective and statutory marginal tax rates. More than one-fifth of the population has at least a 10 percentage point difference. The proportion affected is particularly high in Quebec. On the basis of the joint committee's study, these figures appear to be higher than those calculated for individual taxpayers in the United States. High effective tax rates are concentrated in the 17 percent federal statutory rate bracket; more taxpayers with effective rates above 45 percent come from this bracket than from the supposedly "top" bracket of 31.32 percent. Almost 1 million Canadians, two-thirds of whom are seniors, have an effective marginal tax rate of 60 percent or more.

INTRODUCTION

In February 1998, the US Congress's Joint Committee on Taxation published a study on marginal income tax rates for individuals.¹ The conclusion, as stated in a press release by Bill Archer, chair of the House Committee on Ways and Means, was that "33 million taxpayers [one-quarter of the total] pay higher marginal taxes than they thought because of twenty-one provisions in the tax code that phase out deductions, credits and other benefits."² These provisions have drawn criticism as "phantom tax rates," "hidden tax rates," "stealth tax rates," or even "sneak-attack tax hikes"; in more academic terms, they have been described as "far from transparent" or "low visibility" elements of the tax rate structure.³ Other lines of criticism have focused on adverse effects on tax complexity, horizontal equity, and the incentive to work and save, although the provisions have also been defended as necessary to achieve a more progressive distribution of benefits for a given revenue cost.⁴

More formally, the situations addressed in the joint committee study are those in which a taxpayer's effective marginal tax rate differs from

¹ United States, Joint Committee on Taxation, *Present Law and Analysis Relating to Individual Effective Marginal Tax Rates*, JCS-3-98, February 3, 1998 (Washington, DC: US Government Printing Office, 1998). Other research on effective marginal tax rates includes the following: Thomas Barthold, Thomas Koerner, and John Navratil, "Effective Marginal Tax Rates Under the Federal Individual Income Tax: Death by One Thousand Pin Pricks?" (September 1998), 51 *National Tax Journal* 553-64; Ann Harding and Josh Pollette, "The Price of Means-Tested Transfers: Effective Marginal Tax Rates in Australia in 1994" (1995), *Australian Economic Review* 100-6; Stacy Dickert, Scott Houser, and John Karl Scholz, "Taxes and the Poor: A Microsimulation Study of Implicit and Explicit Taxes" (September 1994), 47 *National Tax Journal* 621-38; Charles Enis and Leroy Christ, "Implications of Phase-Outs on Individual Marginal Tax Rates," *Journal of the American Taxation Association*, forthcoming; and Organisation for Economic Co-operation and Development, *Making Work Pay: Taxation, Benefits, Employment and Unemployment* (Paris: OECD, 1997).

² Bill Archer, "Archer Releases JCT Study on Hidden Taxes," *Congressional Press Releases*, February 4, 1998.

³ The respective sources are the following: William Popkin, "Phantom Tax Rates" (March 16, 1998), 78 *Tax Notes* 1409-17; "Testimony of Michael Mares (Chair, Tax Executive Committee, American Institute of Certified Public Accountants) Before the House Committee on Ways and Means Hearing on Reducing the Tax Burden," February 4, 1998; Howard Gleckman, "Your Taxes May Be Higher Than You Think," *Business Week*, March 9, 1998, 62; Archer, *supra* footnote 2; David Perry, "Equal Partners?" (April 21, 1998), 6 *Canadian Tax Highlights* 26-27, at 26; and Timothy J. Rupert and Arnold M. Wright, "The Use of Marginal Tax Rates in Decision Making: The Impact of Tax Rate Visibility" (Fall 1998), 20 *Journal of the American Taxation Association* 83-99.

⁴ See Nicholas Rowe and Frances Woolley, "The Efficiency Case for Universality," *Canadian Journal of Economics* (forthcoming); Andrew Lyon, "Individual Marginal Tax Rates Under the US Tax and Transfer System," in David H. Bradford, ed., *Distributional Analysis of Tax Policy* (Washington, DC: AEI Press, 1995), 214-47; Frances Woolley, Arndt Vermaeten, and Judith Madill, "Ending Universality: The Case of Child Benefits" (March 1996), 22 *Canadian Public Policy* 24-38; Jonathan R. Kesselman, "Pitfalls of Selectivity in Income Security Programs" (Fall 1980), 2 *Canadian Taxation: A Journal of Tax Policy* 154-63; and Ken Battle and Michael Mendelson, *Child Benefit Reform in Canada: An Evaluative Framework and Future Directions* (Ottawa: Caledon Institute, 1997), 3.

his or her statutory marginal tax rate. The statutory tax rates referred to in the study are the five rates specified in the Internal Revenue Code (15 percent, 28 percent, 31 percent, 36 percent, and 39.6 percent), while the effective tax rate is the increase (or decrease) in an individual's income tax liability that results from an additional dollar of income. For example, the study found that 15.5 million taxpayers who were nominally subject to the 15 percent statutory rate were in fact taxed at an average marginal tax rate of 22.4 percent because of phaseout provisions and similar rules.

Previous Canadian research on effective marginal tax rates falls short of the joint committee study in two respects. First, the divergence between effective and statutory marginal rates has not been examined, despite the prevalence of income-testing and phaseout provisions in Canadian tax and transfer programs. Revenue Canada has even officially recognized this prevalence; beginning in 1997, the individual income tax return has been renamed the "Income Tax and Benefit Return." Second, the research has mainly focused on "typical taxpayers"—a small number of hypothetical individuals and families at differing income levels. For example, David Perry examines three one-earner family types—a single individual, a couple, and a family of two adults and two children.⁵ This approach is quite useful in developing one's intuition about the interaction of provisions, but one may question the representativeness of these particular examples in light of the diversity among Canadians in sources and amounts of income, deductions, and credits. The major attempt to take this diversity into account is James Davies's calculation of the average effective marginal tax rate.⁶ However, because Davies relies on available aggregate data, he is unable to draw detailed conclusions about the distribution of effective marginal tax rates across provinces, income ranges, and demographic characteristics.

The purpose of this article is to perform an analysis of effective marginal tax rates in Canada similar to the US Joint Committee on Taxation study. Using a Statistics Canada database of tax information on 200,000 individuals, the Social Policy Simulation Database and Model (SPSD/M),⁷

⁵ David B. Perry, "Federal Marginal Income Tax Rates," Fiscal Figures feature (1998), vol. 46, no. 2 *Canadian Tax Journal* 477-85. See also Bev Dahlby, "The Distortionary Effect of Rising Taxes," in William B.P. Robson and William M. Scarth, eds., *Deficit Reduction: What Pain, What Gain?* (Toronto: C.D. Howe Institute, 1994), 43-72; R. Howard, G.C. Ruggeri, and D. Van Wart, "Federal Tax Changes and Marginal Tax Rates, 1986 and 1993" (1995), vol. 43, no. 4 *Canadian Tax Journal* 906-22; Roger S. Smith, "The Personal Income Tax: Average and Marginal Rates in the Post-War Period" (1995), vol. 43, no. 5 *Canadian Tax Journal* 1055-76; and Quebec, *White Paper on the Personal Tax and Transfer Systems* (Quebec City: Ministère des finances, 1984).

⁶ James B. Davies, *Marginal Tax Rates in Canada: High and Getting Higher* (Toronto: C.D. Howe Institute, 1998). For historical series, see James B. Davies and Junsen Zhang, "Measuring Marginal Income Tax Rates for Individuals in Canada: Averages and Distributions over Time" (November 1996), 29 *Canadian Journal of Economics* 959-75.

⁷ Previous SPSPD/M research is surveyed in Chantal Hicks and Brian Murphy, "Statistics Canada's Social Policy Simulation Database and Model: A Decade of Policy (The footnote is continued on the next page.)

this article compares statutory and effective marginal tax rates and isolates the reasons for the differences. It also analyzes the distribution of effective marginal tax rates across the population and describes the characteristics of those individuals who have the highest such rates.

Admittedly, much of the importance of the divergence between effective and statutory marginal tax rates rests on the untested assumption that individuals are more likely to know their statutory marginal tax rate than their effective marginal tax rate.⁸ Statutory marginal tax rates are visible both because of their presence on the tax return and (particularly at the top end) because of newspaper articles and accounting-firm publications about the rates.⁹ Effective marginal tax rates are less visible and can be difficult to calculate, as discussed below. Additional factors that limit knowledge of effective rates are the following:

- In order to decide how much to include in the effective tax rate from a particular provision, one must know both the phaseout rate and whether one is in the phaseout range.
- Some effects apply not to the individual earning the extra income but to other members of the family.
- Many elements of effective rates do not appear on the tax return and do not affect employee payroll withholding.
- Any reduction in transfer payments and refundable credits as a result of earning extra income does not take place until six months or more after the income is earned.

The article begins with a review of the methodology employed in calculating effective and statutory marginal tax rates. The results section follows. Nineteen separate sources of differences between effective and statutory rates are ranked in terms of their impact on effective marginal tax rates in Canada, with the benefit reduction under the guaranteed income supplement heading the list. It is also estimated that 16.6 million Canadians, or 56 percent of the population, experience at least some difference between effective and statutory marginal tax rates. These differences are

⁷ Continued . . .

Applications," paper presented at the conference entitled *Microsimulation in Government Policy and Forecasting*, held in Portland, Maine, July 18-20, 1997. The only previous paper to use the SPSPD/M to calculate marginal tax rates is Brian Murphy, Ross Finnie, and Michael Wolfson, "A Profile of High-Income Ontarians," in Allan M. Maslove, ed., *Taxation and the Distribution of Income* (Toronto: University of Toronto Press in cooperation with the Ontario Fair Tax Commission, 1994), 101-32. The authors' analysis is limited to a single graph showing the pattern of average effective marginal tax rates in Ontario over time.

⁸ Empirical researchers in economics studying decisions to work and save may also want to know the error introduced by estimating effective marginal tax rates using statutory marginal tax rates. Using effective rates rather than statutory rates in empirical research would be econometrically useful because it increases variability and reduces the correlation with income.

⁹ A comprehensive study is PricewaterhouseCoopers, *Tax Facts and Figures 1998* (Toronto: PricewaterhouseCoopers, 1998).

far from trivial for many individuals: 22 percent of the population has at least a 10 percentage point difference. The proportion affected is particularly high in Quebec. These figures for Canada appear to be higher than those for the United States. High effective tax rates are concentrated in the 17 percent federal statutory rate bracket; a greater number of taxpayers with effective rates above 45 percent come from this bracket than from the supposedly “top” bracket of 31.32 percent. Almost 1 million Canadians, two-thirds of whom are seniors, have an effective marginal tax rate of 60 percent or more. Following the presentation of these and other findings, the article concludes with a brief discussion of policy implications and some suggestions for future research.

