Tax Incidence in Canada

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PRÉCIS

Cet article utilise une nouvelle microbase de données et un nouveau modèle de simulation pour mesurer l'incidence des impôts sur les familles à revenus faibles, moyens et élevés en 1988 au Canada. L'article de Ruggeri, Van Wart et Howard, qui paraît dans ce numéro, recourt à une méthodologie similaire pour estimer l'incidence fiscale au Canada pour 1986 et offre un contraste intéressant avec nos résultats.

Nous élaborons des mesures d'ensemble pour deux bases de revenu, les revenus avant impôt et les revenus globaux. Pour la première fois, ces mesures comprennent des estimations de plusieurs suppléments assez importants aux revenus (comme les gains en capital accumulés sur les actions en vertu des fluctuations de la demande de marché, certains ajustements pour les revenus de pension et pour les fonds de pension, les legs et les dons). Le fait de disposer de ces sources de revenu améliore le bien-être financier des familles; elles devraient donc être incluses dans le calcul des revenus d'ensemble.

Cet article présente donc des résultats de calculs de l'incidence fiscale effectués à partir de deux bases de revenu, celle des revenus avant impôt et celle des revenus globaux; alors que de son côté, l'article de Ruggeri, Van Wart et Howard présente des résultats basés sur une définition du revenu après impôt. Pour des raisons de politiques, nous préférons utiliser les revenus globaux comme base pour mesurer l'incidence fiscale.

Dans son ensemble, le régime fiscal canadien est légèrement progressif jusqu'au niveau de revenus moyens alors qu'au-delà de ce niveau, il est plus ou moins proportionnel, avec une légère progressivité pour la tranche de 1 pour cent des familles les plus riches. Cette tendance générale de

l'incidence fiscale résulte d'un régime fiscal fédéral nettement progressif (surtout jusqu'au niveau de revenus moyens), un régime fiscal provincial plus ou moins proportionnel, et un régime fiscal local régressif pour tous les niveaux de revenus.

Seul l'impôt sur le revenu des particuliers, représentant 39 pour cent des impôt payés par les familles canadiennes, contribue de façon significative au degré de progressivité qui existe dans l'ensemble du régime fiscal canadien. Dans l'ensemble, les taxes de vente et d'accise, les impôts fonciers et les divers impôts indirects combinés représentent la même part des recettes totales que l'impôt sur le revenu des particuliers; tous ces impôts constituent des éléments régressifs dans le système fiscal canadien. Les charges salariales sont légèrement progressives pour les familles à revenus faibles, plus ou moins proportionnelles pour les familles à revenus moyens, et légèrement régressives pour les familles à revenus élevés. En général, l'impôt des sociétés n'affecte que les familles à revenus élevés.

Les résultats de l'étude sont sensibles à la définition du revenu de base et aux hypothèses concernant la distribution du fardeau fiscal; ce qui indique qu'il faut faire preuve d'une certaine prudence au niveau de l'interprétation des résultats. Cependant, nous sommes d'avis que d'une perspective politique, l'utilisation du concept de revenus globaux et des hypothèses de base concernant la distribution du fardeau fiscal—qui correspondent d'ailleurs en grande partie à ce qui parait dans la littérature à ce sujet— servent à produire une évaluation juste de l'incidence fiscale au Canada en 1988.

ABSTRACT

This article employs a new microdatabase and simulation model to measure tax incidence for low, middle, and high income families in Canada in 1988. The Ruggeri, Van Wart, and Howard article in this issue, which uses a similar methodological approach to estimate tax incidence in Canada for 1986, provides an interesting contrast with our findings.

We develop comprehensive measures of income for two income bases, pre-fisc and broad income. These measures include, for the first time, estimates of several sizable additions to income (accrued capital gains on shares attributable to changes in market demand, adjustments for pension income and pension funds, and inheritances and gifts). These sources of command over goods and services improve the economic well-being of families, and thus should be included in a comprehensive measure of income.

This article presents tax incidence findings for a pre-fisc and broad income base, while the Ruggeri, Van Wart, and Howard article presents the findings for a post-fisc income base. For policy reasons, the broad income base is our preferred choice for measuring tax incidence.

The total Canadian tax system is slightly progressive up to the median broad income level, beyond which it is more or less proportional with a hint of progressivity for the richest 1 percent of families. This overall tax incidence pattern is composed of a federal tax system that is clearly progressive (especially up to the median income), a provincial tax system

that is more or less proportional, and a local tax system that is regressive throughout the income scale.

Only the personal income tax, which accounts for 39 percent of taxes paid by Canadian families, is a significant contributor to whatever progressivity exists in the total Canadian tax system. Sales and excise taxes, property taxes, and other miscellaneous indirect taxes combined account for the same share of total taxes paid as the personal income tax, and they are all regressive elements in the Canadian tax system. Payroll taxes are slightly progressive for lower income families, more or less proportional for middle income families, and slightly regressive for higher income families. Corporation income taxes in general affect only higher income families.

The findings are sensitive to the choice of income base and to the choice of tax shifting assumptions, suggesting a note of caution in interpreting the results. However, it is our judgment that the policy perspective of the broad income base and the standard case shifting assumptions, which are consistent with much of the literature, provide the basis for an accurate assessment of tax incidence for Canada in 1988.

INTRODUCTION: WHO PAYS THE TAXES IN CANADA?

This article measures tax incidence for low, middle, and high income families in Canada in 1988. The results allow us to determine whether the Canadian tax system is progressive, proportional, or regressive.

Empirical evidence on total tax incidence in Canada is woefully out of date. The last years for which we have comprehensive tax incidence estimates are 1969 and 1970.[1] The only year for which we have empirical information on the tax burdens of families and unattached individuals at the micro level of analysis is 1972.[2] This empirical vacuum inhibits careful policy analysis, independent evaluation, and constructive critical debate of major reforms of taxes and transfers in Canada.

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[1] For 1969, see W. Irwin Gillespie, *The Redistribution of Income In Canada* (Ottawa: Gage, 1980); for 1970, see David A. Dodge, "Impact of Tax, Transfer, and Expenditure Policies of Government on the Distribution of Personal Income in Canada" (March 1975), 21 *The Review of Income and Wealth* 1-52. See also James A. Johnson, *The Incidence of Government Revenues and Expenditures,* a study prepared for the Ontario Committee on Taxation (Toronto: Queen's Printer, 1968) for a fiscal incidence study of Ontario for 1961; and Allan M. Maslove, *The Pattern of Taxation in Canada,* a study prepared for the Economic Council of Canada (Ottawa: Information Canada, 1973) for a separate tax incidence study for 1969.

[2] John Whalley, "Regression or Progression: The Taxing Question of Incidence Analysis" (November 1984), 17 *Canadian Journal of Economics* 654-82. See also Isabella Horry, Sally Pipes, and Michael Walker, *Tax Facts Seven: The Canadian Consumer Tax Index and You (* Vancouver: Fraser Institute, 1990). Notwithstanding the increasing availability of microdata files throughout the 1980s and an academic preference for computable general equilibrium modelling of tax incidence and fiscal incidence, no such empirical estimates exist for Canada, and the international evidence is restricted to Australia (John Pigott and John Whalley, "Interpreting Net Fiscal Incidence Calculations" (November 1987), 69 *The Review of Economics and Statistics* 685-94).

A new microdata simulation instrument makes it possible to estimate tax incidence in 1988 for each family unit, rather than relying on aggregate data grouped by income brackets. Statistics Canada's social policy simulation database and model (SPSD/M) permits an analyst to estimate the effects of some taxes and transfers on each family unit in the sample.[3] The model can be extended and adapted to estimate the impact of all taxes on the income of each family unit. Most noteworthy in this regard are the Fair Tax Commission's tax incidence estimate for Ontario residents,[4] and the Ruggeri, Van Wart, and Howard estimate of total Canadian tax incidence within a fiscal incidence framework for 1986.[5] The latter paper is included in this issue and provides an interesting methodological contrast with our own findings.

Our article proceeds in four stages. The next section briefly discusses the analytical approach for estimating tax and expenditure incidence that has been developed in the literature. The third section presents the methodology of the study, the choice of the income concept, the tax shifting assumptions, and a description of the data sources. The fourth section presents the empirical estimates of Canadian tax incidence for 1988. The fifth section provides the conclusions and an agenda for future research. The appendix documents the derivation of the empirical results.

TAX, EXPENDITURE, AND FISCAL INCIDENCE ANALYSIS

Fiscal incidence analysis looks at how government taxes, transfers, and expenditures alter the economic well-being of families. A fiscal incidence study attempts to answer the questions, "Who pays the taxes?" and "Who gets the benefit of the transfers and services that governments provide?"

Fiscal incidence can be disaggregated into tax incidence, which is the impact of all taxes on the relative economic welfare of families, and expenditure incidence, which is the impact of all government transfer payments and government provision of public goods and services on the relative economic welfare of families.

This study focuses on the question, "Who pays the taxes?" Determining the answer is not straightforward because the person who is legally responsible for paying a tax to the government may not be the person who bears the burden of the tax. A manufacturer who pays the manufacturers' sales tax may be able to increase the prices of goods sold to buyers and thereby shift the tax forward to consumers. Alternatively, a manufacturer in a competitive free trade world where other countries do not have a manu-

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[3] Michael Bordt, Grant J. Cameron, Stephen F. Gribble, Brian B. Murphy, Geoff T. Rowe, and Michael C. Wolfson, "The Social Policy Simulation Database and Model: An Integrated Tool for Tax/Transfer Policy Analysis" (1990), vol. 38, no. 1 *Canadian Tax Journal* 48-65.

[4] Shelia Block and Richard Shillington, "Incidence of Taxes in Ontario in 1991," a research paper prepared for the Ontario Fair Tax Commission (mimeograph, Toronto, 1993).

[5] G.C. Ruggeri, D. Van Wart, and R. Howard, "The Redistributional Impact of Taxation in Canada" (herein referred to as RVH) in this issue of the *Canadian Tax Journal*.

facturers' sales tax cannot raise prices but may be able to reduce wages, thereby shifting the tax backward to labourers. Landlords pay the real property tax on their buildings to the municipal government, but under some circumstances they may be able to increase tenants' rents and shift the burden of the tax forward. However, if renters are very mobile and it is a buyers' market, landlords may have to absorb the tax out of a reduced return on their invested capital.

Given these theoretical possibilities, it is necessary to choose a set of tax shifting assumptions that are theoretically and empirically consistent for a given economy of specific characteristics. A tax incidence study quantifies a set of tax shifting assumptions that are internally consistent with, and follow from, some general equilibrium model of the economy. Where the theory of tax incidence is in dispute, as it is for the property tax, the analyst can model several alternative theories of tax incidence.

This approach provides a sensitivity analysis of the findings. However, a disadvantage of modelling alternative sets of tax shifting assumptions is the uncertainty that comes with knowing there may be more than one answer to the question, "Who pays the taxes?" This should cause analysts to be more humble, and policy makers and politicians to be more cautious, in recommending tax reforms. The strength of the approach is that it provides us with both upper and lower bounds of tax incidence that we can rely upon with a reasonable amount of certainty.

Once we have determined who bears the burden of the taxes, we can relate the tax burdens to some annual measure of the economic capacity or economic welfare of families. These derived effective tax rates (taxes paid as a percent of economic capacity) allow us to compare the tax burdens of families with different incomes, and to establish whether the tax system is progressive, proportional, or regressive.

The economic welfare of families can be measured in numerous ways. Money income earned by families in the market economy is one measure of economic welfare. A broader income base, however, which takes into account non-money income, such as imputed rents from owner-occupied residences, and additions in command over goods and services that are not included in official data on money income (such as realized capital gains on principal residences and inheritances and bequests), because it is more comprehensive, provides a better measure of the relative economic capacities of families. The most comprehensive income base that could conceivably be used would account for all money and non-money incomes, including the value of services the family receives from government, as well as income earned in the underground economy, the imputed benefits derived from leisure, and the income equivalents of excess burdens of taxes.

From this array of potential measures of economic well-being, three major income bases have emerged in the literature:[6]

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[6] For a discussion of how these income bases emerged from the theory of tax, expenditure, and fiscal incidence, and the use of such measures of welfare in empirical studies, see

1) *Pre-fisc income*: Assume that the government exists only in its taxing capacity. Individuals receive factor income from employment and investment of capital, non-money income from such sources as imputed rents from owner-occupied homes and food and fuel grown and consumed on the farm, and other increases in command over goods and services that are not recorded as income in official statistics, such as inheritances and gifts. Transfer payments from government (unemployment insurance benefits, old age security payments, family allowances, and other transfers to persons) are not included in pre-fisc income.

2) *Broad income*: Assume that the government exists in its taxing capacity and undertakes some redistribution of factor incomes by applying taxes and providing transfer income to families. Broad income is pre-fisc income plus transfers.

3) *Post-fisc income*: The government exists in its current structure, applying taxes that reduce the incomes of persons, and providing transfers and goods and services that increase the welfare of persons. The transfer payments are a money source of income, and the government goods and services are an imputed goods-in-kind source of non-money income. Post-fisc income includes transfer payments and the imputed value of government goods and services, and excludes tax payments.[7]

The advantage of the pre-fisc income base is that it provides a comprehensive measure of income before the government redistributes it through the collection of taxes and dispensing of transfers and goods and services. The tax incidence rates calculated using this income base can be interpreted as answering the question: "What share of families' market incomes does the government collect in taxes?" They describe how the government "takes" on the tax side without attempting to account for how it "gives" on the spending side. Tax incidence rates using the pre-fisc income base as compared with the broad income base will be higher for lower income families, since a substantial share of these families' incomes comes from government transfers.

The broad income base is similar to "personal income" in Statistics Canada's system of national accounts (SNA), and "total money income" in its survey of consumer finances (SCF)[8] and the SPSD/M microdatabase. It has the added practical benefit that individuals and families consider transfers to be a part of their income (more so than they do the imputed value of government goods and services). Families have full discretionary control over how they will spend money received through transfers; they

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[6] Continued . . .

the references, supra footnote 1 and infra footnote 11; and see Paul Johnsen, "Tax, Expenditure and Net Fiscal Incidence: A Post 1980 Literature Review" (mimeograph, May 1992).

[7] Pre-fisc income and post-fisc income correspond to the terms, "broad income" and "adjusted broad income," respectively, in Gillespie, supra footnote 1. They correspond to the terms, "hypothetical post-government income associated with a distributionally neutral budget" and "actual post-government income," respectively, in RVH, supra footnote 5.

[8] Statistics Canada, *Income Distributions by Size in Canada, 1992*, catalogue no. 13-207.

do not generally have direct control over what (public) goods and services will be provided for them by government. Tax incidence rates using the broad income base answer the question, "What share of income directly controlled by families does the government collect in taxes?" This income measure is useful for policy makers because they are often interested in analyzing the impact of proposed tax changes on the relative after-tax, after-transfer economic position of families. For this reason, and the fact that it can be more accurately measured than a post-fisc income base, it has often been used in tax incidence analyses.[9] Broad income has the disadvantage that some part of the government, but not all, is allowed for in the definition.

The advantage of the post-fisc income base is that it provides the most comprehensive measure of the three income bases. The tax incidence rates reflect the fact that the government redistributes tax dollars through both transfers and the provision of services. The incidence rates can be interpreted as answering the question, "What share of after-tax income, including the imputed income from government services, does the government collect in taxes?" These rates provide a clear picture of how the government "takes" on the tax side, after it has "given" on the spending side. The disadvantage of this base is that it is more difficult to measure, since it requires making many assumptions concerning the distribution of the benefits of government services among income groups.

The present paper provides estimates of tax incidence in Canada for 1988 using the pre-fisc and the broad income bases. We plan to estimate the post-fisc income base as part of our future research agenda.

The most recent year for which the rich microdatabase of the SPSD/M is available is 1988. Given the stability in the underlying quintile distribution of money income in Canada over the past 40 years[10] and the few substantive changes in the tax structure since 1988 (the exception being the substitution of the goods and services tax for the manufacturers' sales

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[9] See, for example, Block and Shillington, supra footnote 4; Ronald Meng and W. Irwin Gillespie, "The Regressivity of Property Taxes in Canada: Another Look" (1986), vol. 34, no. 6 *Canadian Tax Journal* 1417-30; Irving Jay Goffman, *The Burden of Canadian Taxation*, Canadian Tax Paper no. 29 (Toronto: Canadian Tax Foundation, 1962); Maslove, supra footnote 1; Joseph A. Pechman, *Who Paid the Taxes, 1966-85?* Studies of Government Finance (Washington, DC: Brookings Institution, 1985); and N.A. Warren, "Australian Tax Incidence in 1975-76: Some Preliminary Results" (1979), vol. 47, no. 3 *Australian Economic Review* 19-30.

[10] Keith Horner and Neil MacLeod, *Changes in the Distribution of Income in Canada,* Staff Working Paper no. Z-7507 (Ottawa: Health and Welfare Canada, Policy Research and Long-Range Planning, May 1975); Roger Love and Michael C. Wolfson, *Income Inequality: Statistical Methodology and Canadian Illustrations,* Statistics Canada, catalogue no. 13-559 (Ottawa: Information Canada, March 1976); Michael Wolfson, "Stasis Amid Change: Income Inequality in Canada 1965-1983" (December 1986), 32 *The Review of Income and Wealth* 337-70; Gillespie, supra footnote 1, at part c, table 9 of supporting documents, and "The Rich, the Poor and the Distribution of Income" (mimeograph, 1993); and Statistics Canada, *Income Distributions by Size in Canada, 1992*, catalogue no. 13-207, quintile distributions in table 53.

tax in 1991), it is unlikely that the general pattern of the tax incidence estimates will have changed much since then.

Notwithstanding the academic allure for lifetime income and tax incidence analyses, we use an annual time frame rather than a lifetime one. Families are aware of longer-term effects of their decisions on incomes and expenditures. However, unanticipated income interruptions, the short-term nature of most private contracts, and financial market imperfections in allocating human and physical capital make predictions of lifetime income flows extremely uncertain. In addition, the structure and level of taxes, of government provision of goods and services, and of transfer payments to persons are subject to continuing change, even over a short time and certainly over a lifetime.

We therefore conclude that tax incidence on a current or an annual basis is more relevant for both taxpayers and policy makers. Where tax incidence studies are of interest to taxpayers, it is generally because the findings of such studies help them to assess their current economic capacity to pay taxes and to compare their current tax burdens with those of other families. Policy makers and politicians are interested in whether the existing tax system is fair and efficient, and if not, what tax changes or major tax reforms would result in a fairer and more efficient tax system in a reasonably short period of time. Moreover, the absence of relevant, accurate data on a lifetime basis, and the complexity of modelling a lifetime "family," when individuals are members of more than one family unit throughout their lifetime, rule out, in our judgment, any meaningful attempt to measure lifetime tax incidence.

The conceptual framework of tax and expenditure incidence analysis, which we have briefly discussed in this section, is well established in the literature.[11] The approach has not been without some controversy, and several thoughtful survey articles have highlighted the issues involved.[12] Our fo-

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[11] For the analysis and development of the methodology in detail, see, in addition to the references in supra footnote 1, R.A. Musgrave, J.J. Carroll, L.D. Cook, and L. Frane, "Distribution of Tax Payments by Income Groups: A Case Study for 1948" (March 1951), 4 *National Tax Journal* 1-53; Morgan Reynolds and Eugene Smolensky, *Public Expenditures, Taxes, and the Distribution of Income: The United States, 1950, 1961, 1970,* Institute for Research on Poverty monograph (New York: Academic Press, 1977); and W. Irwin Gillespie, "Taxes, Expenditures, and the Redistribution of Income in Canada, 1951-1977," in Economic Council of Canada, *Reflections on Canadian Incomes* (Ottawa: Supply and Services, 1980), 27-50.

[12] Luc De Wulf, "Incidence of Budgetary Outlays: Where Do We Go From Here?" (1981), vol. 36, no. 1 *Public Finance* 55-76; B.G. Dahlby, "The Incidence of Government Expenditures and Taxes in Canada: A Survey," in François Vaillancourt, research coordinator, *Income Distribution and Economic Security in Canada*, Collected Studies of the Royal Commission on the Economic Union and Development Prospects for Canada, vol. 1 (Toronto: University of Toronto Press, 1985), 111-51; Eugene Smolensky, William Hoyt, and Sheldon Danziger, "A Critical Survey of Efforts To Measure Budget Incidence," in Hans M. van de Kar and Barbara Wolfe, eds., *The Relevance of Public Finance for Policy Making,* Proceedings of the 41st Congress of the International Institute of Public Finance, Madrid,

(The footnote is continued on the next page.)

cus is to provide a more recent set of estimates of Canadian tax incidence than those existing for 1972. We therefore do not intend to pursue these methodological issues further, except as they relate to building up the appropriate income base and to developing the appropriate tax shifting model.

METHODOLOGY AND DATA

This section of the paper explains the methodology of estimating tax incidence. First we develop the income concepts. Second, we discuss the model of tax shifting that is taken as our standard case. Third, we present two alternative models of tax shifting that are employed to provide a sensitivity analysis of the empirical results. Throughout this discussion, we describe the data sources used in the analysis.

Derivation of the Income Concepts

Pre-fisc income is a broad, comprehensive income concept rooted in the Haig-Simons definition of income.[13] It should encompass all sources of economic capacity or command over goods and services—both money sources and imputed or non-money sources of such command—in order to provide an accurate comparison of the economic position of one family compared with other families in the country. It is gross income received by or accruing to a family, before any income taxes, profits taxes, or payroll taxes have reduced the income flow to the family, because in a world without government such taxes would not exist. For the same reason, it excludes money that is received as a transfer payment from government.

We derive pre-fisc income for Canada in 1988 as follows (the values are from appendix table A.2):

Market Income (SPSD): $372.2 Billion

The first step in building up the pre-fisc income base is to determine market income in the SPSD. The rich microdatabase in the SPSD is built up from four major sources of information on the income and spending of Canadian households.

Statistics Canada's survey of consumer finances (SCF), which contains data for about 100,000 individuals in 41,168 economic families, provides the crucial host data set for detailed information on income sources and family structure. The personal income tax return data in Revenue Canada's *Taxation Statistics* (the green book presentation) provide more detailed information on personal income tax filers and more complete and accu-

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[12] Continued . . .
1985 (Detroit: Wayne State University Press, 1987), 165-79; and James B. Davies, "Tax Incidence: Annual and Lifetime Perspectives in the United States and Canada," in John B. Shoven and John Whalley, eds., *Canada-US Tax Comparisons* (Chicago: University of Chicago Press, 1992), 151-88.

[13] Henry C. Simons, *Personal Income Taxation* (Chicago: University of Chicago Press, 1938); and R. Murray Haig, *The Federal Income Tax* (New York: Columbia University Press, 1921).

rate income source information for high income tax filers (compared with the SCF, which has known reporting and sampling biases for high income individuals and families). The 3 percent sample of T1 personal income tax returns contains approximately 380,000 records. A 1 percent sample of unemployment insurance claims histories, drawn from administrative system records, provides more detailed information on unemployment insurance eligibility, duration of claims, and employment histories. The sample contains data for 33,000 individuals. Statistics Canada's family expenditure survey (FAMEX), which contains records for 11,377 economic families, provides very detailed information on the expenditure patterns of households.

The SPSD integrates these four data sources into a single microdata set for each household in the model. There are 72,111 economic family records in the model, which, when grossed up by the population weights in 1988, result in 10,464,200 families.[14]

Market income includes gross earnings from employment, self-employment, non-farm and farm income, investment income (including interest income, dividends, realized capital gains, other investment income, and net rental income), pension income, and other money income reported in the SCF.

Additions to Income: $132.0 Billion

The second step is to add all additional sources of income that increase a family's command over goods and services, but that are not included in the SPSD (or other official sources, such as the SCF or the SNA). We describe in detail our procedure for estimating these values in appendix table A.2, and provide just a brief summary here.

These sources include the imputed items, such as interest income that deposit holders receive because they do not pay full service charge marginal costs, imputed rental income on owner-occupied homes, food and fuel grown and consumed on the farm, and employer-provided benefits for employees (these items are also included in the SNA calculation of gross domestic product). Imputed rental income on owner-occupied homes is especially important because of its size ($17.8 billion). It is a non-money source of income for homeowners that has to be included in order to treat owners and renters similarly with respect to their command over goods and services.

There are several components of the stock of wealth held by households that generate an investment return in the form of accrued capital gains (net of losses). These accrued gains increase command over goods and services. They improve the economic position of families that own such wealth, compared with other families, and thus have to be included in income. These sources of income include accrued capital gains on owned homes, on shares, and on other real estate. The accrued capital gains on principal residences is a significant addition to income ($51.3 billion) and reflects the substantial value of the Canadian capital stock in housing.

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[14] For details on the construction of the database, see Bordt et al., supra footnote 3.

The accrued gains on shares ($13.9 billion) reflect the combined result of retained earnings that are reinvested within firms, and changes in market demand that alter relative prices (the methodology of the study cannot separate out the two contributions). In addition to these investment sources, investment income of life insurance companies also has to be imputed to families.

Three adjustments to pension income and pension funds must be made in building up a comprehensive income base for households. First, the investment income that is earned annually on registered pension plans and registered retirement savings plans is an accrued income to the owner of the plans, and is appropriately imputed to the owner as a source of command over goods and services. Second, the pension income received by an individual after the pension fund has been converted into an annuity comprises both a return of part of the principal and an investment return. The amount of pension receipt that is attributable to withdrawal of principal and of earnings accrued in past years has to be deducted from money pensions received in order to avoid double counting. In other words, only the investment returns for 1988 should be included in income. Third, the contributions made by employers to pension plans on behalf of their employees are a source of non-money income for employees, and those contributions have to be added to their income. These adjustments result in a net addition to income of $26.4 billion.

The final source of non-money income to be added is the value of inheritances and gifts; they increase the economic resources of the next-generation recipients and should be included in income. We have estimated, in the absence of reliable empirical data on the size and distribution of inheritances and gifts, a total value and its distribution among households, drawing upon information from Statistics Canada's SCF 1984 asset and debt survey[15] and its *National Balance Sheet Accounts*.[16] The estimated value of inheritances and gifts amounts to an additional $16.4 billion of income.

These additions include, for the first time in tax and fiscal incidence studies for Canada, estimates for three important sources of increased command over goods and services. Accrued capital gains on shares that reflect changes in market demand, adjustments for pension income and pension funds, and inheritances and gifts account for $56.7 billion of the total additions to income.

Adjustments to Income for Model Consistency: $37.9 Billion

The final step in deriving the income base is to make those adjustments that are necessary in order to derive the hypothetical gross income of families before some tax is assumed to have reduced the income flow to those families. If it is assumed that a tax reduces the income of a family before

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[15] See infra footnote 76.

[16] Infra footnote 51.

the family receives it, that income portion has to be added to the family's money income in order to estimate gross, pre-tax income of the family. This renders the income data consistent with the tax shifting assumptions of the model. We describe here the adjustments to income for our standard case shifting model (to be discussed in more detail in the following section). For the alternative case shifting models, appropriate adjustments are made to the income base before the model simulations are carried out.

The major adjustments are for payroll taxes and the corporation income tax. In the standard case shifting model, it is assumed that employees bear all payroll taxes. That is, they not only bear any employee portion of payroll taxes that comes out of their gross employment income, but they also bear the employer portion of the taxes, through a reduction in their wages and salaries. The employer portion of the tax is "shifted backward" to employees, and it is this backward-shifted portion that has to be added to the incomes of employees. The addition to income for the backward-shifted portion of payroll taxes ($16.8 billion) encompasses four payroll taxes that are used to finance all or part of a number of social security programs in Canada: unemployment insurance contributions, CPP/QPP contributions, workers' compensation contributions, and health and education payroll taxes in several provinces.

In the standard case shifting model it is assumed that the owners of earnings in the corporate sector bear the entire corporate income tax. That is, if the corporation income tax were repealed tomorrow the gross incomes of owners of corporate capital would increase. In this sense, the corporation income tax, which has reduced the gross incomes of corporate owners, has to be added back into the incomes of those owners in order to render the income base consistent with the tax shifting model.

In addition to these two major taxes, there are portions of some of the following taxes that are assumed to be borne by factor owners, thereby reducing their gross incomes: sales taxes, property taxes, and natural resource taxes. These portions of taxes have to be added back into the incomes of households in order to build up a pre-tax income base that is consistent with the tax shifting model.

Pre-Fisc Income: $542.3 Billion

Market income in the SPSD plus additions to income plus adjustments to income for model consistency result in pre-fisc income, as defined above.

Broad Income: $592.2 Billion

Pre-fisc income plus transfer income results in broad income as defined above. Transfer income values are from the SPSD ($49.9 billion), and they include, in addition to transfer payments received by persons, the federal refundable child tax credit.[17]

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[17] The SPSD/M also includes as a transfer the federal sales tax credit and the provincial sales and property tax credits. Given that the policy thrust of these refundable credits is to
(The footnote is continued on the next page.)

The Income Bases, Canada 1988

The derivation of the income bases is detailed in appendix table A.2 and illustrated in figure 1. The figure provides the building blocks of market income, additions to income, adjustments to income for model consistency, and transfer income, for each quintile of economic families.[18] The quintile selection is based on market income plus transfer income (money income in the SPSD). The resultant average economic family income is derived for both pre-fisc income and broad income.

Additions to income make a much greater contribution to the average broad income of higher income families than of lower income families. This contribution renders the distribution of broad income more unequal than the distribution of total money income, and it underlines the significance of the income concept used to measure the economic welfare of families. The adjustments to income for model consistency are also somewhat skewed toward higher income families. The well-known, significant contribution of transfers for low income families is evident.

The Selection of Taxes

The taxes we are including in the analysis of tax incidence are provided in table 1. The data for total tax payments are drawn from the government sector in the SNA, with some details extracted from Statistics Canada's financial management system (FMS), or from Public Accounts data. We have not included government revenue sources that more closely resemble a market exchange transaction, such as investment income (except for liquor commission profits), revenues from the sale of goods and services, and contributions to public service pensions (which are not a tax on public servants, but are similar to private sector pension contributions). Details of the selection methodology are provided in the notes to appendix table A.1.

Commodity taxes include the federal manufacturers' sales tax, the provincial retail sales taxes, customs import duties, other excise duties, and other excise taxes at the federal and provincial level. Payroll taxes include unemployment insurance contributions, CPP/QPP contributions, workers' compensation contributions, payroll taxes in several provinces, and medical-hospital premiums. Other taxes include motor vehicle licences and other fees and licences, natural resource revenues, and miscellaneous indirect taxes.

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[17] Continued . . .

offset partially the incidence of sales and property taxes (and to deliver the offset through the personal income tax system), we judge that the credits are more appropriately treated as a reduction in the sales and property tax amounts. Therefore, we have deducted them from transfer payments and the totals for commodity taxes and property taxes. We compare our findings with the results derived from using the SPSD/M assumptions in the discussion of line 23, appendix table A.2.

[18] The economic family (one of five types of families modelled in the SPSD) is defined as a group of individuals living together who are related by blood, marriage, or adoption and who share the same dwelling. Unattached individuals are defined as an economic family in the SPSD. We chose the economic family as the level of analysis because it most closely matches the family unit in the theory of fiscal incidence.