In the interest of allowing others to replicate and extend the findings of this article, all of the computer programs used can be downloaded from the first author’s Web site.¹⁰

METHODOLOGY

The SPSD/M Database

This study would not be possible without a database of individual tax return data. Although the actual Revenue Canada databases used by the Department of Finance are not publicly available, Statistics Canada has developed a product, the SPSD/M, that serves admirably for this purpose.¹¹ As its name suggests, it consists of a database and a model. The “database” component of the SPSD/M contains records for 72,737 households consisting of 200,264 individuals, constituting roughly a two-thirds of 1 percent sample of the population of Canada. Individuals from all 10 provinces, but none of the territories, are included. The “model” part of the SPSD/M performs projections for years from 1984 through 2001. The tax rates are updated each year by a special release of the model after all the provincial budgets have been presented. This article uses version 6.1, which was released in July 1998 and is based on information available at that time. Although the database employs tax return and survey data from 1992, the database and model parameters used in this article are those set by Statistics Canada to represent 1999.

To protect confidentiality, the individuals represented on the SPSD/M are “synthetic” in the sense that they are composites of several similar individuals. For example, the moving expense figure may come from one individual, while the child care expense may come from another. The individuals who are amalgamated in this way are selected so as to be similar on key variables such as age and income. For high-income individuals, the data are also “blurred” since the figure used for, say, capital gains may be

¹⁰ <http://arts.uwaterloo.ca/ACCT/people/macnau.htm>. Note that although there is normally a charge to purchase the SPSD/M, it is free to researchers at universities that subscribe to Statistics Canada’s Data Liberation Initiative.

¹¹ The SPSD/M is superior to the Department of Finance databases in its modelling of social programs; in particular, it models employment insurance claims and therefore allows consideration of the phaseout of the family supplement.

the average of five individuals.¹² This is the price of working with a publicly available database. Consultations on this article with Department of Finance officials suggest that these data problems should not affect the thrust of the results given below.

Confidence intervals and statistical tests are not used in the analysis below since statistical analysis of the predictions of microsimulation models is as yet underdeveloped.¹³

Types of Taxes and Income Considered

Any marginal tax rate, whether statutory or effective, depends on the type of taxes to be considered. The joint committee study considered only personal income tax, while the Davies study also includes the goods and services tax (GST), sales and excise taxes, and payroll taxes levied on both employers and employees. The marginal tax rate also depends on the type of income that is being changed (for example, employment, capital gains, dividends, other income, etc.). The joint committee increased wage income for those taxpayers who otherwise reported wage or salary income and increased other income for those taxpayers who otherwise reported no wage or salary income. Davies implicitly used a similar criterion.

The proper choices on these matters depend partly on the question being addressed. For example, if the question is the effect of taxes on the incentive to work, it may be appropriate to consider changes in employment income and to include payroll taxes and consumption taxes in addition to personal income tax. On the other hand, if the question is the impact of taxes on most tax-planning decisions, one should consider instead a change in other income and exclude both payroll taxes and consumption taxes. For example, consider the incentive for transactions such as contributing to a registered retirement savings plan (RRSP) as opposed to saving in non-sheltered form, investing using borrowed funds, splitting income with spouses and children under 18 years of age, splitting Canada Pension Plan (CPP) payments between spouses, making gifts of income-earning assets to adult children, converting non-deductible child support payments into deductible spousal support, and selling assets with unrealized gains and reinvesting elsewhere. In all these cases, consumption and payroll taxes are not relevant and the proper income component to change is other income.¹⁴ If capital gains are involved, one can just multiply the calculated marginal tax rate by three-quarters.

¹² See the "Database Creation Guide" component of the SPSD/M documentation, and Alan Macnaughton, "Canadian Income Tax Data," in Robert Crum, ed., *A Guide to Tax Research Databases* (Sarasota, Fla.: American Taxation Association, 1992), 80-94.

¹³ See Stephen Pudney and Holly Sutherland, "Statistical Reliability in Microsimulation Models with Econometrically-Estimated Behavioral Responses," in Ann Harding, ed., *Microsimulation and Public Policy* (New York: Elsevier, 1996), 473-503.

¹⁴ Although the change in other income in these transactions is sometimes an increase and sometimes a decrease, the calculation of effective marginal tax rates in this article assumes that other income is to be increased. This distinction should not matter for most individuals.

Another factor in these choices is measurement difficulties. For example, if the choice is to use employment income rather than other income, one should subtract the value of the extra registered pension plan (RPP) or RRSP room created by the increase in earned income. Of course, this value should be zero for individuals who will never use all of the presently available room. Including this value was suggested, but apparently not implemented, by the joint committee.¹⁵ More important, if payroll taxes are to be included, one should exclude the proportion of the payroll taxes paid that represents fair payment for future benefits to be received. This is difficult to measure; studies indicate that it varies widely among individuals.¹⁶ Davies's study excludes one-half of payroll taxes on this basis, while Howard et al. and Perry exclude none. Davies also includes employer-level payroll taxes, while Howard et al. and Perry do not.¹⁷ Given these measurement difficulties, it may be better to exclude payroll taxes entirely so as to avoid having an upward bias in the calculated marginal tax rates. As shown below, these rates would be viewed by many as high without considering payroll taxes.

A final consideration is the comparability of the results with those of the joint committee for the United States. Using other income as the type of income to increase and excluding payroll taxes and consumption taxes from the analysis enhances comparability. Although the joint committee used employment income for those with income from that source, this approach is largely indistinguishable in Canada from using other income if one does not include payroll taxes.

For all of these reasons, this study excludes consumption taxes and computes marginal tax rates using "other income" (for example, interest) as the type of income being increased.¹⁸ Payroll taxes are automatically excluded since they do not apply to other income. Note that increasing other income gives exactly the same result as increasing employment income if it is assumed that the value of the incremental RPP/RRSP room is zero and that payroll taxes are completely fair payment for future benefits to be received.¹⁹

¹⁵ Joint Committee on Taxation, *supra* footnote 1, at 56.

¹⁶ R.L. Brown, "Social Security: Progressive or Regressive" (April 1998), 2 *North American Actuarial Journal* 1-33, concludes that the "tax" component of the CPP varies widely among individuals. Similar variations for the EI program are examined in Miles Corak and Wendy Pyper, *Firms, Industries and Cross-Subsidies: Patterns in the Distribution of UI Benefits and Taxes* (Ottawa: Human Resources Development Canada, 1995).

¹⁷ See *supra* footnotes 5 and 6.

¹⁸ In the SPSP/M, consumption taxes are excluded by setting the parameter CTFLAG equal to zero. The variable used to represent other income in the SPSP/M is "iditoth."

¹⁹ With the demise of the working income supplement in the 1998 budget, the Canada child tax benefit no longer distinguishes between earned income and other income.

Defining Statutory Marginal Tax Rates

All components of marginal tax rates are imposed by statute.²⁰ Nevertheless, some are more hidden than others, and the provisions that are the most obvious are considered in common usage to define the “statutory” marginal tax rate for every individual. These rates are not defined as unequivocally in Canada as in the United States, and there is a continuum between the most obvious and the most hidden components. Nevertheless, there is general agreement that the components of the statutory rate are the following: the section 117²¹ federal tax brackets (that is, 17 percent, 26 percent, and 29 percent); the federal surtaxes; outside Quebec, the provincial tax rate as a percentage of basic federal tax; in Quebec, the Quebec provincial rate schedule; the provincial surtaxes; the requirement that neither provincial nor federal tax payable can be made negative, even if non-refundable credits exceed the tax otherwise payable; and the provincial flat taxes in the prairie provinces. Every other component of the marginal rate, such as the phaseouts of refundable credits and the reduction of the marital credit, is considered to be part of the effective marginal tax rate but not of the statutory marginal tax rate.

The derivation of the federal statutory marginal tax rate begins with the three section 117 tax brackets—17 percent, 26 percent, and 29 percent. The requirement that federal tax payable cannot be negative adds a fourth bracket—0 percent. This rate applies to non-taxpayers, since a small addition to their income will still not produce any tax liability.

The surtaxes add considerable complexity. The 3 percent surtax, the 5 percent surtax, and the \$250 surtax reduction with a 6 percent phaseout create three effective rates of surtax: 0 percent, if basic federal tax is below \$8,333;²² 9 percent, if basic federal tax is between \$8,333 and \$12,500; and 8 percent, if basic federal tax is above \$12,500. To explain: taxpayers with less than \$8,333 in basic federal tax have a 0 percent effective rate of surtax because the \$250 surtax reduction reduces the 3 percent surtax to zero; taxpayers with above \$12,500 in basic federal tax have a total 8 percent rate because of the combination of the 3 percent surtax and the 5 percent surtax; and taxpayers with between \$8,333 and \$12,500 in basic federal tax have a total 9 percent rate because of the combination of the basic 3 percent rate and the 6 percent rate of phaseout of the surtax reduction. Another way to view the surtax-phaseout situation is that a \$1 increase in basic federal tax increases the initial amount of surtax by 3 cents but also decreases the surtax reduction by 6 cents, so that the surtax goes up by 9 cents in total.

²⁰ As established by the Supreme Court of Canada in the *Re Eurig Estate* case (October 22, 1998, court file no. 25866) in connection with probate fees, this is a requirement of sections 53 and 90 of the Constitution Act, 1867.

²¹ Income Tax Act, RSC 1985, c. 1 (5th Supp.), as amended (herein referred to as “the Act”). Unless otherwise stated, statutory references in this article are to the Act.

²² \$8,333 = \$250/0.03.

A person in the 17 percent section 117 bracket must be in the 0 percent surtax bracket,²³ and a person in the 26 percent section 117 bracket must be in either the 0 percent or the 9 percent surtax bracket.²⁴ Apart from these two results, all combinations of section 117 rate brackets and surtax brackets are possible. Thus, there are seven possible federal statutory marginal tax rates for 1999: four in which there is a 0 percent surtax rate (0 percent, 17 percent, 26 percent, and 29 percent); two in which there is a 9 percent surtax rate (28.34 percent and 31.61 percent); and one in which there is an 8 percent surtax rate (31.32 percent).²⁵ However, since the 29 percent bracket comprises less than one-tenth of 1 percent of all taxpayers,²⁶ it is omitted from the tables. Individuals are uniquely assigned to one of the remaining six rate categories by examining their taxable income and basic federal tax as well as determining whether the individual is or is not tax-paying (based on the level of non-refundable credits relative to federal tax on taxable income).

In order to provide further statistical detail, three of these brackets are divided into two: the 0 percent federal statutory marginal tax rate bracket is divided into individuals with no income and individuals with some income; the 17 percent bracket is divided into "lower" and "upper" portions at the halfway point (that is, taxable income of \$14,795); and the 31.32 percent bracket is divided into those with more and those with less than \$100,000 in taxable income. Thus, the method used in this study allows for nine federal statutory marginal tax rates. These are (generally in order of increasing taxable income)²⁷ 0 percent, with no income; 0 percent, with some income; 17 percent lower; 17 percent upper; 26 percent; 28.34 percent; 31.61 percent; 31.32 percent, with less than \$100,000 taxable income; and 31.32 percent, with more than \$100,000 taxable income. Thus, the top statutory rate is not the rate for taxpayers with the highest taxable income; the top rate is 31.61 percent, which occurs where the surtax reduction is phasing out.

Provincial statutory tax rates add more complexity. Consider Ontario, for which in 1999 provincial tax is 40.5 percent of basic federal tax and

²³ Such a person must have federal tax on taxable income of no more than \$5,030. Allowing for the basic personal tax credit, basic federal tax must be no more than \$4,932 (\$5,030 - \$1,098).

²⁴ Such a person must have federal tax on taxable income of no more than \$12,724. Again allowing for the basic personal tax credit, basic federal tax must be no more than \$11,626 (\$12,724 - \$1,098).

²⁵ The calculations are as follows: $28.34\% = 26\% \times 1.09$; $31.61\% = 29\% \times 1.09$; and $31.32\% = 29\% \times 1.08$.

²⁶ This is not all taxpayers with a section 117 tax rate of 29 percent but only those with that rate who also have a 0 percent surtax rate.

²⁷ For a taxpayer to have a 28.34 percent rate, taxable income must be at least \$46,517 [(\$8,333 + \$1,098 - \$5,030)/0.26 + \$29,590]. For 31.61% rate, taxable income must be at least \$59,180. Finally, for a 31.32 percent rate, taxable income must be at least \$62,194 [(\$12,500 + \$1,098 - \$12,724)/0.29 + \$59,180].

which imposes two surtaxes, 20 percent and 36 percent. As a result, there are eight (federal plus provincial) statutory marginal tax rates for Ontario taxpayers.²⁸ For example, the top statutory marginal tax rate, 49.64 percent, is computed by adding to the top statutory federal rate (31.32 percent) the product of three figures—29 percent (the top section 117 rate bracket), 40.5 percent (the percentage that Ontario tax is of basic federal tax), and a term to represent the application of the 20 percent and 36 percent Ontario surtaxes ($1 + 0.2 + 0.36$).

Other provinces are similar, except Quebec. In Quebec, the Quebec abatement reduces the section 117 tax rates by 16.5 percent but does not affect the federal surtax.²⁹ For provincial tax purposes, the three tax brackets and the requirement that provincial tax payable cannot be negative create four provincial statutory tax rates: 0 percent (if no Quebec tax is payable), 20 percent (if Quebec taxable income is below \$25,000), 23 percent (if Quebec taxable income is between \$25,000 and \$50,000), and 26 percent (otherwise). In addition, there is a Quebec anti-poverty fund contribution of 0.3 percent of Quebec tax payable. The Quebec statutory tax rate is imputed for every taxpayer in the sample by observing the taxpayer's Quebec tax-paying status and taxable income. The total statutory marginal tax rate for Quebec taxpayers is the sum of the provincial and federal statutory rates.

Defining Effective Marginal Tax Rates

This article defines an individual's effective marginal tax rate as the change in his or her family's total net payments to government divided by the change in the individual's income. Net payments to government are defined as income taxes less transfer payments. Thus, a tax increase or a transfer payment decrease resulting from an increase in income are both considered as increases in an individual's effective marginal tax rate. The SPSP/M, as a tool created to analyze social policy, contains payment formulas for a wide variety of federal and provincial transfer programs. The specific programs are discussed below in the part of the results section dealing with the sources of effective marginal tax rates.

The change in transfer payments or tax credits that is relevant to the effective marginal tax rate is the change in the amount "earned" in respect of income in the year. For many such measures (for example, the

²⁸ This is one more than the number of federal-only rates, before the extra divisions used in this study. The eight rates and their computation are as follows: 0 percent; 23.885 percent [$17\% + (17\% \times 0.405)$]; 36.53 percent [$26\% + (26\% \times 0.405)$]; 38.87 percent [$28.34\% + (26\% \times 0.405)$]; 40.976 percent [$28.34\% + (26\% \times 0.405) \times (1 + 0.2)$]; 45.704 percent [$31.61\% + (29\% \times 0.405) \times (1 + 0.2)$]; 49.9322 percent [$31.61\% + (29\% \times 0.405) \times (1 + 0.2 + 0.36)$]; and 49.6422 percent.

²⁹ The resulting six federal statutory rates are as follows: 0 percent; 14.195 percent [$17\% - (17\% \times 0.165)$]; 21.71 percent [$26\% - (26\% \times 0.165)$]; 24.05 percent [$28.34\% - (6\% \times 0.165)$]; 26.825 percent [$31.61\% - (29\% \times 0.165)$]; and 26.535 percent [$31.32\% - (29\% \times 0.165)$].

Canada child tax benefit, the GST credit, the guaranteed income supplement, and similar provincial programs), the amount that is affected is the amount that is paid in the following year. For example, if a person earns more income in 1999, the Canada child tax benefit is potentially reduced for the 12-month period beginning in July 2000. That is the change that should be counted in determining the effective marginal tax rate.³⁰ Although that is not the procedure normally followed by the SPSPD/M, it can be set to produce this result.³¹

The amount of benefits “earned” in respect of income in the year is difficult to define in connection with the family supplement portion of the employment insurance program. Benefits under this program are linked to the amount currently being received from the Canada child tax benefit. Thus, when one earns extra income, this reduces the future child tax benefit and also, to the extent that one claims employment insurance in the future, reduces the family supplement. The calculation of effective marginal tax rates in this article assumes that there is a perfect correlation between making a current claim and making a future claim; anyone claiming employment insurance in the current year will also claim it in the future year, and anyone not claiming it this year will also not claim it in the future. A better procedure would be to assign everyone in the sample a probability of claiming employment insurance in the future (which will be part of the next version of the SPSPD/M to be released) and then multiply the decrease in the family supplement by this probability to derive the effective marginal tax rate. The short-cut procedure adopted in this study will give the right result on average, but it will tend to produce much higher marginal tax rates for a few individuals than they would otherwise have.

The reason for considering the entire family is that federal and provincial law provides a variety of links between the tax and transfer-payment positions of different individuals in a family. These include the child tax benefit, the GST credit, the marital tax credit, and the transfer of credits from a spouse or child. Thus, for example, a person who is not earning enough income to pay tax could still have a positive effective marginal tax rate if, when that person earned an additional amount of income, the marital tax credit of his or her spouse decreased. Although it is possible that such changes in a spouse’s net payments from government are disregarded

³⁰ Thus, the future payment should be discounted to its present value. The discounting period should be the period between the time the income in question is earned and the time the credit is to be paid out, which is 18 months on average for the Canada child tax benefit. For simplicity, no discounting is applied in this article.

³¹ The SPSPD/M keeps track of transfers received in the year rather than earned in respect of the year. For example, for the year 1999, the SPSPD/M uses in its calculations of net payments from government the amount paid for the 12-month period starting July 1999, and 1998 income is estimated by multiplying 1999 income by a fraction PYINC (“previous year’s income”). To cause it to use the payment amounts that are correct for this purpose, PYINC must be set to 1 and the Canada child tax benefit parameters must be reset to those applying for the year starting July 2000 (if there is a difference).

or are valued less highly than changes directly affecting oneself, this article assumes that they are of equal value.

The definition of "family" used is the SPSPD/M's "economic family," which consists of either a person or multiple persons related by blood, marriage (including common-law marriage), or adoption, living together within a single household. Note that this includes all children living at home, not just those under 18 years of age. This definition unfortunately excludes students living away from home, who may be transferring their tuition and education credits to their parents.

As noted above, the change in income chosen for the computation of marginal tax rates is a change in other (that is, non-earned) income. The next problem is to decide on the proper amount of the income change. The joint committee uses an income change of \$1. However, such a very small change causes rounding problems in the SPSPD/M and may exaggerate the importance of sharp changes in effective marginal tax rates that affect very small income ranges.³² On the other hand, as the amount of the income change increases, more individuals will cross statutory rate brackets. The statutory marginal tax rate for such individuals will depend on exactly how much income falls into each bracket. Since it is important for presentation of results in tables to keep the number of possible statutory marginal tax rates low, such individuals have to be eliminated from the sample. Therefore, as a compromise position, this study uses an income change of \$100 to compute effective marginal tax rates. This causes the exclusion of slightly less than 1 percent of all individuals.

Technical issues involved in implementing this methodology within the SPSPD/M are discussed in the appendix to this article.

Sources of Bias

The SPSPD/M's lack of modelling of certain laws and social programs understates effective marginal tax rates for some taxpayers. Child support is one example. Under new rules, effective for awards issued or varied after April 1997, a change in the payer's income automatically triggers an increase in child support. To the extent that payers regard this increase as a tax rather than an amount that they would have paid voluntarily anyway, it is an addition to their effective marginal tax rate. It is estimated that there were 388,000 child support awards in Canada in 1997.³³ Another example is the employment insurance benefit reduction for income from part-time employment exceeding 25 percent of employment insurance benefits.³⁴ Most important, social assistance is not modelled in the

³² Popkin, *supra* footnote 3, at 1416-17.

³³ Glenn Feltham and Alan Macnaughton, "Child Support and the Non-Tax Costs of Tax-Planning Strategies" (1997), vol. 45, no. 3 *Canadian Tax Journal* 417-50, at 432.

³⁴ Employment Insurance Act, SC 1996, c. 23, as amended, section 19.