Figure 1   Average Family Income, Standard Case, by Income Source, Canada, 1988

Money income = Market income + transfers

Pre-fisc income = Market income + additions to income
                            + adjustments for model consistency

Broad income   = Pres-fisc income + transfer income

Money income quintiles, dollars

Market income   Additions to income

Adjustments for model consistency   Transfer income
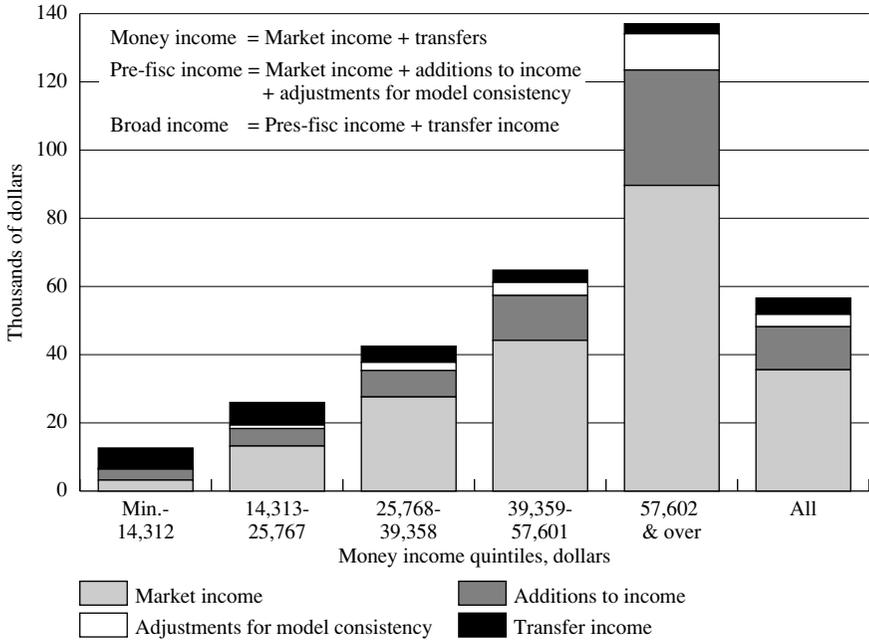
Source: Appendix table A.2

Table 1   Total Taxes, Canada, 1988

Item	Federal	Provincial	Local	Total
	millions of dollars			
Personal income tax	46,160	30,628	—	76,788
Corporate income tax	11,857	7,222	—	19,079
Commodity taxes	25,873	25,788	—	51,661
Payroll taxes	19,573	9,265	—	28,838
Property taxes	—	1,515	19,313	20,828
Other taxes	—	8,762	1,144	9,906
Total taxes	103,463	82,780	20,457	206,700

Source: Appendix table A.1.

The Standard Case Shifting Model

We noted in the preceding section that tax incidence analysis takes place within the broader conceptual framework of fiscal incidence analysis for a given economy. In the case of Canada, this involves a federal system of governments in a small open economy, with considerable mobility of capital and some mobility of consumer outlays. The determination of tax incidence and expenditure incidence entails deriving the effects on relative product prices (the uses side of a household's income, whether it be uses

among the many goods and services or uses between total consumption and total saving) and relative factor prices (the sources side of a household's income) within a general equilibrium framework.[19]

The tax/expenditure mix in the rest of the world can be taken as given. Then, for any new tax on a mobile revenue source (factor income or consumer outlay), the share of the tax up to the average or common rate with the rest of the world can be borne by non-resident factor owners or consumers (that is, it can be exported). The share of the tax reflecting the differential above the average or common rate with the rest of the world would be borne by the least mobile domestic factor owners or consumer outlays.

Three implications follow from this conceptual framework. First, the combination of a net rate of return to capital—which is determined in world (in many cases this can be taken as the Canadian and US) markets—and negotiated foreign tax credits for taxes paid to foreign governments limits any exporting of taxes on capital or capital income to the common share of the tax rate. This is especially relevant for Canada, where there is a significant share of industrial capital owned by non-residents.

Second, fixed world commodity prices for tradable goods and services limit any exporting of taxes that get embedded in the prices of commodities, such that relative product price changes occur, to the common share of the tax rate. This point applies to a corporation income tax that is assumed to be partly shifted forward and borne by consumers, and also to a commodity tax that applies to business purchases and is shifted forward to consumers via a change in relative commodity prices. It does not apply to most sales and excise taxes that specifically exclude exports from, but include imports under, the tax.

Finally, the differential share of the tax rate for taxes on capital and taxes that get embedded into the prices of tradable commodities will tend to be shifted backward and be borne by immobile factors. The differential share is the tax rate above the common, world (in many cases this can be taken as the US) rate. We take labour as immobile within Canada, while acknowledging that this is an exaggeration, especially with respect to skilled professionals.

This discussion provides the context for the shifting assumptions of our standard case. We develop the analysis further in appendix table A.3.

Personal Income Tax

The personal income tax is assumed to be borne by the taxpayer and is not shifted. The SPSD models the personal income tax in considerable detail to the households in the model.

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[19] See, for example, Gillespie, supra footnote 1, at 6-25, and supra footnote 11, at 36-38; Richard A. Musgrave, *The Theory of Public Finance* (New York: McGraw-Hill, 1958), 347-64 and 374-82; and Arnold C. Harberger, "The Incidence of the Corporation Income Tax" (June 1962), 70 *Journal of Political Economy* 457-83.

Corporate Income Tax

The corporate income tax is a tax on capital income and as such follows the analysis noted above: the share of the tax up to the common (US) tax rate is borne by corporate capital, and the differential tax rate is borne by immobile domestic factors or consumer outlays.

The treatment of the common share is derived as follows. If a fully integrated corporation income tax and personal income tax (each having the same effective tax rate) were introduced simultaneously, the after-tax rate of return to capital would fall by the same amount in the corporate and unincorporated sectors, capital would not flow between sectors, and the owners of corporate capital would bear the fully integrated corporation income tax. If the tax rate in the corporate sector exceeded the rate in the unincorporated sector, or if the corporate tax rate were not fully integrated (thereby increasing the effective tax rate in the corporate sector), the initial after-tax rates of return would differ, causing a flow of capital into the unincorporated sector until the rates were once again equated. This adjustment mechanism would mean that all capital (corporate and unincorporated) would bear the differential effective tax rate.[20]

A fully integrated corporate income tax is one that, through devices such as gross-up and credits and full capture of capital gains income, results in all earnings generated through corporations being taxed at the personal income tax rate of the individual owner. In Canada the corporate income tax on earnings for distribution as dividends is not fully integrated with the personal income tax; however, this is more than made up for by the favourable personal tax treatment of realized capital gains income (through partial inclusion of capital gains in income and the lifetime capital gains exemption). Because of these factors, the effective tax rates on capital in the corporate and unincorporated sectors are similar. Consequently, we assume that corporate earnings bear the entire common portion of the corporate income tax.

To estimate the differential Canadian corporate tax rate above the common rate, we examined the effective tax rate calculated on the marginal unit of investment in the corporate sector for Canada and the United States. Recent studies by Jung and by McKenzie and Mintz suggest that the effective tax rates for the two countries are virtually identical (especially after the tax reforms of the late 1980s).[21] In addition, average corporate tax burdens are similar in the two countries.[22] On the basis of this evi-

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[20] See Harberger, supra footnote 19.

[21] Jack Jung, *The Calculation of Marginal Effective Corporate Tax Rates in the 1987 White Paper on Tax Reform*, Working Paper no. 89-6 (Ottawa: Department of Finance, 1989) (table 6 provides the results across all sectors for large corporations); and Kenneth J. McKenzie and Jack M. Mintz, "Tax Effects on the Cost of Capital," in Shoven and Whalley, supra footnote 12, at 189-216, especially at 211, table 5.3, for all firms, taxpaying and loss firms combined, and at 214.

[22] Wayne Thirsk, *Fiscal Sovereignty and Tax Competition*, Discussion Paper no. 93-08, Government and Competitiveness Project (Kingston, Ont.: Queen's University, School of

dence, it is reasonable to conclude that they are equal and that there is no differential above the common world rate.

Consequently, the entire corporate income tax is assumed to be borne by the owners of corporate earnings. Non-residents owned 31 percent of the capital invested in the Canadian economy in 1988.[23] Given the tax/expenditure mix in the rest of the world, and given the foreign tax credit, this portion of the tax is borne by the non-resident households, and is deducted from the total, before the tax is allocated to Canadian households in the model. Our series for corporate earnings combines dividends received and realized capital gains income on shares.

Commodity Taxes

Sales and excise taxes are assumed to be borne by consumers of the taxed items in proportion to consumption expenditures on those taxed items. In a general equilibrium setting, the substitution of a general sales tax on consumption goods for a general income tax results, through the income uses effect of an increase in the prices of consumer goods subject to tax relative to the prices of capital goods, and neutral income sources effects of unchanged relative factor prices, in consumers being worse off relative to savers. It is this change in relative prices against the consumer that results in the incidence of a general consumption tax being on the consumer. A similar argument develops the theory that the incidence of a selective excise tax, through the increase in relative product prices between taxed and non-taxed items, is borne by the consumers of the taxed items compared with the consumers of the untaxed items.[24]

An alternative approach, built on the identity that consumption plus savings equals income, and developed for a lifetime model where all income is eventually consumed (that is, where gifts and bequests are zero), results in the conclusion that a general consumption tax is identical to a general income tax. This view rules out any income uses effects of relative commodity price changes, and allocates the burden of such sales taxes proportionally to income. In addition, it is argued that transfer payments are implicitly or explicitly fully indexed for an absolute increase in the

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[22] Continued . . .

Policy Studies, 1993), 14-15 and 19-24; corporate profits taxes as a percent of GDP are equal for Canada and the United States, and nominal federal-provincial (state) corporation income tax rates are similar (with the rates in Ontario being slightly lower than in New York for manufacturing and slightly higher for non-manufacturing).

[23] Statistics Canada, *Canada's International Investment Position, 1991*, catalogue no. 67-202, 22 and 79, table 25, for the share of non-resident ownership of long-term capital in non-financial industries.

[24] In addition to the references in footnote 12, see Richard A. Musgrave, "Estimating the Distribution of the Tax Burden," in Colin Clark and G. Stuvel, eds., *Income Redistribution and the Statistical Foundations of Economic Policy, Income, and Wealth: Series X,* International Association for Research in Income and Wealth (London: Bowes and Bowes, 1964), 186-219; and Gillespie, supra footnote 1, at 41-45.

price level, and therefore transfer recipients do not bear any burden of sales and excise taxes. Consequently, sales and excise taxes are borne solely by factor earners, and allocated by factor incomes.[25]

We are unconvinced by the analysis and have not employed the approach in this study. First, the approach does not apply to a pre-fisc income base.[26] In addition, the all-consumption model with zero savings is possible only within a lifetime perspective; consequently the approach results in an uneasy combination of lifetime considerations for sales and excise taxes with an annual time frame for all other taxes and the income base. This is methodologically inappropriate.[27] Third, given that lifetime saving is positive (substantial gifts and bequests do occur), the analysis is less than helpful even for sales and excise taxes.

Fourth, the existence of full indexation of transfers would still not rule out the changes in relative commodity prices that are the avenue through which households bear the incidence of sales and excise taxes. Finally, transfers are not the only source of income that is indexed for an absolute increase in prices: many wage contracts have cost-of-living clauses; some pension contracts are partly indexed; and interest rates, after expectations adjust to inflation rates, are effectively indexed. An approach that adjusts transfers for indexation attributable to sales and excise tax effects, and does not adjust the other income sources, is partial, and could generate misleading results.

The SPSD models a package of federal commodity taxes (the manufacturers' sales tax, customs import duties and excise duties on alcohol and tobacco, and excise taxes on gasoline, tobacco, wine, and air transportation, etc.) and provincial commodity taxes (retail sales taxes, liquor commission profits, liquor gallonage tax, gasoline tax, amusement taxes, and tobacco taxes). It is assumed that these sales and excise taxes are

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[25] Edgar K. Browning, "The Burden of Taxation" (August 1978), 86 *Journal of Political Economy* 649-71; Edgar K. Browning and William R. Johnson, *The Distribution of the Tax Burden* (Washington, DC: American Enterprise Institute for Public Policy Research, 1979); and Edgar K. Browning, "Tax Incidence, Indirect Taxes, and Transfers" (December 1985), 38 *National Tax Journal* 525-33. This treatment of sales and excise taxes has been used by Horry, Pipes, and Walker, supra footnote 2.

[26] This exception is acknowledged by Browning in "The Burden of Taxation," supra footnote 25, at 651 and 653, and in "Tax Incidence, Indirect Taxes, and Transfers," supra footnote 25, at 531.

[27] In this respect, we share the reservations of Timothy M. Smeeding, *Are Sales Taxes Progressive?* Institute for Research on Poverty Discussion Paper no. 545-79 (Madison: University of Wisconsin-Madison, June 1979); Michael C. Wolfson, "Tax Incidence in Canada: Robin Hood on Thin Ice" (Summer 1980), 2 *Canadian Taxation* 123-28; Dahlby, supra footnote 12, at 137; and Davies, supra footnote 12, at 164 and 179. See James Davies, France St-Hilaire, and John Whalley, "Some Calculations of Lifetime Tax Incidence" (September 1984), 74 *The American Economic Review* 633-49, and Don Fullerton and Diane Lim Rogers, "Lifetime Versus Annual Perspectives on Tax Incidence" (September 1991), 44 *National Tax Journal* 277-87, for methodologically consistent lifetime tax incidence estimates for Canada and the United States, respectively.

borne by consumers, and the portion of the taxes falling on final demand purchased by the household sector is distributed proportionally to consumption of the taxed items.

The portion of commodity taxes on purchases in the other final demand categories—government purchases, capital goods, and exports and inventories—is treated as follows. For government purchases, the excess over the common share of taxes paid by each government to the other will result in an increase in taxes on families. We derived this excess as $418 million in federal commodity taxes being paid by the provinces, and we assumed that provinces would raise those funds through their most important tax source, the personal income tax. For commodity taxes on capital goods and embedded in exports and inventories, it is assumed that in a long-run equilibrium, firms are able to pass forward to consumers the share of such taxes up to the common or world rate. The share of sales taxes above the common rate, owing to the open economy nature of the Canadian economy, cannot be shifted to consumers and is assumed to be shifted backward to the more immobile factor of production—labour—through a reduction in wages and salaries.

Finally, we treat the federal and provincial sales tax credits as a reduction in total commodity taxes paid. While the credits are delivered through the personal income tax system, they are specifically designed to offset some of the price effects of sales taxes. Consequently it is methodologically appropriate, in our judgment, to treat these policy credits as a negative tax.[28]

Payroll Taxes

In a small open economy model, where capital is more mobile than labour, and where there is a high degree of competition, the employer contribution to payroll taxes will ultimately be borne by labour through a reduction in wages and salaries. We assume that all payroll taxes are borne by labour, and distribute them by "covered" wages and salaries.

Property Taxes

We assume that the portion of the property tax on land is borne by the landowner and there is no shifting of the tax. The portion of the property tax on structures is mostly borne by consumers of structures' services, through an increase in the prices of structures' services relative to the prices of other items.