SPSD/M because of the lack of data on household assets.³⁵ This is an unfortunate omission, since it is estimated that 2.8 million children and adults were recipients of social assistance in March 1997³⁶ and Davies estimates that the benefit reduction rate for extra income averages 75 percent.³⁷ There are also significant interactions with other programs; for example, in Ontario, social assistance is reduced dollar-for-dollar for Canada child tax benefits received.

Effective marginal tax rates may also be overstated for some individuals. For example, individuals who are part of the underground economy and do not file tax returns should have a zero effective marginal tax rate, but the SPSP/M assumes that all individuals pay the tax liability due. Revenue Canada estimates that only 5 percent of Canadians 18 years of age and older who should have filed a return did not do so voluntarily, and only 2 percent remained non-filers after enforcement actions.³⁸ Also, the SPSP/M includes takeup rates only for the guaranteed income supplement, the spouse's allowance, and employment insurance; for all other transfer payments and tax credits, the SPSP/M assumes that all individuals claim the social program benefits and tax credits to which they are entitled. To the extent that they do not, their marginal tax rate should not be increased by the SPSP/M-calculated phaseouts and benefit reductions. However, this omission does not seem to be a major problem, at least for the federal refundable tax credits. Available data suggest that 1 percent of entitled tax filers fail to claim the GST credit, and a further 6 percent claim the credit but fail to claim their entitlement in respect of their children. For the Canada child tax benefit, 5 percent of entitled Canadian-born children are not enrolled in the program within a year of being born, and almost 10 percent of potential recipients had their benefits interrupted or did not receive benefits because they or their spouses did not file an income tax return on time.³⁹

Finally, the federal and Quebec alternative minimum tax (AMT) is an issue because, as a one-period model, the SPSP/M does not allow for minimum tax carryovers into a future year. As shown in the appendix, the two AMTs consequently have a much larger impact on effective marginal

³⁵ As this article was going to press, it was learned that the SPSP/M development team has written some code to include social assistance, which, although not part of the present SPSP/M release, could be used with it.

³⁶ National Council on Welfare, *Profiles of Welfare: Myths and Realities* (Ottawa: National Council on Welfare, 1998), 64-66. A total of 1,149,000 of those lived in Ontario. By September 1998, the number of people in Ontario dependent on social assistance had declined from 1.15 million to about 700,000: "Welfare Cases Down by 20,000 in September, Province Reports," *The (Kitchener) Record*, October 8, 1998.

³⁷ Davies, *supra* footnote 6, at 10.

³⁸ Revenue Canada, *Compliance: From Vision to Strategy* (Ottawa: Revenue Canada, 1997), 18-19.

³⁹ Revenue Canada, *Benefit Programs Report* (Ottawa: Revenue Canada, 1997), 14-15.

tax rates than they should have. Therefore, tax liabilities are calculated as if the two AMTs did not exist.⁴⁰

RESULTS

Contributions of Particular Measures

Using the SPSPD/M, it is possible to study 19 separate tax and transfer measures that cause deviations between the effective rate and the statutory rate. These measures are listed in table 1. Together, they explain why 14.4 million people have differences between their effective and statutory marginal tax rates.⁴¹ Three-quarters of this group are affected by just one or two of these measures, with the average number for all individuals with such differences being 1.9. As discussed further below, an additional group of people are affected by other measures that are not analyzed separately in table 1, bringing the overall total number of people affected to 16.6 million.

The measures listed in table 1 can also be divided into those relating to transfer payments and those relating to tax credits. Altogether, of the 14.4 million Canadians who are affected by these measures, 12.9 million are affected by the tax credit measures and 1.9 million are affected by the transfer-payment measures. Obviously, many Canadians are affected by both types of measures. A similar division may be made between federal and provincial measures. A total of 8.5 million Canadians are affected by the provincial measures and 12.5 million are affected by the federal measures. Again, many people are affected by both.

It is evident from table 1 that the measures differ on two dimensions: the number of people affected and the amount by which the measures change an affected person's effective marginal tax rate. Measures that are large on both dimensions are most important. Thus, the most important measure by far is the income testing of the guaranteed income supplement, since 5.3 percent of the population is affected and the average increase in the effective marginal tax rate (calculated using the SPSPD/M) is 47.9 percentage points.⁴²

To capture these two dimensions of importance, the measures in table 1 are listed in order of the product of the proportion of the population affected and the average difference in percentage points between the effective marginal tax rate and the statutory rate. This "impact" measurement gives a rating of 2.54 (0.053×47.9) to the income testing of the guaranteed income supplement, while no other measure rates higher than 0.81.

⁴⁰ To disable the algorithm that calculates the AMTs and eliminate carryovers from other years, the parameters AMTTX, MINCARFLAG, and QAMTXFLG are set equal to zero.

⁴¹ The figures for the number of people affected agree well with the totals from administrative data cited in Davies, *supra* footnote 6, table 1.

⁴² This rate differs from the 50 percent phaseout rate specified in the legislation because for some people the \$100 increase in income is only partly in the phaseout range.

Table 1 Summary of Provisions Creating Effective Marginal Tax Rates Different from Statutory Marginal Tax Rates (1999)

Provision	Legislative authority (year first effective)	Effective marginal tax rate	Applicable range	Estimated no. of individuals affected	Percent of pop. affected	Impact
Income testing of seniors' guaranteed income supplement	Old Age Security Act, sec. 12; (1966)	Statutory rate plus 25 or 50 percentage points	Little or no family div. B income beyond old age security	1,575,000 (132,000 at 25%; 1,443,000 at 50%)	5.3	2.54
Reduction of spouse's marital tax credit	ITA, para. 118(1)(a); (1947)	17 percentage points plus federal surtax and provincial effects	Div. B income from \$538 to \$5,918	1,001,000	3.4	0.81
Phaseout of Canada child tax benefit: 1st tier	ITA, subsec. 122.61(1); (1993)	Statutory rate plus from 12.1 to 26.8 percentage points	Family div. B incomes from \$20,921 to \$25,921	4,420,000 408,000	14.8 1.4	0.8
2nd tier		Statutory rate plus (1) 2.5 percentage points if 1 child and (2) 5 percentage points if 2 or more children	Family div. B incomes from \$20,921 to \$25,921 plus product of initial child tax benefit and (1) if 1 child, 40 and (2) if 2 or more children, 20	1,562,000 with 1 child; 2,451,000 with 2 or more children	13.5	
Phaseout of prov. refundable tax credits	BC, Man., Ont., Que., NS, Nfld.	Statutory rate plus an average of 3.6 percentage points	Mostly people with 0% and 17% federal statutory rates	6,384,000	21.5	0.78
Prov. low-income tax reductions:						
phase-in	Alta., Sask., Man., Ont., Que.	Statutory rate less an average of 9.6 percentage points	People with 17% and 26% federal statutory rates	2,651,000 897,000	8.9 3.0	0.64
phaseout	Alta., Sask., Man., Ont., Que., NS	Statutory rate plus an average of 5.9 percentage points		1,754,000	5.9	

(Table 1 is continued on the next page.)

Table 1 Continued

Provision	Legislative authority (year first effective)	Effective marginal tax rate	Applicable range	Estimated no. of individuals affected	Percent of pop. affected	Impact
GST credit:	ITA, subsec. 122.5(3): (1988)			4,222,000	14.2	0.54
phase-in	paragraph (e)	Statutory rate less 2 percentage points	Family div. B income from \$6,456 to \$11,706	1,434,000	4.8	
phaseout	paragraph (f)	Statutory rate plus 5 percentage points	Family div. B incomes from \$20,921 to \$25,921 plus 20 times initial GST credit	2,788,000	9.4	
Income testing of provincial top-ups to guaranteed income supplement	BC, Alta., Sask., Man., Ont., NB	Statutory rate plus 25 or 50 percentage points (plus the guaranteed income supplement reduction rate)	Little or no family div. B income beyond old age security	347,000 (203,000 at 25%; 144,000 at 50%)	1.2	0.41
Phaseout of provincial child tax benefit and family programs	BC, Alta., Sask., Ont., Que., NB	Statutory rate plus an average of 9.4 percentage points	Mostly people with 0% to 26% federal statutory rates	895,000	3.0	0.28
Income testing of spouse's allowance	Old Age Security Act, sec. 22: (1975)	Statutory rate plus 25, 50, or 75 percentage points	Little or no family div. B income beyond old age security	127,000 (56,000 at 25%; 31,000 at 50%; and 40,000 at 75%)	0.4	0.2
Phaseout of supplementary personal tax credit	ITA proposal, para. 118(1)(b.1): (1998)	Statutory rate plus 0.68 percentage points plus federal surtax and prov. effects	Mostly people with a 17% federal statutory rate	4,575,000 (see note 5)	15.5	0.16
Reduction of tax credits transferred to spouse	ITA, secs. 118.8 and 118.81: (1988)	17 percentage points plus federal surtax and prov. effects	Federal tax payable zero overall but positive after deducting only certain credits	176,000	0.6	0.12

(Table 1 is continued on the next page.)

Table 1 Continued

Provision	Legislative authority (year first effective)	Effective marginal tax rate	Applicable range	Estimated no. of individuals affected	Percent of pop. affected	Impact
Reduction of tax credits transferred to parent	ITA, sec. 118.9: (1988)	17 percentage points plus federal surtax and prov. effects	Federal tax payable zero overall but positive after deducting only certain credits	93,000	0.3	0.08
Phaseout of age tax credit	ITA, subsec. 118(2): (1994)	Statutory rate plus 2.55 (15 x 0.17) percentage points plus federal surtax and prov. effects	Div. B income from \$25,921 to \$49,134	501,000	1.7	0.06
Clawback of employment insurance benefits	Employment Insurance Act, sec. 145 (1979)	30 percentage points plus 70% of statutory rate	Div. B income from \$48,750 to point at which 30% of employment insurance benefits are repaid; for repeat claimants, threshold is \$39,000 and fraction repaid is 50-100%	59,000	0.2	0.04
Income testing of family supplement portion of employment insurance benefits	Employment Insurance Act, sec. 16 and Employment Insurance Regulations, sec. 34: (1997)	Statutory rate plus the product of the probability of claiming benefits and 20 percentage points per \$1,000 of Canada child tax benefit received in the claim period	Family div. B incomes from \$20,921 to \$25,921	59,000 (average addition to statutory rate is 21 percentage points)	0.3	0.04
Income testing of old age security benefits	ITA, sec. 180.2: (1989)	15 percentage points plus 85% of statutory rate	Div. B income from \$53,215 to \$86,505	84,000	0.3	0.04
3% floor on medical tax credit	ITA, subsec. 118.2(1): (1942)	Statutory rate plus 0.51 percentage points plus federal surtax and prov. effects	Div. B income up to \$53,800	706,000	2.4	0.01

(Table 1 is concluded on the next page.)

Table 1 Concluded

Notes:

- 1) In the absence of these particular provisions, the effective marginal tax rate would be the statutory marginal tax rate.
- 2) "ITA" is the Income Tax Act.
- 3) Impact is measured as the product of the proportion of the population affected and the number of percentage points by which the provision causes the effective marginal tax rate to differ from the statutory marginal tax rate.
- 4) The number of individuals affected is given to the nearest thousand.
- 5) The number of individuals affected by the supplementary personal credits is too low because the SPSPD/M currently models only the \$500 supplementary credit and not the \$1,000 credit.

Source: Calculations using the SPSPD/M.

Davies's measure of "contribution to average marginal tax rate" is identical to this impact measure, other than the fact that Davies uses the proportion of adults instead of the proportion of the population.⁴³

For the 19 measures, these differences between the two types of marginal rates can be broken down into six categories. The first four relate to tax credits, while the last two relate to government transfer payments.

1) *Phaseouts* (7 measures; 12,896,000 people affected). An increase in income may reduce the amount that the taxpayer would otherwise receive in the form of refundable or non-refundable tax credits. Phaseouts are the most common source of deviations of effective marginal tax rates from statutory rates. Currently, there are phaseouts for the Canada child tax benefit, the GST credit, the age credit, the proposed supplementary personal tax credit, provincial refundable tax credits, provincial low-income tax reductions, and provincial child tax benefit and family programs.⁴⁴ All provinces but Prince Edward Island have phaseouts for one or more provincial credits.

2) *Phase-ins* (2 measures; 2,208,000 people affected). An increase in income may actually increase the amount of credits received. This occurs only for the GST credit for single individuals and for low-income tax reductions in five provinces.

3) *Thresholds* (1 measure; 706,000 people affected). An increase in income may decrease a credit because it increases the floor that expenditures must exceed before they are eligible for the credit. There is only one such provision, the medical tax credit, which allows a credit for medical expenses only to the extent that they exceed the lesser of a dollar amount (\$1,614) and a 3 percent-of-income floor.

4) *Credit-transfer reductions* (3 measures; 1,270,000 people affected). An increase in income may increase the amount of an individual's federal tax payable before certain credits and thereby decrease the amount of a credit that can be transferred to a child or spouse. Where the individual who is making the transfer will not have any tax payable even after the increase in income, this reduction in the amount of credit transferred represents an increase in the effective marginal tax rate. Currently, there are three such provisions: the marital tax credit, the transfer of certain other credits from a spouse, and the transfer of tuition and education credits from a child or grandchild. The marital tax credit is included in this category since it can be regarded as the partial transfer of the basic personal credit from the spouse who cannot use it because of low income to the spouse who can.

5) *Benefit reductions* (5 measures; 1,846,000 people affected). An increase in income leads to a decrease in the amount of a government

⁴³ Davies, *supra* footnote 6, at 10.

⁴⁴ Phaseouts are also used for the refundable medical tax credit and the caregiver tax credit.

transfer payment that is to be paid out in the future. This type of measure is also known as income testing. Currently, there are benefit reductions for seniors' guaranteed income supplement, provincial top-ups to that supplement, spouse's allowance (for certain individuals aged 60 to 65), old age security benefits,⁴⁵ and the family income supplement portion of employment insurance benefits.

6) *Clawbacks* (1 measure; 59,000 people affected). An increase in income may cause the taxpayer to have to return all or part of a transfer payment. The only present example is the repayment of employment insurance benefits by high-income taxpayers. This type of provision is not widely used because of the argument that the taxpayer may have spent the money.

The second column of table 1 shows the effective marginal tax rate of individuals affected by the measure. A measure with no impact would have an effective marginal tax rate equal to the statutory rate; phase-ins lower the rate below that level, while all of the other five categories of measures raise it.

Phaseouts, for example, are quite straightforward. Consider the Canada child tax benefit. For a person with a family income between \$20,921 and \$25,921, an increase in other income not only would be taxed at the usual statutory rate under the personal income tax, but would also reduce the child tax benefit by 12.1 percent, 20.2 percent, or 26.8 percent, depending on the number of qualified dependants. If instead the family income were above \$25,921 but still in the affected range, the reduction in the child tax benefit would be at either a 2.5 percent or a 5 percent rate, again depending on the number of qualified dependants. Of course, the effective marginal tax rate would be just the statutory rate if the person were outside the two phaseout ranges (either because family income was less than \$20,921 or because family income was so high that the child tax benefit had already been reduced to zero). The estimated number of individuals affected by each of the five possible phaseout rates is given in the fourth column.

Provincial low-income tax reductions are generally intended to eliminate provincial tax for a very low income range but to cause provincial tax to return to the normal amount at a higher income level. Thus, the effective marginal tax rate is the statutory rate less a certain rate in the phase-in range, but plus a certain rate in the catchup range. The first range of income is the phase-in, while the second is the phaseout. Thus, for a taxpayer affected by the Ontario low-income tax reduction, the total effective marginal tax rate is simply the federal statutory tax rate at the beginning of the range, but it is the federal rate plus double the Ontario

⁴⁵ Technically, the provision relating to old age security benefits is a clawback in that persons affected are required by section 180.2 to repay some or all of their benefits. However, in practice, it is implemented through a reduction in future old age security payments, rather than through an addition to tax payable on the tax return.

statutory rate in the higher part of the affected range.⁴⁶ The Ontario low-income tax reduction can reach a fair amount up the income scale; some individuals with a number of children receive this reduction and also pay the Ontario high-income surtax.

Benefit reductions can have either simple or complex impacts on the effective marginal tax rate. The guaranteed income supplement is simple because, like a tax credit, it is a non-taxable receipt. Therefore, the effective marginal tax rate is the statutory rate plus the guaranteed income supplement reduction rate, which is either 25 or 50 percentage points. On the other hand, old age security benefits are taxable, and therefore the tax effect of the reduction in these benefits also must be taken into account. For example, for a person in the affected range, a \$100 increase in other income will cause a reduction in old age security of \$15. This reduces taxable income by \$15, so that the net increase in taxable income is \$85 ($\$100 - \15). Therefore, the effective marginal tax rate is 15 percent plus 85 percent of the statutory marginal tax rate. The clawback of employment insurance to high-income earners can be analyzed similarly.

Particularly high effective marginal tax rates can result when “stacking” occurs (that is, when more than one measure applies to the same increase in income). For example, a low-income senior may be subject to both the 50 percent benefit reduction under the guaranteed income supplement and a benefit reduction under the guaranteed income supplement’s provincial top-up program. In Ontario, such a program also has a 50 percent reduction rate, so that there can be a confiscatory 100 percent effective marginal tax rate on outside income.

The benefit reduction for the family supplement portion of employment insurance has a similar stacking problem. Essentially, the family supplement rules provide that, within an income range of \$20,921 to \$25,921, any extra income in a year will reduce any employment insurance claim in the period from 6 months to 18 months after the end of the year by the amount of extra income multiplied by 20 percent per \$1,000 of Canada child tax benefit received in the claim period. This reduction is in addition to the reduction that the increase in income will produce in child tax benefit cheques in the future. Consider an individual in this income range with two children, who will receive the supplement for six months in this future period. His Canada child tax benefit for this six-month period would be \$1,525 [$0.5 \times ((2 \times \$1,020) + \$1,010)$]. Thus, if he earns \$100 of extra income, there are three consequences: personal income tax of, say, \$25 (for a 25 percent statutory rate); \$30.50 [$20\% \times (\$1,525/\$1,000) \times \100] less supplement received; and \$20.20 ($20.2\% \times \100) less child tax benefit in the future. Thus, the overall effective marginal tax rate is 76 percent. Further evidence on stacking effects is given below.

⁴⁶ Section 7(2) of the Ontario Income Tax Act, RSO 1990, c. I.2, as amended.

Aggregate Impact of All Measures

Since effective and statutory marginal tax rates are calculated for each individual in the sample, it is possible to examine the overall impact of all measures combined, including many others that could not easily be separately identified in the SPSP/M. The average statutory marginal tax rate for the population is 17 percent, while the average effective marginal tax rate is 25 percent.⁴⁷ Effective tax rates are almost always higher than statutory rates, since only persons affected by the two phase-in measures listed in table 1 can have effective rates below statutory rates.

A total of 16,553,000 Canadians have effective marginal tax rates that differ from their statutory tax rates. This figure represents 56 percent of all individuals in the country. As discussed above, this estimate should probably be taken as a lower bound since one important measure that would substantially raise effective marginal tax rates—social assistance—is not included in the analysis.

Further analysis shows that for many of these people, this difference is likely to be of an economically significant size: 51 percent of the population (15,157,000 people) have a difference of at least 1 percentage point between their effective and statutory rates (for example, a 45 percent statutory rate and an effective rate of at least 46 percent or no more than 44 percent); 22 percent of the population (6,465,000 people) have at least a 10 percentage point difference; and 10 percent of the population have at least a 25 percentage point difference.

Table 2 shows that these percentages differ substantially by province. Quebec is at the extreme high end, with a surprising 79 percent of the population of the province having at least some difference between their effective and statutory marginal tax rates. This pattern persists for economically significant differences; Quebec also occupies first place for differences of 1, 10, and 25 percentage points or more. As the only province that is not part of the personal income tax collection agreements (not an “agreeing province”), Quebec has the most freedom to bring in features of the tax system, such as phaseouts of credits, that affect different people from those affected by the federal measures. Saskatchewan and Manitoba are also high, at least for smaller differences. British Columbia, Alberta, and Newfoundland are generally low.

As discussed above, it is difficult to say whether these differences should be attributed to the federal or the provincial governments. For the agreeing provinces, any differences between effective and statutory marginal tax rates created by federal provisions that influence basic federal tax will automatically flow through to provincial taxes. Nevertheless, it is

⁴⁷ Davies calculates an average effective marginal tax rate that is much higher—44 percent (Davies, *supra* footnote 6, at 8)—than this study’s 25 percent. One reason is that Davies considers only adults rather than the whole population. Also, Davies includes social assistance benefit reductions, payroll taxes, and consumption taxes, while this study does not.