This is a "traditional" view of property tax incidence, with substantial excise effects of forward shifting. It also reflects the implications of the small open economy framework with internationally mobile capital, and less than full mobility of consumer outlays (especially renters). The "new"

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[28] See also supra footnote 17.

view aspects of the debate get picked up in the progressive tax incidence model below.[29]

We used the breakdown of property tax revenues across the business, farm, and residential sectors, and between the land and structures component within each sector, to first allocate the property tax to factor owner or consumer outlay. In addition, we used the further breakdown within the residential sector for owner-occupied and renter-occupied properties. The estimated property tax on business, farm, and residential renter-occupied land is distributed to the landowners by capital income, farm income, and land rental income, respectively. The estimated property tax on business, farm, and renter-occupied structures is distributed to the users by total consumption expenditures, food consumption expenditures, and rent expenditures by renters. The property tax on owner-occupied housing is borne by the owners and distributed by property taxes paid. We treated the property tax credits that several provinces provide through the personal income tax as a negative tax for purposes of calculating property tax incidence at the local level.[30]

Other Taxes

Other taxes include motor vehicle licences, permits and other fees, natural resource revenues, and miscellaneous other indirect taxes.

We assume that motor vehicle licences and permits, and other licences, fees, and permits, are borne by the payee, and we derive a series to approximate the average payment per family. For natural resource revenues, the miscellaneous taxes on natural resources are mostly resource rental payments (such as land rentals, ground rents, timber rights charges, and resource bonus charges). They are similar to a property tax on land and we assume are borne by the resource owner, who cannot shift them. Resource revenues in the form of royalties are similar to excise taxes, and assumed to be shifted forward to consumers. The other miscellaneous taxes are an amalgam of sales and indirect taxes, which are also assumed to be borne by consumers.

Alternative Case Shifting Models

We present two alternative case shifting models, one of which is expected to provide a more progressive pattern of tax incidence, and one of which

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[29] For a discussion of the "traditional" and "new" views of property tax incidence, see Peter Mieszkowski, "The Property Tax: An Excise Tax or a Profits Tax?" (April 1972), 1 *Journal of Public Economics* 73-96; Henry J. Aaron, *Who Pays the Property Tax: A New View*, Studies of Government Finance (Washington, DC: Brookings Institution, 1975); R.M. Bird and N.E. Slack, *Residential Property Tax Relief in Ontario*, Ontario Economic Council Research Studies (Toronto: University of Toronto Press, 1978); and Harry M. Kitchen, *Property Taxation in Canada*, Canadian Tax Paper no. 92 (Toronto: Canadian Tax Foundation, 1992), 46-62.

[30] Kitchen, supra footnote 29, at 89, on the other hand, has suggested that it might be more appropriate to analyze these credits as part of the provincial transfer delivery system.

is expected to provide a more regressive incidence pattern. We define a progressive pattern of tax incidence as one where the average effective tax rate rises as the level of income (broad or pre-fisc) increases, and a regressive incidence pattern as one where the effective rate declines as income increases.

The Progressive Tax Incidence Model

Our progressive tax incidence case extends the small open economy framework of the standard case to encompass a free trade world with much greater mobility of consumer outlays. World commodity prices inhibit the extent to which any commodity taxes embedded in the prices of commodities (for the differential tax rate above the common, world rate) can be borne by consumers through relative commodity price changes. Domestic consumers have no preferences for locally produced products, and renters are mobile and have no preference for place.

Capital is less mobile than in the standard case, especially among countries, regions, or sectors (across unincorporated, privately owned firms, and large multinational corporations; across such industrial sectors as oil and gas, compared with manufacturing and financial sectors; and across residential and non-residential structures and financial sector investments). Imperfections in labour market supply conditions result in labour being able to inhibit the extent to which firms can shift taxes backward through a reduction in wages and salaries. Powerful unions may be able to bargain successfully on an after-tax basis, especially where payroll taxes are involved.

This model results in no change in the shifting assumptions for the personal income tax, or the corporation income tax. The differential portion of commodity taxes paid through purchases of capital goods and exports is borne by the owners of businesses, who are inhibited in shifting such taxes backward to labour or forward to consumers. We adopt the "new" view of property tax incidence, where the tax is more like a tax on capital (all the burden being borne on the income sources side), with the excise effects of the income uses side being inhibited by mobile renters and consumers. Less-than-perfect capital mobility in this model and similar average property tax burdens between Canada and the United States mean that the incidence of a property tax is borne by the owners of capital in structures.[31] We assume that the employer portion of payroll taxes is borne by capital, and that natural resource royalties are similar to a tax on capital (rather than an excise tax) and are borne by corporate owners.

The Regressive Tax Incidence Model

Our regressive tax incidence model combines the imperfections in the labour market supply of the progressive tax incidence model with the mobility of just some consumer outlays of the standard case. Consumers in a less-than-completely free trade world do not benefit as much from fixed world

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[31] Thirsk, supra footnote 22, at 14-18; property taxes as a percent of GDP are similar for Canada and the United States (at 3.1 and 2.7 percent, respectively).

commodity prices. Capital is as mobile as in the standard case. In addition there exists an imperfectly competitive product market structure, such that firms, through administered pricing policies, and other oligopolistic strategies, sales maximization, or "satisficing" behaviour, are able to effect changes in relative product prices. Through these mechanisms, some part of the corporation income tax is shifted forward to consumers.[32]

This model, compared with the standard case, results in no change in the shifting assumptions for the personal income tax, the property tax, and natural resource revenues. We assume that half the corporation income tax is borne by consumers in proportion to their total consumption expenditures; the other half continues to be borne by the owners of corporate capital.[33] Because consumer outlays are less mobile, commodity taxes paid through purchases of capital goods and exports are assumed to be shifted forward to consumers. We also assume that the employer portion of the payroll tax is shifted forward to consumers.

The three shifting assumption models are summarized in table 2, for convenient reference throughout the following discussion of the findings.

TAX INCIDENCE RESULTS, CANADA, 1988

"Who pays the taxes?" When the taxes that a family pays are expressed as a percent of the family's income, the resulting average or effective tax rate describes the family's tax incidence. These calculated tax rates can be compared for all families in order to indicate whether the tax system is progressive, proportional, or regressive. Our methodology generates these effective tax rates for Canadian economic families in 1988.

The effective tax rates are calculated for each economic family in the microdata set, and presented by income groups that increase by $10,000 to an income level of $100,000, and three larger income groupings: $100,001 to $150,000; $150,001 to $300,000; and $300,001 and above.

The income measure used to group economic families along the horizontal axis in the figures that follow is always identical to the income concept used to derive the effective tax rates; that is, pre-fisc income for

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[32] See, for example, the seminal contribution by Marian Krzyzaniak and Richard A. Musgrave, *The Shifting of the Corporation Income Tax* (Baltimore: Johns Hopkins University Press, 1963); in addition, R.J. Lévesque, *The Shifting of the Corporation Income Tax in the Short Run*, Studies of the Royal Commission on Taxation no. 18 (Ottawa: Queen's Printer, 1967); Byron G. Spencer, "The Shifting of the Corporation Income Tax in Canada" (February 1969), 2 *The Canadian Journal of Economics* 21-34; Richard Dusansky and J. Ernest Tanner, "The Shifting of the Profits Tax in Canadian Manufacturing, 1935-1965" (February 1974), 7 *The Canadian Journal of Economics* 112-21; and A. Asimakopulos and J.B. Burbidge, "The Short-Period Incidence of Taxation" (June 1974), 84 *The Economic Journal* 267-88.

[33] This corporation income tax shifting assumption was adopted in the standard case of earlier work (Gillespie, supra footnotes 1 and 11). Given the dearth of more recent empirical studies supporting forward shifting to consumers, and the increasing emphasis on global capital mobility, we believe it is more reasonable to adopt a standard case that reflects these developments, and to allow for some forward shifting in this alternative case. See also Whalley, supra footnote 2, at 667.

Table 2   Shifting Assumption Models

	Standard case	Progressive case	Regressive case
Personal income tax	Borne by taxpayer	Borne by taxpayer	Borne by taxpayer
Corporate income tax	Borne by owners of corporate capital	Borne by owners of corporate capital	Borne half by owners of corporate capital, half by consumers
Commodity taxes	Borne by consumers except for government purchases by PIT and purchases of capital goods and exports by consumers for common share and by labour for differential share	Borne by consumers except for government purchases by PIT and purchases of capital goods and exports by consumers for common share and by owners of capital for differential share	Borne by consumers except for government purchases by PIT and purchases of capital goods and exports by consumers
Payroll taxes	Employee portion borne by employees; employer portion by employees	Employee portion borne by employees; employer portion by owners of capital	Employee portion borne by employees; employer portion by consumers
Property taxes	Portion on land borne by owners; portion on residential structures by users and on commercial and farm structures by consumers	Portion on land borne by owners; portion on structures by owners	Portion on land borne by owners; portion on residential structures by users and on commercial and farm structures by consumers
Other taxes			
Fees and miscellaneous	Borne by consumers	Borne by consumers	Borne by consumers
Natural resource revenues	Rental payments by owners; royalties by consumers	Rental payments by owners; royalties by owners	Rental payments by owners; royalties by consumers

the pre-fisc income concept, and broad income for the broad income concept.[34] These different income measures have a significant effect on the distribution of family units; for example, half of Canadian families had money incomes of $32,000 or less, pre-fisc incomes of $37,500 or less, and broad incomes of $42,000 or less in 1988.[35]

Deriving the aggregate groupings from the underlying family units is made possible by the SPSD/M and is an improvement over earlier studies. Previous studies, which started with aggregate data grouped by money income brackets, did not permit the use of alternative income bases to group economic families. The absence of data for each economic family in those studies meant that the analyst could not shift families whose pre-fisc or broad income was sufficiently greater than their money income to place them in a higher income bracket (potential "bracket jumpers").[36] The problem of potential bracket jumpers vanishes when a microdata set is used to build up the relevant income concepts (pre-fisc, broad, or post-fisc) and then to group families by those income measures.

What Is the Tax Incidence in Canada?
The tax incidence estimates for the standard case shifting assumptions are presented in figure 2. These are the effective tax rates for all taxes levied by Canadian governments that are borne by Canadian families. As noted previously, two income bases are employed in this study, pre-fisc income and broad income, each of which addresses a different policy question.

As would be expected, the income concept clearly matters for families with incomes up to about the median income. This difference over the lower and middle income groups results from a pre-fisc income base that does not include transfer income. The greater contribution of transfer income to money income of low income families, compared with higher income families, generates a significant difference in the distributive pattern of the two income bases over those income groups. For families with incomes higher than median income, total tax incidence is similar.

Specifically, figure 2 illustrates the following points:

• For the pre-fisc income base, tax incidence is regressive, declining from about 89 percent for low income families to 37 percent for families with pre-fisc incomes of $50,000 to $60,000. Note that the two lowest pre-fisc income groups, under $10,000 and $10,000 to $20,000, contain 19 and 11.9 percent of economic families, respectively.

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[34] It seems that RVH have used money income to group families into income brackets and post-fisc income to calculate the effective tax rates. This procedure will produce different estimates from one that groups families by the same measure for which the tax incidence rates are calculated—that is, post-fisc income.

[35] See appendix tables A.2 and A.5 for the distribution of economic families throughout the income scale, by broad income group and pre-fisc income group.

[36] See, for example, Gillespie, supra footnote 1, at 27, and W. Irwin Gillespie, *The Incidence of Taxes and Public Expenditures in the Canadian Economy*, Studies of the Royal Commission on Taxation no. 2 (Ottawa: Queen's Printer, 1966), 8, at note 9.

Figure 2   Effective Tax Rate, Total Taxes, by Income Concept, Canada, 1988
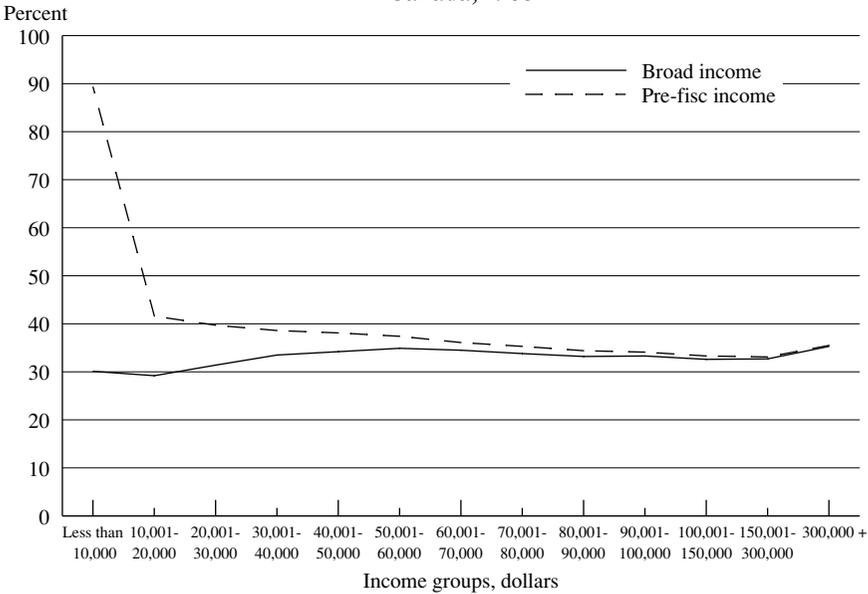
Source: Appendix tables A.4 and A.5.

• For the broad income base, tax incidence is mildly progressive, increasing from about 30 percent for low income families to about 34 percent for families with broad incomes of $40,000 to $50,000. The two lowest broad income groups contain 8.3 and 14.4 percent of economic families, respectively.

• The tax system is virtually proportional beyond the middle income range, with a hint of progressivity over the highest income range. This is true regardless of which of the two income bases is used (specifically, tax incidence is proportional beyond a broad income of $50,000 and a pre-fisc income of $60,000). The two richest income groups—$150,001 to $300,000, and $300,001 and over—contain 2.9 (3.1) and 0.8 (0.8) percent of economic families grouped by pre-fisc (broad) income. We categorize the highest income group as the very rich. It is interesting to note that the total tax system is relatively less progressive for the very rich, with the average tax rate increasing from 33 to 35 percent, than it is for low income Canadians, whose average tax rate rises from 30 to 34 percent.

These findings underline the importance of the choice of the income base for the general pattern of tax incidence, at least for families with incomes up to the median. The pre-fisc and broad income concepts are two valid measures against which to compare the change in a family's economic welfare, relative to other families' welfare, as a result of all taxes. We noted in the second section that the choice of one base over the other depends on the policy perspective of the analysis. If the policy question is, "What share of a family's market income do Canadian governments

collect in taxes?" pre-fisc income is the relevant measure of comparison, and the answer for low income Canadians is that the tax system is very regressive. If the policy question is, "What share of income directly controlled by the family is collected in taxes?" broad income is the relevant comparison measure, and the answer for low income Canadians is that the tax system is moderately progressive.

We have not yet estimated tax incidence for the post-fisc income base, and therefore we cannot address the policy question, "What share of after-tax income, including the imputed income from government services, does the government collect in taxes?" The Ruggeri, Van Wart, and Howard paper (RVH) in this issue estimates tax incidence for the post-fisc (actual post-government) income measure.

In our judgment, the policy question underlying the broad income concept is more relevant and useful for taxpayers and politicians alike, compared with the other two income concepts. Consequently, we now focus attention on the results for the broad income base, and leave the reader to visualize the more regressive estimates up to an income of about $50,000 to $60,000 for the pre-fisc base.

Is There a Robin Hood?

The previous figure provided estimates of tax incidence for the combined effect of all three levels of government. Figure 3 disaggregates this effect into the three levels of government, and demonstrates that each level of government has a significantly different pattern of tax incidence. It also demonstrates that there is only one Robin Hood (at least with respect to taxation)—only the federal tax system is clearly progressive, and it barely offsets the combined effect of a proportional provincial tax system and a regressive local tax system.

• Federal taxes are strongly progressive up to a broad income of $42,000, increasing from 9 to 17 percent of income. Federal tax incidence then becomes proportional, with a hint of progression for the very rich (who pay, on average, 19 percent of broad income in taxes).

• Provincial tax incidence is more or less proportional, with average effective tax rates ranging between 12 and 14 percent of broad income. There may be some very mild regressivity for the poorest 23 percent of families, and some equally mild progressivity for the richest 1 percent of families, but this variation may be well within the margin of error that accompanies a study of this sort.

• Local tax incidence is regressive throughout the income scale, falling from an average effective tax rate of 7.5 percent for the poorest 8.3 percent of families to 2.5 percent for the richest 1 percent of families.

What Is the Incidence of the Different Types of Taxes?
Effective Tax Rate, by Revenue Source
Figure 4 illustrates the incidence of the various types of taxes. Only the personal income tax is a significant contributor to whatever progressivity

Figure 3   Effective Tax Rate, by Level of Government, Broad Income, Canada, 1988
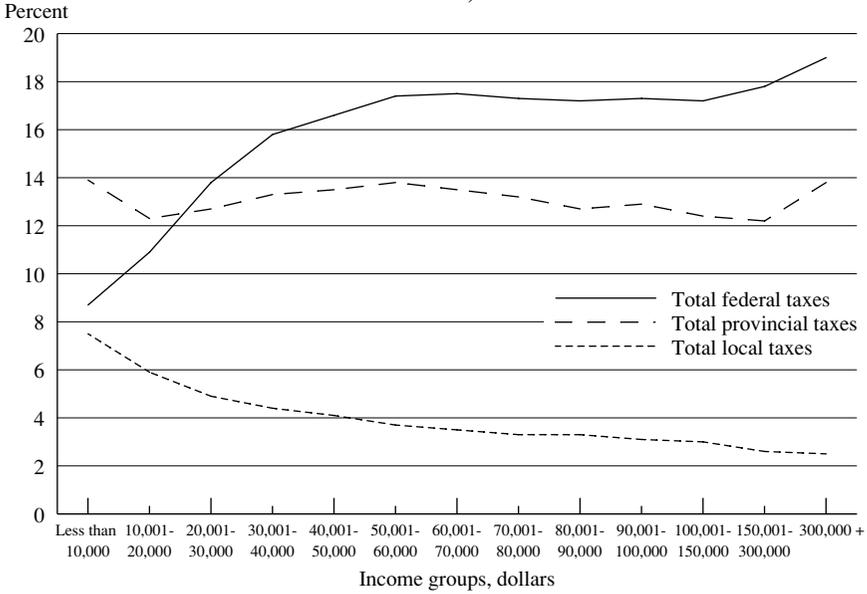
Source: Appendix table A.4.

Figure 4   Effective Tax Rate, by Revenue Source, Broad Income, Standard Case, Canada, 1988
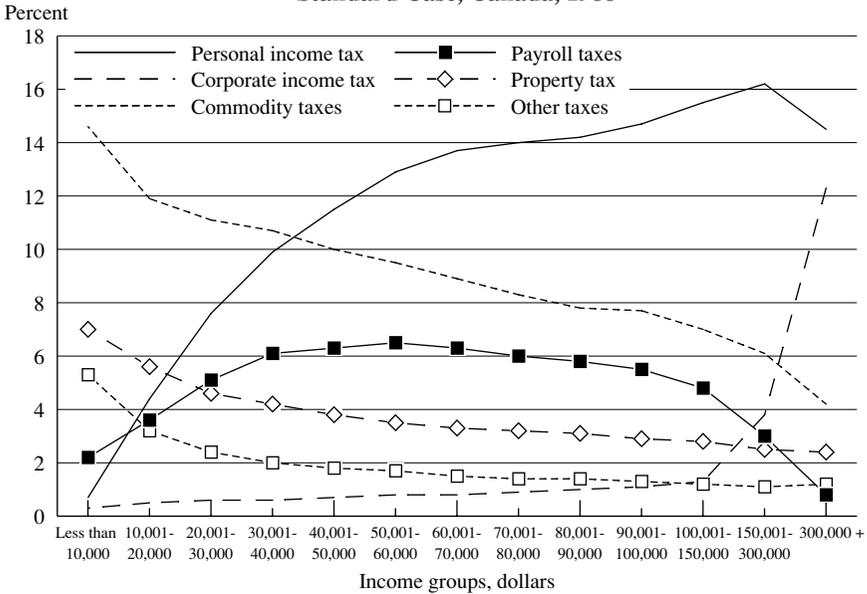
Source: Appendix table A.4.

exists in the total Canadian tax system. Sales and excise taxes, property taxes, and other taxes combined account for the same share of total taxes paid by Canadian families as the personal income tax, and they are all regressive elements in the Canadian tax system.

• The personal income tax, which accounts for 39 percent of total taxes paid by Canadian families, is strongly progressive, at least up to the median income. The effective average tax rate increases sharply from less than 1 percent for the poor to 13 percent for families with incomes of $50,000 to $60,000, beyond which it is more or less proportional (rising to 16 percent for the $150,000 to $300,000 income group, and falling to 14.5 percent for the richest 1 percent of families). The extensive use the federal government makes of the personal income tax explains its larger redistributive role in taxation, compared with the provinces and the municipalities.

• Sales and excise taxes (net of the federal and provincial sales tax credits) account for 25 percent of total taxes paid, and the incidence pattern is continuously regressive throughout the income distribution. This regressive incidence pattern exists despite the sales tax credits at the federal and provincial levels, credits that were introduced as a policy offset to the burden of sales and excise taxes on lower income families. The poorest 8.3 percent of families, on average, pay a rate of 15 percent, while the richest 1 percent pay a rate of 4 percent.

• Payroll taxes make up 15 percent of total taxes paid, and their tax incidence pattern is progressive for lower income families, increasing from 2 to 6 percent at an income of $30,000 to $40,000, after which they are more or less proportional for families with broad incomes up to $80,000 to $90,000. Beyond that income level, the incidence pattern is regressive, falling to 1 percent for the richest 1 percent of families.

• Property taxes (net of property tax credits) account for 10 percent of total taxes paid and are continuously regressive throughout the income distribution. Average effective tax rates decline from 7.5 percent for the poorest 8.3 percent of families to 2.4 percent for the richest 1 percent of Canadian families. It is the heavy reliance of municipal governments on the property tax as the major revenue raiser that explains the regressive pattern of local tax incidence we noted in figure 3.

• The corporation income tax, which accounts for 7 percent of taxes paid by Canadian families, is trivial (less than 1.3 percent of broad income) up to an income level of $150,000, beyond which the effective tax rate increases sharply to 12 percent for the richest 1 percent of families. Other taxes (fees, licences, miscellaneous indirect taxes, and natural resource revenues) account for 5 percent of taxes paid and are regressive up to an income level of $80,000, beyond which they are more or less proportional.

Share of Taxes Paid, by Revenue Source

Figure 5 provides a different perspective on the pattern of tax incidence, by illustrating the share of taxes paid by tax type for each income group. Two observations stand out:

Figure 5   Share of Taxes Paid by Revenue Source, Canada, 1988
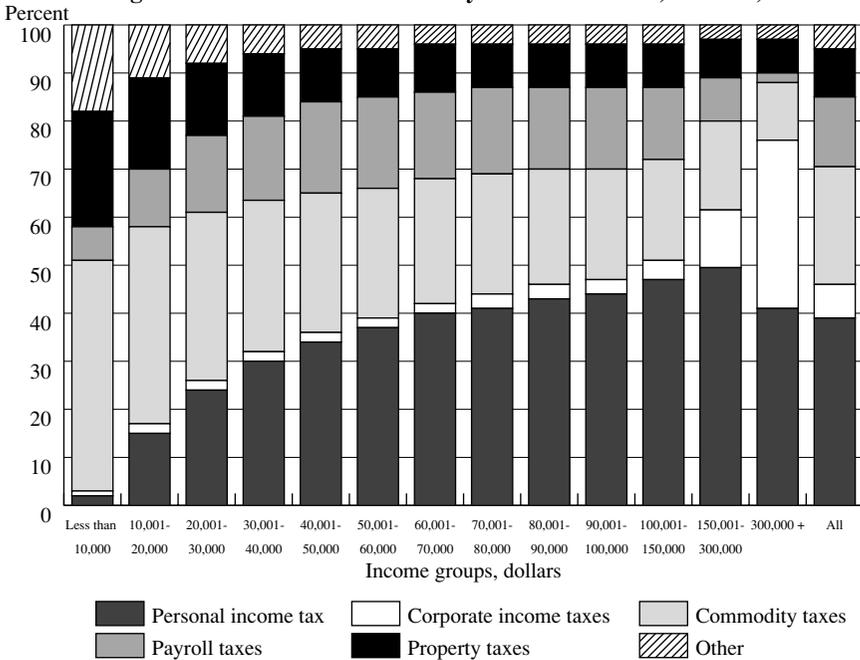
Source: Based on appendix table A.4.

• Lower income families contribute to the fisc primarily through commodity and property taxes (which have a regressive tax incidence).

• Higher income families and the rich contribute to the fisc primarily through personal and corporate income taxes (which have a progressive tax incidence).

Do the Shifting Assumptions Matter?

The tax incidence results discussed up to this point are based on our standard case shifting assumptions. It is our judgment that these assumptions are most appropriate for Canada in 1988 and therefore provide an accurate picture of the general pattern of tax incidence. They follow from a widely accepted competitive model with a federal system of governments in a small open economy, with considerable mobility of capital and some consumer outlays. It is unlikely that small variations in these shifting assumptions would affect the general pattern of tax incidence reported here.

Other shifting assumptions for two dramatically different cases have, however, been modelled. Our findings for those two cases indicate that the shifting assumptions do matter and that the general pattern of total tax incidence in Canada is significantly different for the three shifting models. Readers who prefer one of the two alternatives will find grounds for urging caution in using the standard case results in a policy context.

**Figure 6   Effective Tax Rate, by Shifting Assumption Model,
Broad Income, Canada, 1988**

Percent
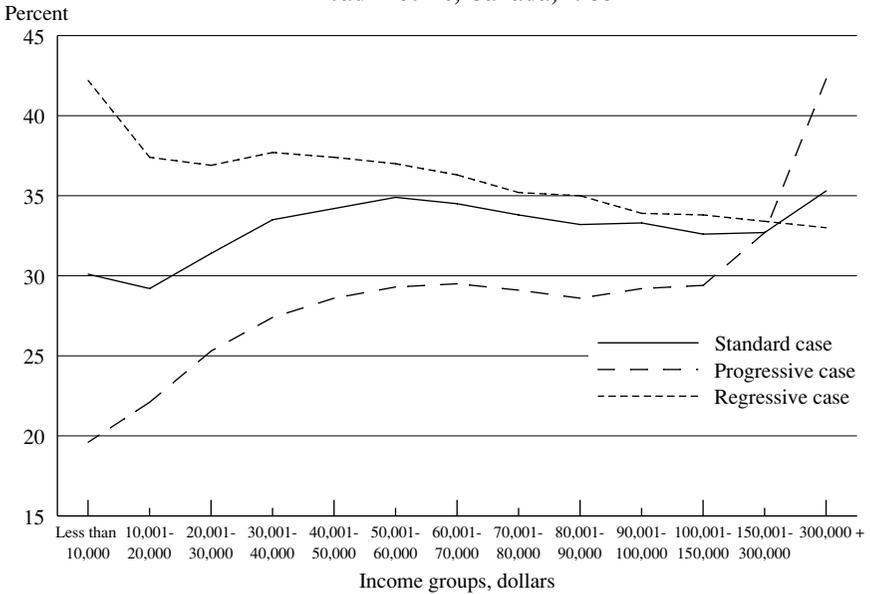
Source: Appendix table A.5.

The tax incidence pattern for the progressive case assumptions (capital is not perfectly mobile, but consumer outlays are; powerful unions help labour to resist backward shifting of taxes; and the new view of property tax incidence prevails) is much more steeply progressive, when compared with the progressivity for the standard case. The tax incidence pattern for the regressive case assumptions (consumers are much less mobile, product markets are imperfectly competitive, and firm pricing practices allow some forward shifting of corporate taxes) is regressive throughout the income scale (albeit slightly) when compared with the standard case.

These findings are illustrated in figure 6.

• For the progressive case, total tax incidence becomes more strongly progressive, especially for low income families and the rich. Average effective tax rates increase from 20 to 29 percent for families with incomes up to $40,000 to $50,000, and from 33 to 42 percent for the richest 1 percent of families with incomes over $300,000. The average effective tax rate for all Canadian families falls from 33.4 percent (standard case results) to 30.2 percent, because of the larger share of total taxes borne by capital (and the foreign portion thereof).

• For the regressive case, total tax incidence becomes regressive, especially for low income families. Average effective tax rates decline from 42 percent of income for the poorest 8.3 percent of families to about 37 percent for families with incomes of $40,000 to $50,000, after which they gradually decline to 33 percent for the richest 1 percent of families. The

average effective tax rate for all Canadian families increases from 33.4 percent (standard case) to 35.6 percent, because of the smaller share of total taxes borne by capital (and the foreign portion thereof).

Our Findings Compared with RVH Findings

Our findings of a regressive-then-virtually proportional total tax incidence pattern for pre-fisc income and slightly progressive-then-virtually proportional total tax incidence for broad income in 1988 contrast sharply with the quite progressive 1986 tax incidence findings of RVH. There are two major reasons for these differences—the choice of income base and the tax shifting assumptions.

Our results are derived for a pre-fisc and broad income base, each of which addresses a different policy question. The RVH results are derived for a post-fisc income base, which addresses a third policy question. We have argued in this paper for our preference on practical grounds for the policy question, "What share of income directly controlled by the family is collected in taxes?"—the policy perspective that underlies the broad income base. In addition to the different conceptual models and policy perspectives among the three income bases we discussed in the second section, there are several other differences in the building up of the income bases that probably affect the empirical results.

First, we include estimates of several sizable sources of additions to income (accrued capital gains on shares that reflect changes in market demand as well as retained earnings, adjustments for pension and RRSP income, and inheritances and gifts). These income sources are more concentrated among middle income families and the rich, and their exclusion from the RVH post-fisc income base contributes to the progressive pattern of effective tax rates.

Second, the RVH argument that sales and excise taxes are not borne by the indexed portion of transfers leads them to deduct that indexed portion from both transfers in the income base and commodity taxes paid.[37] This draws upon one of the two features of the Browning approach, which we chose not to adopt for reasons outlined previously.[38] Since transfers as a share of income decline as income increases, this procedure reduces the incomes of low income families relative to high income families, when compared with our broad income base.

Finally, the fiscal incidence literature has not resolved the most appropriate method for imputing the benefits of government general (pure public goods) expenditures, and usually models the results for four alternative assumptions (per capita, broad income, the Aaron-McGuire income vari-

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[37] See RVH, supra footnote 5, at 421-22, for an example of their approach applied to seniors that is developed for an all-consumption, zero-saving model, and at 447-48, for their reconciliation of Browning's treatment of indexation of transfer payments and the traditional approach.

[38] See the discussion supra footnotes 26 and 27 and the accompanying text.

ant,[39] and capital income). The findings in previous studies for these alternative cases vary from a distribution that allocates relatively more benefits to poor families (per capita) to a distribution that allocates relatively more benefits to rich families (capital income), with the other two income variants somewhere in between.[40] RVH model the results for a per capita assumption (for which they report the findings) and a money income variant. Since allocating the benefits of pure public goods on a per capita basis has resulted in the most pro-poor pattern of benefits in previous studies, and since these imputations are added to income for a post-fisc income base, this procedure increases the incomes (and therefore decreases the effective tax rates) of low income families relative to high income families, when compared with our use of a broad income base. This procedure contributes to their progressive pattern of effective tax rates.

The choice of tax shifting assumptions also accounts for some of the differences in findings. This is most noticeable in connection with the incidence pattern for sales and excise taxes, where our results are unambiguously regressive throughout the entire income range and their estimates are generally progressive over the lower income range, then proportional, and regressive only for the highest income groups (except for liquor and tobacco taxes, which are more similar to our findings). Their methodology of deducting the indexed portion of transfers received by each household from commodity tax revenues reduces the commodity taxes paid (and therefore decreases the effective tax rates) for low income families more than for middle and high income families.