Table 2 Percentage of the Population with Differences Between Effective and Marginal Tax Rates, by Jurisdiction and Size of Difference (1999)

Size of difference (in percentage points) only	Federal measures only	Including both federal and provincial measures										
		BC	Alta.	Sask.	Man.	Ont.	Que.	NB	NS	PEI	Nfld.	Canada
Any	43	45	50	63	61	47	47	49	49	51	44	56
1 or more	34	42	40	62	60	44	45	48	48	48	42	51
10 or more	14	12	15	19	17	16	17	19	19	19	17	22
25 or more	7	9	8	12	9	9	12	12	12	14	13	10

Source: Calculations using the SPSD/M.

clear that both levels of government share a large part of the responsibility. Table 2 shows that the proportion of the population affected by federal measures only is substantially less than the total proportions quoted above; for example, although 51 percent of the population has a difference between effective and statutory rates of at least 1 percentage point, this proportion would be just 34 percent if only federal measures were considered.

Table 3 analyzes total (federal plus provincial) effective and statutory rates by category of federal statutory marginal tax rate. Federal statutory rates are used for categorization purposes rather than total federal-provincial statutory rates mainly because the former rates are fewer, create a fairly even distribution of individuals, and are closely related to the latter. Columns three and four of this table compare average effective and statutory marginal rates; effective rates are uniformly higher. Notice that total statutory rates rise as one moves into higher federal statutory rate brackets, but total effective rates rise much less steeply. Such rates are already 33 percent in the lower half of the 17 percent federal statutory rate bracket, and then climb to join statutory rates as one moves to the top federal statutory rates.⁴⁸ Hence, the progressivity of effective rates is much less than the progressivity exhibited by statutory rates.

Table 3 also provides more detail on those people for whom effective and statutory rates differ. (Only differences of at least 1 percentage point are considered in this table.) As shown, the individual's federal statutory rate is a key determinant of whether his or her (federal-plus-provincial) effective and statutory rates will differ. The proportion of individuals who have an effective rate different from their statutory rate is in the pattern of an upside-down "U."

The right-hand side of this "U" is the most important. Only 2 percent of individuals in the top rate category (31.3 percent with over \$100,000 in taxable income) have such differences. On the other hand, such differences are almost universal (89 percent) in the lower half of the 17 percent rate category. In between these categories, the proportion smoothly rises as the federal marginal tax rate falls. An alternative way to look at these numbers is to examine the proportion of the effective rate that comes from "non-statutory" (that is, arising from something other than the statutory rate) sources. This proportion is 1 percent for the highest federal statutory rate categories, while it is approximately 25 percent for the 17 percent rate categories.

Table 4 shows that the same patterns occur when individuals are classified by their total income, which is defined as essentially the line for total income on the tax return plus non-taxable transfer payments (such as the guaranteed income supplement) and refundable tax credits.⁴⁹ The highest

⁴⁸ For further analysis of this point using hypothetical individuals, see Perry, *supra* footnote 5.

⁴⁹ The SPSD/M variable used is "imtotot."

Table 3 Distribution of Canadian Individuals by Federal Statutory Marginal Tax Rate and by Whether the Individual's Effective Marginal Tax Rate Differs from His/Her Statutory Marginal Tax Rate (1999)

Federal statutory marginal tax rate (%)	All individuals													
	Average					% of effective								
	Average taxable income (\$)	No. (000s)	Average effective marginal tax rate (%)	Average statutory marginal tax rate (%)	Average marginal tax rate from non statutory sources ^a	No. (000s)	Average effective marginal tax rate (%)	Average statutory marginal tax rate (%)	Average marginal tax rate	% of group				
0%: no income	0	7,069	4.1	0.0	100	5,680	0	0	0	80	1,389	21	0.0	20
0%: some income	3,918	7,550	18.2	0.2	99	2,489	0.1	0.1	0.1	33	5,061	27.2	0.2	67
17%: lower	11,449	2,771	33.8	25.2	26	310	27.3	27.1	27.1	11	2,462	34.6	24.9	89
17%: upper	21,916	5,672	33.3	27.4	24	1,803	27.1	26.9	26.9	32	3,869	36.2	27.7	69
26%:	38,003	4,298	42.8	39.6	8	2,352	39.3	39.3	39.3	55	1,946	47	39.9	45
28.3%:	53,145	1,001	44.2	42.6	4	725	42.5	42.5	42.5	72	276	48.7	43.0	28
31.6%:	62,880	346	49.9	48.7	3	262	48.9	48.8	48.8	76	83	53.2	48.2	24
31.3%: < \$100K TI	77,172	662	50.5	49.9	1	594	50	49.9	49.9	90	68	55.1	49.7	10
31.3%: > \$100K TI	197,956	235	50.2	50.1	—	232	50.2	50.1	50.1	99	3	53.3	51.6	1
All individuals	17,618	29,605	25.0	16.9	32	14,447	16.3	16.2	16.2	49	15,157	33.3	17.6	51

^a 100 (Average effective marginal tax rate – average statutory marginal tax rate)/Average effective marginal tax rate.

Notes: 1) TI indicates taxable income.

2) — indicates less than 0.5%.

3) The effective marginal tax rate is considered to equal the statutory marginal tax rate if the difference is less than 1 percentage point.

4) The distinction between the "lower" and "upper" portions of the 17% bracket is the halfway point, (i.e., taxable income of \$14,795).

5) Except as otherwise indicated, all marginal rates are federal plus provincial.

Source: Calculations using the SPSPD/M.

Table 4 Distribution of Canadian Individuals by Total Income Group and by Whether the Individual's Effective Marginal Tax Rate Differs from His/Her Statutory Marginal Tax Rate (1999)

Total income group	All individuals														
	Average			% of effective			Effective rate equals statutory rate			Effective rate differs from statutory rate					
	taxable income (\$)	No. (000s)	Average effective marginal tax rate (%)	Average statutory marginal tax rate (%)	Average marginal tax rate from non statutory sources ^a	No. (000s)	Average effective marginal tax rate (%)	Average statutory marginal tax rate (%)	No. affected (000s)	Average effective marginal tax rate (%)	Average statutory marginal tax rate (%)	% of group	No. affected (000s)	Average effective marginal tax rate (%)	Average statutory marginal tax rate (%)
None	0	7,069	4.1	0	100	5,680	0	0	80	1,389	21	0	0	0	20
Less than \$10,000	3,171	5,336	14	1.8	87	2,029	0.7	0.7	38	3,307	22.2	2.5	2.5	62	62
\$10,000-\$20,000	10,761	5,723	33	15.9	52	936	15.1	14.8	16	4,787	36.5	16.1	16.1	84	84
\$20,000-\$30,000	21,172	3,893	31.6	25.6	19	1,300	26	25.9	33	2,593	34.5	25.5	25.5	67	67
\$30,000-\$40,000	30,798	2,954	40.1	35.4	12	1,247	36.1	36.1	42	1,707	43	34.8	34.8	58	58
\$40,000-\$50,000	40,340	1,892	41.6	39	6	1,146	39	39	61	746	45.6	38.8	38.8	39	39
\$50,000-\$75,000	53,893	1,966	45	43.2	4	1,403	43.6	43.6	71	563	48.3	42.4	42.4	29	29
\$75,000-\$100,000	76,449	444	49.3	48.6	1	390	49.1	49.1	88	54	50.8	45.6	45.6	12	12
\$100,000-\$125,000	95,056	127	49.3	48.8	1	119	49.4	49.3	94	7	47	41	41	6	6
More than \$125,000	206,044	201	49.1	48.9	—	197	49.2	49.1	98	4	45	42.1	42.1	2	2
All individuals	17,618	29,605	25	16.9	32	14,447	16.3	16.2	49	15,157	33.3	17.6	17.6	51	51

^a 100 (Average effective marginal tax rate - average statutory marginal tax rate)/Average effective marginal tax rate.

Notes: 1) — indicates less than 0.5%.

2) The effective marginal tax rate is considered to equal the statutory marginal tax rate if the difference is less than 1 percentage point.

3) All marginal rates are federal plus provincial.

Source: Calculations using the SPSPD/M.

incidence of effective tax rates differing from statutory rates occurs in the group with \$10,000 to \$20,000 of total income.⁵⁰

Canada-US comparisons are instructive. Consider table 5, which is reproduced from the Joint Committee on Taxation study of US taxpayers.⁵¹ In striking contrast to the Canadian results in table 3, the proportion of individuals whose effective marginal tax rate is different from their statutory tax rate increases with the statutory marginal tax rate in the United States. In the two top brackets, over 85 percent of taxpayers are affected, although the differences in average effective tax rates between affected and non-affected individuals are larger at lower levels of taxable income. Still, the rationale for phaseouts and similar measures—to deny benefits to high-income individuals—seems to be different in the United States; phaseout effects are still continuing for taxpayers with taxable incomes of over US\$200,000, while in Canada almost all phaseouts are finished before taxable income reaches \$75,000. Admittedly, the US taxable incomes are in many cases the income of a couple, since the United States has joint filing (in contrast to Canada, which permits only individual filing). Also, the joint committee study considers only federal income taxes and does not include transfer programs.

Another Canada-US comparison that can be made is the number of people who have differences between their effective and statutory rates. The number in the United States is 33 million taxpayers, or about one-quarter of the total. To derive a comparable figure for Canada, it is necessary to exclude all provincial programs and federal transfer payments, leaving only the federal income tax measures. This cannot easily be done using the SPSPD/M, but it is possible to add up the number affected for the eight such measures listed in table 1 (the old age security benefit reduction; the phaseouts of the Canada child tax benefit, the GST credit, the age credit, and the supplementary personal tax credit; the phase-in of the GST credit; and the threshold to the medical expense tax credit).⁵² A total of 11,045,000 individuals, or 28 percent of all people in Canada, have effective marginal tax rates that are affected by these measures. Of taxpayers only, 34 percent are affected. Thus, a significantly greater proportion of Canadians experiences differences between effective and statutory marginal tax rates.

⁵⁰ One strange result is that in the group whose effective rates differ from their statutory rates, both statutory and effective rates are lower in the two top income groups than in the income groups immediately below them. The reason for this result is that these particular individuals have large total incomes but relatively small taxable incomes owing to large tax deductions.

⁵¹ Joint Committee on Taxation, *supra* footnote 1, at table 3.

⁵² Joint filing of married couples in the United States has a similar effect to the marital credit but is not included in the joint committee figures. Therefore, to avoid biasing the comparison, the marital tax credit is excluded.