Second, there are several differences between their base case and our standard case shifting assumptions (as explained in the text). They assume that half the corporate profits tax is borne by owners and half is shifted forward to consumers, whereas we assume the entire tax is borne by corporate owners. In addition, they assume that half the property tax on structures is borne by owners and half is shifted forward to users, whereas we assume the entire property tax on structures is shifted forward to users.

Finally, the choice of tax shifting assumptions extends into the alternative shifting models of the two studies. The RVH study provides a progressive and regressive set of alternative shifting assumptions for the corporation income tax and the property tax. We include these two taxes and as well provide alternative shifting assumptions for payroll taxes, natural resource revenues, and the portion of commodity taxes on purchases of capital goods and exports. In addition, some but not all of the differences between our standard case and their base case get picked up in the alternative shifting models (that is, our standard case assumption for corporation income taxes is their progressive variant, but we did not estimate a case of 100 percent shifting to consumers for the reasons noted above).

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[39] Henry J. Aaron and Martin McGuire, "Public Goods and Income Distribution" (November 1970), 38 *Econometrica* 907-20.

[40] Gillespie, supra footnote 1, at 110, 120, and 123; and Dodge, supra footnote 1.

CONCLUSIONS

This article set out to determine, "Who pays the taxes in Canada?" and to establish whether the Canadian tax system is progressive, proportional, or regressive.

We developed comprehensive measures of pre-fisc and broad income. These measures include, for the first time, estimates of several sizable additions to income (accrued capital gains on shares attributable to changes in market demand, adjustments for pension income and pension funds, and inheritances and gifts). These sources of command over goods and services improve the economic well-being of families, and thus should be included in a comprehensive measure of income.

We derived three tax shifting assumption models. It is our judgment that the standard case shifting assumptions provide an accurate assessment of tax shifting that is consistent with much of the literature. The two alternative tax shifting cases, while developed in terms of polar extremes, do provide upper and lower bounds within which the general pattern of tax incidence is most likely to be found.

The standard case shifting assumptions were employed to distribute taxes paid to families and to express those taxes as a percent of the two income bases. "What share of income directly controlled by families is collected by governments?" is the policy question underlying the broad income base, and on practical grounds it is our preferred choice. Governments do seem to take into account the existence of transfer payments to persons when formulating major tax changes or tax reforms. Economic well-being or capacity to pay taxes, in other words, is defined as including transfers for practical policy purposes.

Our tax incidence results are derived for Canadian families in 1988, the most recent year for which the rich microdata of the SPSD are available. Given the stability in the underlying distribution of income and the few changes in the tax structure since then, the general pattern of these findings is not likely to be much different today.

The results are interesting, both in terms of what we did find and in terms of what we did not find.

We found that, for all three levels of government combined, the pattern of tax incidence is very moderately progressive for families with broad incomes up to about $42,000 and proportional for those with incomes that are higher (with a hint of progressivity for the very rich).

When total tax incidence is disaggregated by level of government, only the federal tax system is clearly progressive. Federal tax incidence is progressive for families with incomes up to $42,000 and more or less proportional for families with higher incomes. Provincial tax incidence is more or less proportional, and local government tax incidence is regressive throughout the income scale.

When total tax incidence is disaggregated by type of tax, it becomes clearer why the federal tax system is somewhat progressive. The personal income tax is strongly progressive up to the median income level and then

more or less proportional for families with higher incomes. The federal government's reliance on the personal income tax as its most important revenue source accounts for the more redistributive role of the federal tax system as a whole.

Sales and excise taxes and property taxes are regressive throughout the income scale, even after the various refundable tax credits are taken into account. Payroll taxes are progressive, then proportional, and eventually regressive for the rich. The corporation income tax burden is trivial for most families, but it is steeply progressive for the rich.

We did not find that the middle income class in Canada is burdened by excessively high taxes, in comparison to other income groups. The middle class is not on the road to extinction, driven there by high tax burdens. Quite the contrary, at least for families with broad incomes from about $42,000 to $300,000, total tax incidence is virtually proportional: for these families, a flat rate tax system is already in existence!

We did not find that the refundable sales and property tax credits existing in 1988 had any significant impact on reducing the regressivity of sales and property taxes. Sales and excise taxes, especially, are very regressive. The improvements in property tax credits and the enhancement of the federal sales tax credit with the introduction of the GST are not likely to alter this conclusion. If a future federal government wished to increase the overall progressivity of the tax system, there is ample room, in our opinion, to achieve this objective through enriched sales tax credits to reduce regressivity.

We did not find a steeply progressive total tax system. The average effective tax rate for the richest 1 percent of families with broad incomes in excess of $300,000 is 35 percent, compared with 30 percent for the poorest 8.3 percent of families with incomes of $10,000 or less. If this pattern of moderate tax progressivity is not significantly different from the pattern in other countries, it is unlikely to induce more mobile Canadians to leave the country. In the absence of more recent and comparable tax incidence estimates for the United States and other countries, it is not possible to be more definitive.

This article is the first stage of an ongoing research program. We plan to model the incidence of government expenditures on goods and services and transfers, and develop the post-fisc income base. This will allow us to answer the question, "Who receives the benefits of government spending?" and provide the empirical estimates to derive a full fiscal incidence study.

In addition, we plan to extend the research methodology used in this study. There exist tax incidence estimates for 1951, 1961, 1969, and 1972. We intend to combine these earlier results and our findings in a common framework, with a view to providing a picture of the extent to which tax incidence has changed in Canada during the past 40 years.

Finally, we intend to exploit the richness of the microdatabase in order to derive estimates of horizontal tax equity and expenditure equity within the income groups of figures 2 to 6.

APPENDIX
Table Source Notes
Source notes follow for each of the appendix tables. Note that in all tables with breakdowns by income groups, the income groups used are economic family[41] income groups.

Table A.1: Total Taxes, Canada, 1988
The data for total tax payments are drawn from the SNA government sector tables, with some adjustments from the FMS or the Public Accounts, where a greater level of detail is required.

The SPSD includes and models the personal income tax, the commodity taxes (those portions that are assumed to be shifted forward to households in the personal sector of the final demand components), and the contributions of employees to unemployment insurance and to the Canada Pension Plan and Quebec Pension Plan, and it also provides a series for the residential property tax paid by homeowners. In each case the model is targeted to the SNA control totals, and for the most part we found the model totals, adjusted for refundable tax credits (see below),[42] to be reasonably close to the SNA values; differences in the tax totals in table A.1 and table A.3 that remain after adjustments for tax credits are due to slight variations between SNA and SPSD tax totals.

Table A.1 includes taxes only. We have excluded revenue from sources that resemble market exchange transactions, such as government income from investments, revenues from the sale of goods and services, and contributions to public service pensions. These amounts should be deducted from the total expenditures of the government sector (to retain the correct budget balance) in an analysis of expenditure incidence, but are not deducted here. In addition, we have excluded from the table withholding taxes on non-residents. Given the similarities in effective marginal tax rates on capital in Canada and the United States, and consistent with our treatment of the incidence of the corporation income tax in the standard case, taxes on income accruing to non-residents will by borne by the recipients and thus should not be allocated to Canadian households.

Corporate income taxes are included in the table at the values recorded in the SNA. However, the share of these taxes borne by non-residents (31 percent) in the standard case shifting model has to be deducted before the incidence of the tax on Canadian households is estimated. Therefore, $5,915 million ($3,676 million at the federal level and $2,239 million at the provincial level) is deducted from corporate income taxes before these taxes are allocated to families in table A.3.

Commodity taxes are included at the values recorded in the SNA. However, given the analysis in the standard case shifting model, commodity

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[41] Supra footnote 18.

[42] See the discussion of transfer income in the notes to table A.2 and the description of personal income taxes, commodity taxes, and property taxes in the notes to table A.3.

Table A.1   Total Taxes, Canada, 1988

Line	Item	Federal	Provincial	Local	Total
		millions of dollars			
1	Personal income tax	46,160	30,628	—	76,788
2	Corporate income tax	11,857	7,222	—	19,079
3	Commodity taxes	25,873	25,788	—	51,661
	a) General sales tax	15,700	18,638	—	
	b) Customs import duties	4,644	—	—	
	c) Other excises	5,529	7,150	—	
4	Payroll taxes	19,573	9,265	—	28,838
	a) UI contributions	11,637	—	—	
	b) CPP/QPP contributions	7,936	—	—	
	c) Workers' compensation	—	4,441	—	
	d) Provincial payroll taxes	—	2,288	—	
	e) Medical-hospital premiums . .	—	2,536	—	
5	Property taxes	—	1,515	19,313	20,828
6	Other taxes	—	8,762	1,144	9,906
	a) Motor vehicle licences	—	2,263	—	
	b) Natural resource revenues . . .	—	4,225	—	
	c) Miscellaneous	—	1,874	1,144	
7	Total taxes	103,463	82,780	20,457	206,700

Sources: SNA; see also the descriptive notes accompanying this table.

taxes of $2,236 million ($1,077 million at the federal level and $1,160 million at the provincial level)[43] paid by governments on their purchases have to be deducted before the tax incidence on families can be estimated. (These amounts should also be deducted from the total expenditures of the government sector before the expenditure incidence estimates are derived.)

Detailed comments follow for some of the taxes in the table.

Line 1: Personal Income Tax
At the provincial level, personal income taxes amount to $32,728 million in the SNA, including the Quebec provincial payroll tax of $2,100 million. We have separated out this tax source and included it in line 4(d) of the payroll taxes.

Line 2: Corporate Income Tax
At the provincial level, corporate income tax includes the capital taxes paid by corporations of $1,493 million.

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[43] See table A.3, line 3, for details.

Line 3(a): The Manufacturers' Sales Tax

Total excise taxes in the SNA are $18,837 million. This includes the manufacturers' sales tax at $15,700 million and numerous other excise taxes, which sum to $3,137 million.

Line 3(c): Other Excises

At the federal level other excises includes excise duties at $1,462 million, the air transportation tax at $492 million, and miscellaneous indirect taxes at $438 million (these are specified in the SNA), and a residual of $3,173 million, which also includes the special gasoline tax. At the provincial level other excises include the amusement tax, liquor commission profits, and the liquor gallonage tax (which, in the SNA, is included in the miscellaneous indirect taxes category).

Line 4(d): Payroll Taxes

Quebec and Manitoba payroll taxes are not disaggregated in the SNA. The value recorded here is from FMS data.

Line 5: Property Taxes

At the provincial level, line 5 includes property taxes of $1,115 million and land transfer taxes of $400 million (which in the SNA are included in miscellaneous indirect taxes). We have included the land transfer tax here because we are treating it as a tax that affects property in the tax incidence analysis. At the local level, property taxes include real and other property taxes of $17,373 million from the SNA, and business taxes related to property and occupancy of $1,940 million (which, in the SNA, are included in miscellaneous indirect taxes; we have included them here because these business taxes and property taxes are treated similarly in the incidence analysis).

In the incidence analysis we have grouped provincial property taxes with the local property tax for ease of calculation; this means that there is a small distortion in tax incidence by level of government of which the reader should be aware. In the analysis, the share of property taxes on land that is borne by non-residents ($810.4 million) is netted out before property taxes are distributed to families in table A.3.

Line 6(a): Motor Vehicle Licences

In addition to motor vehicle licences, line 6(a) includes other permits and licences specified in the SNA.

Line 6(b): Natural Resource Revenues

Natural resource revenues total $4,225 million and consist of miscellaneous taxes on natural resources of $825 million and royalty payments of $3,400 million (which are recorded in the SNA under investment income; we have included them here because they should be included in the tax incidence analysis). The share of the miscellaneous resource taxes borne by non-residents ($255.7 million) in the standard case shifting model is deducted from the total before these taxes are distributed to families in table A.3.

Line 6(c): Miscellaneous Indirect Taxes

At the provincial level, miscellaneous indirect taxes include crop insurance premiums; land transfer taxes; hotel, motel, and meal taxes; public utilities tax; fire prevention tax; and numerous smaller levies. At the local level, these other miscellaneous taxes include amusement taxes, sales taxes, licences and fees, and a miscellaneous group of smaller charges and levies. We include them here because the commodity tax section above includes only those taxes that are specifically modelled in the SPSD. However, we treat them in the same way as sales taxes in the incidence analysis.

Table A.2: Average Family Income and Total Income, Standard Case, by Income Source and Broad Income Group, Canada, 1988

Average family incomes by income source are shown for each income group (in dollars). The final column shows income totals by income source (in millions of dollars) for all families in Canada.

Line 1: Employment Income

Employment income includes earnings from employment (gross of employee contributions to payroll taxes, and gross of all medical-hospital premiums paid in Ontario, Alberta, and British Columbia), self-employment income from non-farming activities, and net farm income. These items are all defined as variables in the SPSD model, and their control totals are the respective items in the SNA. The same is true for the other items in total money income; in some cases, values from Revenue Canada's *Taxation Statistics* (green book) are used as the control totals.[44]

Line 2: Investment Income

Investment income includes interest income, the actual amount of Canadian dividends, realized capital gains (this is called imputed actual capital gains in the SPSD model, and it is derived from the green book reported taxable capital gains, grossed up to the actual realized amount for the inclusion rate of the year in question), other investment income (such as net rents from real estate, loan and mortgage interest, and royalties), and net income from roomers and boarders.

Line 3: Other Income

Other income includes pension income (from private pensions, annuities, RRSP pension income, and pensions of retired public servants), and other money income reported in the SCF, such as scholarships, strike pay, alimony, royalties on books, group insurance disability payments, and many other smaller items.

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[44] Revenue Canada, Taxation, *1990 Taxation Statistics: Analyzing 1988 T1 Individual Tax Returns and Miscellaneous Statistics* (Ottawa: Supply and Services, 1992) (herein referred to as the green book).

Table A.2   Average and Total Family Income, by Income Source and Broad Income Group, Canada, 1988

Line		Up to 10,000	10,001-20,000	20,001-30,000	30,001-40,000	40,001-50,000	50,001-60,000	60,001-70,000	70,001-80,000	80,001-90,000	90,001-100,000	100,001-150,000	150,001-300,000	Over 300,000	All	Total
	Number of families by broad income base *(thousands)*	871	1,505	1,389	1,234	1,094	921	735	599	493	385	825	328	84	10,464	10,464
	Share of total by broad income base *(percent)*	8.3	14.4	13.3	11.8	10.5	8.8	7.0	5.7	4.7	3.7	7.9	3.1	0.8		100.0
							average per family, dollars									*$ million*
	Market income															
1	Employment income	1,434	4,438	10,670	18,325	25,414	32,994	39,924	45,414	52,017	57,543	71,148	96,822	178,963	29,956	313,466
2	Investment income	141	837	1,478	1,748	2,114	2,644	2,927	3,413	3,404	4,406	6,454	21,072	132,847	3,951	41,347
3	Other income	284	887	1,514	1,930	1,932	1,931	1,820	1,833	1,602	1,765	1,882	3,353	10,909	1,666	17,437
4	Total market income	1,860	6,161	13,662	22,002	29,459	37,568	44,672	50,660	57,023	63,713	79,485	121,247	322,719	35,574	372,250
	Additions to income															
5	Imputed interest income	35	173	300	335	383	448	489	550	534	637	869	2,020	4,033	465	4,870
6	Imputed rental income	3	392	1,049	1,196	1,502	1,353	1,487	2,200	2,741	3,196	4,679	6,324	5,365	1,701	17,796
7	Food and fuel grown and consumed on the farm	4	8	11	16	21	24	27	30	32	32	38	51	103	21	218
8	Employer-provided benefits	1	0	56	173	280	408	510	583	660	746	880	930	675	325	3,400
9	Accrued capital gains on principal residence	162	950	2,369	3,339	4,812	5,216	6,585	7,473	8,759	9,296	11,774	13,156	11,548	4,900	51,270
10	Accrued capital gains on shares	-13	-10	-4	-9	-4	19	38	49	61	120	444	3,397	91,126	885	9,264
11	Accrued capital gains on other real estate	4	7	11	20	32	48	81	103	108	167	273	977	10,461	172	1,800
12	Investment income of life insurance companies	6	27	47	52	60	70	76	86	83	99	136	315	630	73	760

(Table A.2 is concluded on the next page.)

Table A.2 Concluded

Line	Up to 10,000	10,001- 20,000	20,001- 30,000	30,001- 40,000	40,001- 50,000	50,001- 60,000	60,001- 70,000	70,001- 80,000	80,001- 90,000	90,001- 100,000	100,001- 150,000	150,001- 300,000	Over 300,000	All	Total
					average per family, dollars										*$ million*
13 Adjustment for RPPs and RRSPs	-157	-252	-214	77	687	1,584	2,643	4,045	4,939	6,723	8,455	20,757	19,847	2,517	26,339
14 Inheritances and gifts	2	45	294	368	379	969	796	1,309	1,759	1,666	3,310	8,549	67,845	1,564	16,371
15 Total additions to income	391	1,783	4,312	6,078	8,732	10,256	13,161	16,491	19,479	22,790	30,059	57,168	178,501	12,619	132,046
Adjustments for model consistency															
16 Backward shifted payroll taxes	77	268	682	1,188	1,659	2,126	2,454	2,655	2,911	3,141	3,372	3,341	2,929	1,607	16,819
17 Corporate income taxes on corporate earnings	21	70	140	214	300	426	523	708	846	1,079	1,549	7,303	77,656	1,258	13,164
18 Backward shifted commodity taxes	24	70	166	288	397	530	642	730	842	937	1,131	1,400	2,484	471	4,924
19 Backward shifted property tax	-4	25	60	97	113	138	161	196	228	298	396	1,292	8,893	234	2,451
20 Natural resource taxes on owners	1	3	6	9	13	18	23	31	37	47	67	316	3,358	54	569
21 Total adjustments for model consistency	120	436	1,054	1,797	2,482	3,238	3,803	4,319	4,863	5,502	6,514	13,653	95,320	3,625	37,928
22 *Pre-fisc income*	2,027	7,938	18,634	29,366	40,094	50,946	61,206	71,406	81,563	91,898	116,857	191,376	629,674	51,821	542,265
23 *Transfer income*	4,984	6,954	6,219	5,476	4,833	3,971	3,685	3,366	3,351	2,915	2,589	2,803	2,565	4,771	49,921
24 *Broad income*	7,011	14,892	24,852	34,842	44,927	54,917	64,891	74,772	84,914	94,813	119,446	194,179	632,240	56,592	592,186

Source: See the descriptive notes accompanying this table.

Line 4: Total Market Income

Total market income is the sum of lines 1-3.

Line 5: Imputed Interest Income

Imputed interest income is the gain that deposit holders receive because they do not pay full service charge marginal costs on all the services that they receive from financial institutions. The total is derived from the estimate provided in the SNA ($4,870 million).[45] This total is distributed by the series, interest income (which we assume to be an appropriate proxy for the deposit holders who gain), which is found in the model.

The appropriate treatment for measuring the value-added of deposit-taking institutions is still the subject of some controversy. For a useful and practical discussion, see Gaudet.[46]

Line 6: Imputed Rental Income

Imputed rental income is the return to equity in owner-occupied housing. It is a non-money source of income for homeowners that has to be taken into account in order to treat renters and owners similarly with respect to their command over goods and services. The SNA estimates a total for imputed rental income in calculating the value of gross domestic product ($17,887 million).[47]

The market value of the family home, mortgage interest expenses, property taxes, and home repair expenses are variables whose values are provided for each household in the model. We used these variables and the methodology of the SNA to derive a distributive series for imputed rent on owner-occupied homes. We first estimated gross imputed rent by applying an 8 percent rate of return to the market value of the family home (suggested by several writers as the return on home ownership in Canada).[48] We then estimated the expenses for mortgage interest payments, property taxes, repairs, insurance expenses, and miscellaneous expenses as a distributive series, and subtracted those expenses from the gross rate of return. The result is the net rate of return (or net imputed rent) on owner-occupied homes. The total dollar amount of imputed rents distributed to homeowners corresponds closely with the SNA estimate.

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[45] Statistics Canada, *National Income and Expenditure Accounts, Annual Estimates 1979-1990*, catalogue no. 13-201, 80, table 62.

[46] Céo Gaudet, "On the Value of Banking: A Suggested Methodology for Measuring the Value-Added of Deposit-Taking Institutions" (unpublished draft, March 23, 1993).

[47] Supra footnote 45.

[48] See, for example, James B. Davies, "On the Size Distribution of Wealth in Canada" (September 1979), 25 *The Review of Income and Wealth* 237-59, at 243 (who suggests a 7.6 percent rate of return); Michael C. Wolfson, "Wealth and the Distribution of Income in Canada 1969-70" (June 1979), 25 *The Review of Income and Wealth* 129-40; and Kitchen, supra footnote 29, at 57.

Line 7: Food and Fuel Grown and Consumed on the Farm

The value of farm food estimated in the SNA is $98 million and the value of wood grown, cut, and consumed on the farm is $120 million. We created a series that reflects the distribution of food and fuel grown and consumed on the farm (a food-fuel variable) as follows. Food-fuel expenditures in the market get recorded in the FAMEX data that are built into the model. Given the assumption that farm families have similar food-fuel consumption to non-farm families at a given income level, we estimated the average market value of purchased food-fuel expenditure for farm families and non-farm families, by income groups. The average food-fuel expenditure for non-farm families exceeded the average for farm families by 0.65 percent. We assumed that this difference would be accounted for by food-fuel grown and consumed on the farm, and allocated it to farm families. The total derived was reasonably close to the SNA estimate of $218 million.

Line 8: Employer-Provided Benefits

Employer-provided benefits for employees are similar in concept to the imputed interest income of deposit holders and the imputed income that farmers derive from food and fuel grown and consumed on the farm; they are thus a source of non-money income for employees. The benefits include employer contributions to dental plans, extended health care plans, drug benefit plans, supplementary hospital benefit plans, death and dismemberment insurance plans, and group life insurance plans. In 1988, employer contributions to these plans totalled approximately $3,350 million.[49] This amount was distributed to employees by employment income (workers with low employment incomes were excluded and those with higher incomes were allocated benefits that did not increase proportionately to their incomes).

Not included as employer-provided benefits were employer contributions to loss-of-income insurance plans and similar plans. Although the premiums paid by employers to those plans are not included in the income of employees for tax purposes, *benefits* received under the plans are included in personal income and are taxable.

Employer contributions to registered pension plans are dealt with in line 13, below.

Line 9: Capital Gains on Principal Residence

There are several components of the asset holdings of families that generate a return in the form of capital gains (net of losses). These gains increase

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[49] Canadian Life and Health Insurance Association, Labour Income Division, "Survey of Health Insurance Benefits in Canada" (mimeograph, 1991), and supplementary labour income sources from the Department of Finance. The approximate breakdown for employer contributions is: dental ($1,187 million), extended health care ($1,211 million), drug benefits ($16 million), supplementary hospital insurance ($39 million), accidental death and dismemberment insurance ($106 million), and group life insurance ($790 million). Approximately 4.5 million employees were covered in 1988.

the command over goods and services of families owning such assets relative to families that do not. To measure family income comprehensively, it is necessary to include the gains in income. The assets in question are principal residences, shares, and other real estate. Measurement of gains on these assets should be on an accrual rather than a realization basis.

Our estimate of capital gains accruing to homeowners attempts to approximate the situation in a long-run, steady state equilibrium. It is derived by applying an annual average price increase to the market value of homes. The annual average price increase for owner-occupied homes from multiple listing service (MLS) housing prices for 1971-1991 is 10 percent. Given the annual average price increase attributable to restoration and renovation, the net price increase is 9.75 percent. This average probably masks some regional differentiation across the country and variation that could result in price decreases for some homes. Consequently, we decided to use a lower estimated price increase of 9 percent.

The market value of the family home is provided for each household in the SPSD model. This value is derived from the underlying survey data, and it is one of the asset values that is judged to be reasonably accurately reported (its total corresponds closely with independent estimates of the total market value of homes).[50]

Line 10: Accrued Capital Gains on Shares

Accrued capital gains (net of capital losses) on shares represent an increase in command over goods and services, and annual gains, whether realized or not, should be included in the income of shareowners. Annual increases in share values are the combined result of retained earnings that are reinvested within the firm and changes in market demand that alter relative prices. Realized capital gains are counted as income for tax purposes and recorded in green book statistics and as income in the SPSD model (see line 2 above). Realized capital gains on shares are not recorded separately from other realized capital gains in the model but they are segregated in the green book. Unrealized capital gains are not recorded as income in any official source.

In determining broad annual income, we are interested in capital gains measured on an accrual basis (that is, capital gains accrued in 1988). Realized capital gains include gains that accrued in previous years as well as a (small) portion of gains that accrued during the current year. In a growing economy, the value of capital gains accruing in any given year exceeds the value of capital gains realized during the year.

We used two different methods to estimate accrued capital gains on shares. Both methods involved, as a first step, estimating the market value of shares held by households. We did this, using the *National Balance*

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[50] Davies, supra footnote 48.

Sheet Accounts,[51] by adding to the book value of Canadian shares held by households (not including shares held in RRSPs and RPPs) the net worth of the corporate sector attributable to those shares.[52] We then added to that total the market value of foreign shares owned by households.[53]

In our first estimation method, we determined the year-to-year increase in the market value of shares over a seven-year period (the end of 1983 to 1990). By netting out the value of any new shares issued during the year,[54] we derived the increase in market value of shares outstanding at the beginning of the year for each of the seven years. This increase averaged 5.09 percent over the seven-year period. This was 2.52 times greater than the average yearly value of realized capital gains (as reported in green book data) expressed as a percentage of the market value of shares.

In our second estimation method, we assumed that investors who buy shares required at least a 9 percent return on their investment over the same seven-year period analyzed in the first estimate. This is very conservative, since the average return on bonds, a less risky investment vehicle, was greater than 9 percent during the period.[55] Dividend income received by households plus realized capital gains reported by households during the seven-year period yielded an average annual rate of return of only 3.92 percent (1.9 percent in dividends plus 2.02 percent in realized capital gains). For a 9 percent return, capital gains would have had to have been 3.42 times higher than the realized capital gains reported. For a 10 percent return, which is a more realistic, though still conservative, estimate of the return on shares required by investors during the time period, capital gains would have had to have been 3.91 times the reported realized amount.

Although the results of the estimation methods vary, they clearly indicate that accrued capital gains exceed realized gains considerably. We conservatively modelled accrued capital gains by estimating their value at three times the value of reported realized capital gains (and losses) on shares in 1988—a total of $13,896 million. With realized capital gains of $4,632 million (green book), $9,264 million was therefore added to in-

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[51] Statistics Canada, *National Balance Sheet Accounts, Annual Estimates, 1982-1991*, catalogue no. 13-214; and Statistics Canada, *National Balance Sheet Accounts, 1990*, catalogue no. 13-214.

[52] The net worth of the corporate sector, as this concept is used in the *National Balance Sheet Accounts*, is the excess of the market value of tangible corporate assets over their book value. Shares owned by households are recorded in the *National Balance Sheet Accounts* at book value (including the book value of retained earnings).

[53] Estimated, using the foreign investments field in the *National Balance Sheet Accounts, 1990*, supra footnote 51, as less than 4 percent of the market value of Canadian shares owned by households.

[54] Using Statistics Canada, *National Income and Expenditure Accounts, Annual Estimates, 1980-1991*, catalogue no. 13-201.

[55] See, for example, [June 1990] *Bank of Canada Review*. Bond yields in 1988 varied from 9.46 to 11.34 percent depending on the issuer and the length of the term.

come. This was distributed to families in proportion to their realized capital gains and dividends on shares.

Line 11: Accrued Capital Gains on Other Real Estate

Other real estate consists of land holdings and structures other than those included with principal residences in line 9 above.[56] It is necessary to estimate accrued capital gains on other real estate because in a growing economy, accrued capital gains exceed realized capital gains.

We estimated the value of other real estate holdings using both the national balance sheets and Department of Finance estimates of land and capital stock values.[57] From the values for mid-year holdings of land, residential structures, and non-residential structures by the person and unincorporated business sector listed in the *National Balance Sheet Accounts* we subtracted the value of principal residences (including associated land) and the value of land and structures attributable to universities, churches, charities, and unions.[58] This total came to $91 billion and was confirmed by the Department of Finance data. Using a 9 percent rate of accrual, 1988 accruals on other real estate totalled $8.2 billion. With total realized capital gains on real property of $6.4 billion (from the green book), $1.8 billion therefore had to be added to income.[59] This amount was distributed using the capital gains/losses series in the SPSD.

Line 12: Investment Income of Life Insurance Companies

Line 12 gives the imputed gain that holders of life insurance receive because they use life insurance as an investment vehicle, with the accumulating investment income being automatically reinvested (without any income

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[56] Line 11 (other real estate) includes farmland and structures owned by unincorporated businesses (as well as other land holdings and structures not included in line 9).

[57] Department of Finance, Federal-Provincial Relations Division, "Provincial Fiscal Equalization: Estimates" (February 26, 1993, unpublished). These data are for the entire residential, farm, and commercial/industrial sectors. From the totals, we netted out amounts attributable to the corporate sector.

[58] Using "The Persons and Unincorporated Business Sector: Notes and Supplementary Detail," feature article in Statistics Canada, *National Balance Sheet Accounts, 1989*, catalogue no. 13-214.

[59] We have not attempted to estimate the total accrued capital gains on the value of unincorporated businesses. Such an estimate would be too difficult. However, by including farmland and non-residential structures in "other real estate," we are including a part of the value of unincorporated businesses in our accrual estimates.

Our estimate of accrued gains for other real estate may be too low. If this is the case, and assuming that national balance sheet totals for land and structures are accurate, then our estimates of capital gains on principal residences is too high because other real estate asset values are a residual, which we derived by subtracting the value of principal residences (as recorded in the SPSD based on SCF data) from total household land and structure holdings. We use the same rate of return for calculating gains on principal residences and on other real estate so that any overestimates or underestimates will cancel each other out. Total capital gains for all real estate holdings combined should therefore be quite accurate.

tax being paid), thereby increasing the value of the policy. The investment income is estimated at \$760 million in 1988 (this value is derived from data provided by the Office of the Superintendent of Financial Institutions). We consider interest income to be a close proxy variable that reflects investment in fairly safe instruments, and therefore allocated the investment income on life insurance policies to families in proportion to their interest income as recorded in the SPSD.

Line 13: Income Adjustment for RPPs and RRSPs

Several adjustments to income are required to properly account for registered pension plan and registered retirement savings plan income. As with income dealt with in previous lines, this income should be measured on an accrual basis.