Table 5 Distribution of US Individual Taxpayers by Federal Statutory Marginal Tax Rate and by Whether the Taxpayer's Effective Marginal Tax Rate Differs from His/Her Statutory Marginal Tax Rate (1998)

Statutory marginal tax rate	All individuals				Effective rate equals statutory rate				Effective rate differs from statutory rate			
	Range of taxable income (\$US) ^a	No. (000s)	Average effective marginal tax rate (%)	No. (000s)	Average effective marginal tax rate (%)	No. (000s)	Average effective marginal tax rate (%)	No. affected (000s)	Average effective marginal tax rate (%)	No. affected (000s)	Average effective marginal tax rate (%)	% of group
0%	0	40,500	-0.2	33,400	0	7,100	-11.2	17				
15%	0 - 25,350	62,200	16.8	46,800	15	15,500	22.4	25				
28%	25,351 - 61,400	26,600	28.4	19,700	28	6,900	29.4	26				
31%	61,401 - 128,100	3,000	31.7	900	31	2,000	32	67				
36%	128,101 - 278,450	1,100	37.1	100	36	1,000	37.2	91				
39.6%	over 278,450	700	40.2	100	39.6	600	40.3	86				
All taxpayers	na	134,100	14.1	100,900	12.8	33,200	18.1	25				

^a The taxable income ranges shown are those for single individuals. The taxable income brackets and statutory marginal tax rates for married individuals filing jointly are as follows: \$0-\$42,350, 15%; \$42,351-\$102,300, 28%; \$102,301-\$155,950, 31%; \$155,951-\$278,450, 36%; and over \$278,450, 39.6%.

Notes: 1) The analysis excludes individuals who are dependants of other taxpayers and taxpayers with income less than zero.
 2) na means not applicable.

3) All rates shown reflect only federal income taxes. They do not include transfer payments or state income taxes.

Source: United States, Joint Committee on Taxation, *Present Law and Analysis Relating to Individual Effective Marginal Tax Rates*, JCS-3-98, February 3, 1998 (Washington, DC: US Government Printing Office, 1998), table 3.

Who Has High Effective Rates?

To the extent that individuals understand the tax-transfer system, it is the effective marginal tax rate that should affect decisions about tax planning, work, and savings. Also, the greatest such effects would be expected to be observed at the highest rate levels. Thus, it is interesting to study which individuals have the highest effective rates.

Since the lowest statutory rate for the highest income earners in the country for 1999 is Alberta's 45.6 percent, one definition of a high effective rate is any such rate over 45 percent. Table 6 shows that 17 percent of the Canadian population has an effective marginal rate that is at least this high. This group includes at least 99 percent of all individuals in the three top statutory rate brackets. Surprisingly, these three top brackets comprise only 20 percent of the people with these high effective rates. Almost equal percentages of the 45 percent-and-over effective rate class come from the 17 percent and 26 percent federal statutory rate brackets. The federal statutory rate bracket making the greatest contribution (27 percent) to this effective rate category is the class of people with a 0 percent statutory rate and some income. Fully 18 percent of the people in this statutory rate category have such a high effective rate.

Table 6 also shows that a more extreme pattern is observed when the high effective rate is defined more stringently as an effective rate of 60 percent or more. Only 3 percent of the population has an effective rate this high. With this definition, 98 percent of the people in this class have federal statutory rates of 26 percent or less. Fully 40 percent of the people in this effective rate class come from the federal statutory rate category of 0 percent with no income. While many policy makers and social policy observers generally understand that the least well-off have the highest marginal tax rates, it may be surprising that the numbers are this high—without even including social assistance.

Age is an important determinant of inclusion in these two high-effective-rate classes. Although only 13 percent of the population is over age 65, the over-65 group makes up 35 percent of the people with an effective rate over 45 percent and 66 percent of the people with an effective rate over 60 percent. The benefit reduction for the spouse's allowance and the guaranteed income supplement (plus provincial top-ups) are the most important causes.

Table 7 shows that seniors generally have higher effective rates regardless of the federal statutory rate bracket. For three of the higher brackets (the 28.3 percent bracket, the 31.6 percent bracket, and the portion of the 31.3 percent bracket relating to individuals with less than \$100,000 of taxable income), there is a 5-7 percentage point difference between effective and statutory rates. Even if an individual drops into a lower statutory rate bracket on retirement, it is quite possible that his or her effective rate will rise.⁵³

⁵³ Although seniors have higher effective tax rates as a result of government transfer programs, they are certainly better off as a result of these programs because their after-tax income has increased.

Table 6 Analysis of Individuals with High Effective Marginal Tax Rates (1999)

Federal statutory marginal tax rate	Effective rate 45% or more			Effective rate 60% or more		
	No. (000s)	Percentage of people in the statutory rate category with this effective rate	Percentage of people in the effective rate category with this statutory rate	No. (000s)	Percentage of people in the statutory rate category with this effective rate	Percentage of people in the effective rate category with this statutory rate
0%: no income	3	—	—	2	—	—
0%: some income	1,352	18	27	390	5	40
17%: lower	366	13	7	272	10	28
17%: upper	602	11	12	165	3	17
26%	1,045	24	21	111	3	12
28.3%	383	38	8	19	2	2
31.6%	343	99	7	3	1	—
31.3%: < \$100K TI	663	100	13	3	—	—
31.3%: > \$100K TI	236	100	5	—	—	—
All individuals	5,040	17	100	965	3	100

Notes: 1) TI denotes taxable income.

2) — indicates less than 0.5%.

3) Except as otherwise indicated, all marginal rates are federal plus provincial.

Source: Calculations using the SPSPD/M.

Table 7 Effective Marginal Tax Rates by Age, Number of Children, and Selected Provinces (1999)

Federal statutory marginal tax rate	Age		Age less than 65, number of dependent children is . . .						Province			
	65 or more	Less than 65	0	1	2	3	BC	Alta.	Ont.	Que.		
			0	1	2	3						
0%: no income	1.1	4.1	6.6	4.3	4.4	3.2	0.2	0.1	0.2	16.6		
0%: some income	44	10.1	8	10.9	14.5	14.5	15.7	15.3	16.1	24.4		
17%: lower	48.1	30.3	28.5	32.1	35.7	36.7	31.2	30.6	32.9	37.1		
17%: upper	36	32.8	30.3	35.6	37.6	38	29.4	30.6	29.2	42.7		
26%	45.4	42.5	40.5	43.1	46.2	48.8	41.0	40.3	39.6	49.2		
28.3%	49.6	43.9	42.7	44.1	45.8	47	43.2	41.7	41.2	51.6		
31.6%	56.8	49.5	48.7	49.4	49.8	53.6	50.6	46.7	48.3	54.2		
31.3%: < \$100K TI	55.6	50.3	50	50.3	50.2	52	51.4	46.0	50.2	53.3		
31.3%: > \$100K TI	51	50.2	50.1	50.8	49.5	50.1	52.9	45.4	49.7	52.9		
All individuals	42.8	22.4	26.2	22.3	19.4	15.8	22.6	21.9	24.0	32.5		

Notes: 1) TI denotes taxable income.

2) Except as otherwise indicated, all marginal rates are federal plus provincial.

Source: Calculations using the SPSD/M.

The other important demographic determinant of a high effective marginal tax rate is dependent children. Table 7 shows that across almost any particular federal statutory rate bracket, the average effective rate rises by about 2-3 percentage points per child. This effect disappears in the two highest federal statutory rate categories. The leading contributors to this pattern are the phaseouts of the GST credit and the Canada and provincial child tax benefits.

Effective marginal tax rates for the four most populous provinces (British Columbia, Alberta, Ontario, and Quebec) are also shown in table 7. Throughout the income scale, Alberta generally has the lowest rates and Quebec the highest. The degree to which Quebec's rates exceed those of other provinces is quite striking for the low and middle federal statutory rate brackets. For example, Quebec's effective marginal tax rate for the upper half of the 17 percent bracket (42.7 percent) is more than 12 percentage points higher than the rate in each of the other three provinces. Quebec has both higher statutory rates than other provinces and, as shown in table 2 above, more differences between effective and statutory rates.

CONCLUSION

In an era of deficit cutting and debt reduction, it is perhaps inevitable that policy makers would create the proliferation of measures such as those described in this article. Phaseouts, benefit reductions, and the like constrain the costs of programs and thereby satisfy the political desire to be seen as doing something constructive without attaching a high price tag. In this respect, the 1998 federal budget may be regarded as a pinnacle in that it introduced both a phased-out surtax reduction and a phased-out supplementary personal tax credit.⁵⁴

The introduction of such measures carries more than a revenue cost, however. Apart from their adverse incentive effects for work and saving, these measures compromise the basic goal of simplicity in the tax system. Taxpayers need to be able to calculate their marginal tax rates easily if they are to avoid errors in simple tax-planning decisions, such as whether to contribute to an RRSP. A taxpayer must now master the complications of the 19 special features of the federal tax and transfer system listed in table 1 above in order to compute this basic information—in addition to the labours involved in calculating his or her statutory tax rate.⁵⁵

⁵⁴ One alternative to the measures proposed in the budget that would have similar distributional consequences but less confusing marginal rate effects is to lower the first-bracket rate from 17 percent to 16.6 percent. See Finn Poschmann, *How Do I Tax Thee? Choices Made on Federal Income Taxes* (Toronto: C.D. Howe Institute, 1998).

⁵⁵ In some respects, most of the computational complexity concerns the statutory rates. Every individual requires 3 to 5 numbers (the section 117 rate, the federal surtax rate, the provincial rate on basic federal tax, the provincial surtax rate, and the Quebec abatement rate) to compute his or her statutory rate, while, as noted above, only 51 percent of individuals have differing effective and statutory rates and each of these individuals is affected by an average of 1.9 of the measures listed in table 1.

This complexity may even cause tax practitioners to make errors. In the United States, concerns have been raised that practitioners could be “blind-sided” by clients’ unexpected loss of tax or transfer benefits, often completely unrelated to the transaction at hand.⁵⁶ To prevent such occurrences, tax-planning software should display a marginal tax rate that takes into account effects on government transfer programs. Currently, such rates often consider only the tax return; one has to consult separate schedules to study effects on, say, refundable credits. More subtle errors arise from not anticipating future-year effects. For example, clients could be dismayed with their investments in RRSPs if they discover in retirement that their marginal tax rates are higher than they were when the contributions were made.⁵⁷

One way to reduce taxpayers’ errors in estimating marginal tax rates is for the government to calculate each taxpayer’s effective marginal tax rate for the past year and print it on the notice of assessment. This disclosure would be in the spirit of the present practice of informing taxpayers about their RRSP room. Revenue Canada would probably not have all of the information to take all of the transfer programs and Quebec provincial income tax into account, but it would be easy to include at least the items that appear on the tax return plus the Canada child tax benefit and the GST credit. This solution is not likely to be adopted, however, because in addition to the obvious political disadvantages, there would be a concern that raising awareness of marginal tax rates might increase the disincentive effects on work and saving.

Restructuring could help make the system more transparent. The combination of the 3 percent surtax and the surtax reduction could be exactly reproduced in its effects by a much more transparent 9 percent surtax on amounts of basic federal tax between \$8,333 and \$12,500. At a slight revenue loss but with even more transparency, one could replace both the 3 percent and 8 percent surtaxes and the surtax reduction with a single 8 percent surtax on amounts of basic federal tax above \$8,333.⁵⁸ Replacing the present tax-on-tax system of calculating provincial personal income tax with a tax-on-base system could greatly simplify the calculation of provincial statutory marginal rates (although the figures for Quebec shown

⁵⁶ “Blindsided: How Marginal Tax Rates Affect Tax Strategies,” *Accounting Today*, March 16, 1998.

⁵⁷ Although the primary benefit of RRSPs is tax deferral, the difference in marginal rates also can be important—even with the withdrawal of the seniors’ benefit proposal. See Malcolm P. Hamilton, “Silent Running: The Quiet Reform of the Retirement Income System,” in *Report of Proceedings of the Forty-Eighth Tax Conference*, 1996 Conference Report, vol. 2 (Toronto: Canadian Tax Foundation, 1997), 60:1-21; and Darroch (Rick) Robertson and T. Ross Archibald, “Are RRSPs Beneficial to All?” (Spring 1998), 11 *Canadian Investment Review* 27-33.

⁵⁸ The revenue loss is due to the fact that this proposal would lower the surtax rate in the phase-out range of the surtax reduction from the present 9 percent (as discussed above) to 8 percent.

in table 2 make one wonder if this would be at the cost of adding more complexity to effective rates). Perhaps the GST credit and the Canada child tax benefit could be combined into a single measure, since they share the same family income measure and phaseout ranges. A US proposal for simplifying phaseouts could be of relevance here.⁵⁹ Fundamentally, however, true simplicity can be achieved only by eliminating the phaseouts altogether and adjusting the tax rates as necessary to protect revenue and achieve distributional targets. For example, one suggestion is to eliminate the phaseouts of refundable credits and to make the credits taxable.⁶⁰ For the Canada child tax benefit, this would essentially mean replacing it with the pre-1989 system of universal family allowance payments.

Future research on effective marginal tax rates should address the changing pattern over time. Since the SPSD/M can model any year from 1984 to the present, it would be worthwhile to document recent trends. It would also be worthwhile to further disaggregate the results into particular programs, particularly at the provincial level. Finally, it would be interesting to do a survey or experiment to determine the extent to which taxpayers and tax practitioners correctly calculate effective marginal tax rates. One study has found that US taxpayers make significant errors.⁶¹ Since our tax rates are even less transparent than theirs, one would expect an even bigger problem here.

APPENDIX: TECHNICAL ISSUES

SPSD/M Modelling

Although the SPSD/M is an excellent tool for analyzing marginal tax rates, it was not designed with this in mind as a primary purpose. As a result, some tradeoffs made in the model's design cause difficulties. In particular, the SPSD/M does not allow a user to compute in a single run the amounts of various tax and transfer-payment variables with and without an increase in income. An exception to this rule is the SPSD/M's own marginal tax rate facility (or rewriting of the original source code of the SPSD/M in C++, which requires extensive programming knowledge). This facility is not suitable for computing effective marginal tax rates because it calculates the change in taxes and transfers only for the individual receiving the increase in income and not for the rest of the family. For example, for a married couple, an increase in income of either husband or wife could cause a decrease in the amount of the child tax benefit received. The SPSD/M's marginal tax rate facility would take this change into account in computing the wife's marginal tax rate but not the husband's.

⁵⁹ See Mares, *supra* footnote 3.

⁶⁰ James Davies, "Personal Income Tax: Directions for Structural Reform," *Policy Options* (forthcoming).

⁶¹ Timothy J. Rupert and Carol M. Fischer, "An Empirical Investigation of Taxpayer Awareness of Marginal Tax Rates" (September 1995), 17, supplement *Journal of the American Taxation Association* 36-59.

The only solution to this problem in so-called black box mode (as opposed to glass box mode, which involves rewriting the source code) is to calculate for each individual in the database the values of these variables with the extra \$100 of income, write them out,¹ read them into a second-stage run using the reference value facility, and then use the two sets of variables to compute the effective marginal tax rate and its components. Because of the tax and transfer-payment links within families, one must do a separate set of runs for each individual in the family (that is, for each possible combination of values for the sequence numbers of the individual and the census family, “idinseq” and “idcfseq”). Since there are 27 such combinations and each one takes a pair of runs, 54 individual runs are required. The creation of effective marginal tax rates for any particular taxation year takes about 30 minutes for a 266-megahertz Pentium II machine with 64 megabytes of memory. Once this is done, each second-stage run to produce tables takes only about 2 minutes on this machine.

A similar difficulty occurs in relation to the takeup rates for the guaranteed income supplement, spouse’s allowance, and employment insurance programs. The problem is that the program randomly assigns individuals to the “take” and “do-not-take” classes in order to achieve the overall target takeup rate, and different individuals may be assigned to the two classes in the first-stage and second-stage runs. People who are not in the same class on the two runs will have spurious hugely positive or hugely negative effective marginal tax rates. The solution adopted is as follows. First, in the first run all takeup rates are set to 100 percent (by setting GISTURFLAG equal to zero and UIEITKP to a vector of 10 zeroes), while in the second run they are reset back to the normal SPSPD/M rates. Second, to eliminate the problem relating to people who are assigned to “take” in the first run but “do not take” in the second run, the change in the transfer payment between the two runs is subtracted from the calculated effective marginal tax rate if the amount of the payment calculated in the second run is zero. This method will introduce errors since some elements of the tax calculation (for example, division B income) will be incorrect for those individuals.

A further problem with the SPSPD/M is that the program code does not allow tax credits to be transferred from a high-income spouse to a low-income spouse, even though the high-income spouse may be paying tax while the low-income spouse is not. This situation can occur if the high-income spouse has an exceptionally large amount of credits, typically including the impairment credit. This defect in the code causes problems if the addition of \$100 causes the low-income spouse suddenly to have the higher income and become eligible to receive credits transferred from

¹ SPSPD/M results files are normally rounded to the nearest dollar before being written out. To avoid the small inaccuracies that this rounding produces, the precision for each variable should be set to, say, 4 decimal places.

the other spouse. High negative, but spurious, effective marginal tax rates are produced for a few individuals.

Another problem concerns the foreign non-business tax credit (“imfortxc”). This credit is modelled as the lesser of foreign income taxes paid and division B income net of certain adjustments. The second quantity really should be the ratio of foreign income to adjusted division B income, but the SPSPD/M has no measure of foreign income. As a result, large and spurious marginal tax rate effects occur for taxpayers with little division B income. This problem is resolved by deducting from the effective marginal tax rate any contribution to that change caused by the change in the foreign tax credit.

AMT Issues

A taxpayer subject to the federal AMT under section 127.5 has a federal tax liability equal to the difference between 17 percent of “adjusted taxable income” and the “basic minimum tax credit.” Naive use of the SPSPD/M would lead one to conclude that such a taxpayer’s federal effective marginal tax rate is 17 percent since the offset of this tax in a future year, through the carryover provision, is ignored. As the two examples below demonstrate, the effect of this omission on an individual’s effective marginal tax rate will depend on the taxpayer’s section 117 tax bracket.

For the first example, suppose that in 1999 a taxpayer has regular part I tax of zero and minimum tax of \$50,000 so that the minimum tax determines her tax liability. If her income increases by \$1, her tax liability increases by 17 cents; however, her AMT carryover also increases by 17 cents. If this carryover can be applied to reduce regular part I tax two years hence, in 2001, there is a tax saving of 17 cents in that year. The present value of the tax savings to be realized two years in the future must be subtracted from the value of the minimum tax paid this year. The effective marginal tax rate is therefore calculated as $0.17 - 0.17/(1+r)^2$, where r is the assumed discount rate. If r equals 10 percent, this taxpayer’s effective marginal rate in 1999 is 3 percent.

For the second example, suppose instead that the taxpayer has a substantial amount of regular part I tax in 1999, say, \$30,000, but with the same minimum-tax liability of \$50,000. Given this level of part I tax, the taxpayer must be in the 29 percent section 117 tax bracket. A \$1 increase in income would, as before, cause a 17-cent increase in the tax liability (reflecting the AMT rate). However, in this case, the carryover amount would be *reduced* by 12 cents since regular part I tax in 1999 goes up by 29 cents but the minimum tax goes up by only 17 cents. If, as before, the minimum-tax carryover will be used in 2001, the federal effective marginal tax rate is given by $0.17 + 0.12/(1+r)^2$. For r equal to 10 percent, the effective rate is 26.9 percent (instead of the statutory 29 percent in this tax bracket).

In these two examples, it is more accurate to compute the taxpayer’s effective marginal tax rate as if the AMT did not exist and to use only regular part I tax. In the first example, there would be a 3 percentage

point error between the true effective marginal rate and the rate calculated when the AMT is ignored (that is, 3 percent minus 0 percent). In the second example, the error would be 2.1 percentage points (that is, 26.9 percent minus 29 percent). Including the AMT in calculating the effective rate would produce much larger errors. In both cases, the effective rate would be 17 percent, and the error would be 14 percentage points (that is, 3 percent minus 17 percent) in the first case and 9.1 percentage points (that is, 26.9 percent minus 17 percent) in the second case.

Including the AMT will improve the accuracy of the effective rates only if the carryover is not claimed for a long time or expires, and hence is small in present value terms. By far the most common situation, however, is quick recovery of the AMT through the carryover provision. A study found that of the total amount of Quebec AMT (which is similar to the federal AMT) paid in 1988, 48 percent was recovered by the taxpayer in the following year and a further 23 percent was recovered in the second following year.²

² Gilles N. Larin and Marie N. Jacques, "Is the Alternative Minimum Tax a Paper Tiger?" (1994), vol. 42, no. 3 *Canadian Tax Journal* 804-42, at 839, table 13, lines 15 and 16.