RRSPs and RPPs provide individuals with a way of saving for their retirement years. When an individual receives pension income from an RPP or RRSP annuity upon retirement (or makes an RRSP cash withdrawal at any time), the amounts received are not actually income (although they are treated that way for tax purposes) but, instead, a withdrawal of savings that were deposited or earned previously. We therefore subtract all RRSP and RPP pension receipts (\$11,016 million) plus RRSP cash withdrawals (\$2,557 million) from income.[60]

Income is earned on RPP and RRSP funds on an ongoing basis in the form of interest. It is earned every year, both before retirement and after (as long as any principal remains). These earnings should be measured on an accrual basis just as for capital gains on homes, shares, and other real estate, rather than on a realization basis (as would be the case if pension receipts were treated as income). We determined total RRSP and RPP assets to be \$355 billion in 1988.[61] This is a large sum and it is growing at a rapid rate. Adjustments for income related to RRSPs and RPPs are therefore significant. Accrued interest for 1988, using a 9 percent rate of return,[62] was \$31,090 million. This amount was added to income.[63]

We distributed RRSP and RPP accrued interest to pensioners and to those reporting RPP and RRSP contributions in 1988 (the information was con-

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[60] Totals and distribution from the green book and the SPSD and, for RRSP withdrawals, from Hubert Frenken, "RRSPs—Not Just for Retirement" (Winter 1992), 4 *Perspectives on Labour and Income* 9-13; and Hubert Frenken, "Note on RRSP Contributions and Payouts" (Spring 1993), 5 *Perspectives on Labour and Income* 49-50.

[61] Statistics Canada, *Trusteed Pension Funds: Financial Statistics, 1990*, catalogue no. 74-201; also Statistics Canada, *National Balance Sheet Accounts*, supra footnote 51.

[62] See Diane Galarneau, "The Performance of Trusteed Pension Funds" (Spring 1990), 2 *Perspectives on Labour and Income* 42-51; also supra footnote 55.

[63] A significant part of accrued interest is earned by pensioners (\$7,490 million). Therefore, although all pension receipts were withdrawn from pensioners' incomes, after accrued interest was added back to income, pensioners' incomes measured on an accrual basis were, though significantly altered, still reasonably close to incomes measured on a realization basis.

tained in the SPSD/M model). Additional amounts were also distributed to some non-RPP and non-RRSP contributing persons to model interest accrual for participants in non-contributory pension plans and for persons who have pension assets accumulating because of contributions in previous years but who did not make a contribution in 1988.[64] Statistics Canada's 1984 SCF asset and debt survey contains information on the distribution of RRSP assets by income groups, which we judged to be fairly reliable.[65] Unfortunately, the asset and debt survey contains no information on the distribution of RPP assets. We therefore had to assume that the distribution of RPP assets by income groups is the same as for RRSPs. Since contribution patterns by income groups are very similar for RRSPs and RPPs, this seems like a reasonable assumption, given the lack of any firm data.[66]

One further adjustment has to be made with regard to RPPs. The contributions made by employers to registered pension plans (100 percent for non-contributory plans and usually 50 percent for contributory plans) have to be added to the incomes of employees. These employer contributions are conceptually the same as the employer-provided benefits discussed in line 8, above. In 1988, these contributions totalled $8,835 million.

Theoretically, deferred profit sharing plan (DPSP) income should be treated in the same way as RPP and RRSP income—that is, interest accrued in 1988 should be included in income and realizations should not. However, since there is no accurate information available on the total value

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[64] These distributions were made using the available information on the total number and characteristics of RPP and RRSP participants, the ratio of RPP participants in contributory versus non-contributory plans, and the probabilities of contributing to RRSPs in any given year, given contributions in previous years. Sources: Hubert Frenken, "RRSPs: Tax-Assisted Retirement Savings" (Winter 1990), 2 *Perspectives on Labour and Income* 9-20; Hubert Frenken and Karen Maser, "Employer-Sponsored Pension Plans—Who Is Covered?" (Winter 1992), 4 *Perspectives on Labour and Income* 27-34; Statistics Canada, *Pension Plans in Canada, 1990*, catalogue no. 74-401; Anil K. Gupta, Steven F. Venti, and David A. Wise, "Storing the Option and Saving for Retirement" (December 1991, unpublished); John B. Burbidge and James B. Davies, "Government Incentives and Household Savings in Canada" (March 1993, revised, unpublished).

[65] Statistics Canada, *The Distribution of Wealth in Canada, 1984*, catalogue no. 13-580 (Ottawa: Supply and Services, 1986).

[66] RRSPs were designed, in part, to be a savings vehicle for self-employed persons and professionals because, unlike employees, these individuals are usually not able to save through RPPs. It may therefore appear that RRSP asset ownership is more concentrated in higher income groups than is ownership of RPP assets. This is, however, not the case. The average income of RPP contributors is very similar to that of RRSP contributors. (One reason for this is that RPPs are available only to persons with higher paying jobs. Many lower income employees are in jobs that do not provide RPPs and therefore use RRSPs to save instead.) For every three dollars contributed to RRSPs, two dollars are contributed by paid workers (Frenken, supra footnote 64) so that the majority of RRSP contributors are not, in fact, self-employed. A further indication that RPP and RRSP asset distribution by income groups is similar is that there is considerable overlap between RPP and RRSP contributors. Of 1.4 million RRSP participants in 1987, for example, 39 percent contributed to RPPs as well; and 37 percent of taxfilers contributing to RPPs contributed to RRSPs compared with 16 percent of RPP non-contributors (Frenken, ibid.).

or distribution of assets in DPSPs, and since the amounts involved are relatively small, we accounted for DPSP income on a standard realization basis rather than on an accrual basis. The SPSD model contains $13,312 million in total pension income. After RPP and RRSP pensions have been taken out of this total, $2,996 million is left. That includes DPSP realizations, foreign pensions, and some other annuity receipts.

Line 14: Inheritances and Gifts

Inheritances and gifts add to the economic resources of persons and should be included in income. While no reliable empirical data on the size or distribution of inheritances and gifts exists for Canada, enough work has been done in this area by economists in both Canada and the United States to attempt some estimates.

We estimated the total size of all yearly intergenerational transfers among Canadian families using the 1984 SCF asset and debt survey[67] data on wealth distribution by age groups, augmented by an upper Pareto tail based on Davies[68] and data on age-specific death rates. The calculation indicated that, of the $905 billion in total wealth held in families or by unattached individuals in 1984,[69] $5.3 billion was passed on to other generations. We then adjusted this calculation to take into account gifts and other inter vivos transfers, using available estimates of the size of the inherited wealth stock in Canada[70] and the United States[71] and estimates of inheritances as a percentage of lifetime earnings.[72] We concluded conservatively that approximately 1.2 percent ($10.9 billion in 1984) of all wealth held by Canadian families is transferred across generations per year.

To distribute this total yearly wealth transfer among income groups, we made use of the fact that the distribution of inheritances by income groups follows closely the distribution of wealth by income groups. Over a large range of all wealth holders, the ratio of inheritances received by families

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[67] Statistics Canada, *The Distribution of Wealth in Canada*, supra footnote 65.

[68] James B. Davies, "The Distributive Effects of Wealth Taxes" (September 1991), 17 *Canadian Public Policy* 279-308.

[69] This estimate for 1984 was made using *National Balance Sheet Accounts, 1990*, supra footnote 51, at 8, table P3-1, and feature article "The Persons and Unincorporated Business Sector: Deferred Compensation and Retirement Funds, 1980-90." It is mid-year, and excludes the net worth of the corporate sector (see supra footnote 52) and the net worth of universities, churches, and charities.

[70] James B. Davies and France St-Hilaire, *Reforming Capital Income Taxation in Canada* (Ottawa: Economic Council of Canada, 1987), 108, based on the simulation model in James B. Davies, "The Relative Impact of Inheritance and Other Factors on Economic Inequality" (August 1982), 97 *The Quarterly Journal of Economics* 471-98.

[71] Henry J. Aaron and Alicia H. Munnell, "Reassessing the Role for Wealth Transfer Taxes" (June 1992), 45 *National Tax Journal* 119-43.

[72] Davies, St-Hilaire, and Whalley, supra footnote 27; Davies, supra footnote 68.

to the total net worth of those families is constant.[73] This is, however, not the case for very wealthy families. Among the top 5 percent of wealth holders, the proportion of their net worth that is due to inheritances is greater than for lower wealth holders.[74]

Given the distribution of wealth by income groups for Canada,[75] our estimate of the average yearly flow of inheritances to families within each income group was calculated by taking a fraction of the average wealth of families within each income group. The same fraction was used to calculate average yearly inheritance flows for all income groups except the top one, for which a higher fraction was used. The average yearly inheritances for the income groups were calculated so that the total of all inheritance receipts in all income groups, taking into account the number of families in each income group, was equal to our estimated overall yearly intergenerational wealth flow ($10.9 billion for 1984).

We assume that the distribution of wealth by income groups has not changed significantly since the 1984 wealth survey.[76] Our estimate of the total wealth owned by households in 1988 is $1,361 billion.[77] This figure includes the middle-of-year net worth of the persons and unincorporated business sector (*National Balance Sheet Accounts*) net of wealth held in pensions and life insurance, and net of the estimated net worth of universities, churches, and charities. It also includes the 1988 middle-of-year net worth of corporations, exclusive of any portion attributable to foreigners. Using this stock of wealth as a base, our estimate of 1988 intergenerational flows is $16,335 million.[78] Within each income group,

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[73] See, for example, Davies and St-Hilaire, supra footnote 70, where both wealth and inheritance distributions are modelled. See also John A. Brittain, *Inheritance and the Inequality of Material Wealth* (Washington, DC: Brookings Institution, 1978).

[74] See supra footnote 73. Because the top wealth-holding families are also likely to be among the top income-earning families, it follows that among top income earners, inheritances constitute a larger portion of net wealth than among low income earners. Of course, some high wealth families are low income earners, and some high income-earning families have little accumulated wealth. Our estimation method takes account of this.

[75] Supra footnotes 65 and 68.

[76] We used family income quintile cutoff points for 1983 and 1988 to grow the 1984 SCF asset and debt survey distribution data to 1988 (the 1984 survey uses 1983 income groups). This should minimize any distortions due to changes in relative incomes and family structure.

[77] Statistics Canada, *National Balance Sheet Accounts, 1990*, supra footnote 51, at 8, table P3-1, and feature article "The Persons and Unincorporated Business Sector: Deferred Compensation and Retirement Funds, 1980-90."

[78] Because random numbers were employed to model inheritance distributions, the actual amount distributed by the SPSD/M program differs slightly (see the entry for the total at line 14 of the table).

the total amount of inheritances and gifts attributable to the income group were distributed randomly to every 40th family.[79]

Line 15: Total Additions to Income
Line 15 is the sum of lines 5-14.

Line 16: Backward-Shifted Payroll Taxes
The employee portion of payroll taxes is already included in gross earnings from employment (line 1). In the standard case shifting assumption model all payroll taxes are assumed to be borne by labour, and are allocated proportionally to "covered" wages and salaries. Therefore, the employer portion of payroll taxes has to be added to the income of employees in order to render the income base consistent with the tax shifting assumptions. This section includes four payroll tax categories: unemployment insurance contributions, CPP and QPP contributions, workers' compensation contributions, and flat rate payroll taxes in several provinces (called health or education taxes). Employer contributions of hospital-medical premiums in Ontario, Alberta, and British Columbia ($1,569 million) are already included in employees' market income in the SPSD.

Unemployment insurance contributions: Employers pay 1.4 times the amount that employees contribute to unemployment insurance. Employee contributions are provided in the SPSD (total: $5,298 million) for each household. We applied the employer rate times the employee contribution to estimate the employer contribution. Initially this resulted in a total (employee and employer) UI contribution that exceeded the SNA value by about $1 billion. Our application of the 1.4 ratio to every employee may have resulted in such an overestimate for several reasons related to how UI contributions are modelled in the SPSD. We therefore reduced the ratio to 1.21. This resulted in an employer total of $6,338 million and a total (employee and employer) UI contribution amount equal to the SNA estimate of $11,637 million.

CPP/QPP contributions: Employers pay the same rate that employees do up to the permissible maximum limits. Employee and self-employed contributions are provided in the SPSD model (total: $4,234 million). We allocated to employees, as the backward-shifted employer portion of CPP/QPP taxes, an amount equivalent to their employee contribution. The total of employee and self-employed contributions (in the model) and estimated employer contributions sum to a value that is close to the SNA total of $7,936 million.

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[79] In an earlier version of this paper, we calculated tax incidence using an alternative method of distributing inheritances and gifts attributable to an income group equally over all families within the income group. This spreading out of inheritances and gifts was more appropriate for a lifetime income approach, and we were convinced by comments on the earlier paper to change our approach. (We especially thank Roger Smith in this regard.) Distributing inheritances and gifts to every fortieth family within the SPSD model captures the actual receipts of such income on an annual basis more realistically.

Workers' compensation contributions: These contributions ($4,441 million in the SNA) are made entirely by employers at the provincial level. The distributive series is derived as follows. First, we noted the assessment rates by industries within the standard industrial classification, for each province.[80] Then we extracted a set of average rates for the broad industrial groupings that seemed representative. These ranged from an average rate of 8 percent for construction industries, through 4 percent for manufacturing industries, to a low of 1 percent for service and education industries. We then roughly matched these industrial groupings with the occupational codes in the SPSD, and applied the average assessment rates to employment income (up to a maximum insurable earnings level of $36,000, our estimate of the 1988 average provincial values). This resulted in a distribution of employee wages and salaries subject to workers' compensation contributions by employers. We used this series to distribute the payment of workers' compensation contributions as a tax payment in table A.3 and as a source of income in the present table.

Health and education payroll taxes: These payroll taxes in Quebec and Manitoba ($2,288 million, derived from information in financial management statistics and the Public Accounts)[81] are allocated proportionally to wage and salary income in those two provinces. We did not attempt to model the differential rate structure in Manitoba since we had no way of linking an individual's wage income in the model with the size of the employer's payroll. The payroll tax in Ontario came into existence after 1988.

Line 17: Corporate Income Tax on Corporate Earnings

In the standard case, the corporate income tax (net of the share borne by non-residents) is assumed to be borne by owners of capital, and is distributed to families in accordance with their ownership of corporate earnings.[82] This amount ($13,164 million) is added to the income base to make it consistent with the tax incidence model.

Line 18: Backward-Shifted Commodity Taxes

In the standard case, the portion of sales and excise taxes on capital goods and exports that is assumed to be shifted backward to labour (total: $4,924 million) and borne by earnings from employment is added to the income base to make it consistent with the tax incidence model.

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[80] Association of Workers' Compensation Boards of Canada, *Workers' Compensation Industry Classifications and Assessment Rates in Canada, 1992* (Ottawa: the association, August 1992).

[81] Statistics Canada, *Public Finance Historical Data, 1965/66-1991/92*, catalogue no. 68-512, 203-4; see also *Provincial and Municipal Finances, 1989* (Toronto: Canadian Tax Foundation, 1990), 14:16 and 10:54; and Manitoba Public Accounts, 1988-89, 1.9.

[82] We measure families' ownership of corporate earnings by their capital gains on shares income (accrued rather than realized), earned dividends, and RRSP and RPP accrued interest earnings attributable to shares.

Line 19: Backward-Shifted Property Tax

Backward-shifted property tax includes property taxes that in the standard tax shifting case are assumed to be borne by landowners in the business sector, the farm sector, and the residential renter-occupied sector (total: $2,253 million). They are distributed to families in accordance with their ownership of corporate earnings,[83] farm income, and rental income, respectively, in the tax incidence analysis, and are added to the income base.

Line 20: Natural Resource Taxes on Owners

Natural resource revenues are one of the three taxes included in the category, other taxes. In the standard case, the portion of natural resource revenues from resource rental payments is assumed to be borne by the owners and is distributed to families in proportion to their ownership of corporate earnings. This amount, net of the portion borne by non-resident owners ($569.3 million) is added into the income base to render it consistent with the tax incidence analysis.

Line 21: Adjustments to Income for Model Consistency

Line 21 is the sum of lines 16-20.

Line 22: Pre-Fisc Income

Pre-fisc income is the sum of market income (line 4), non-money additions to income (line 15), and adjustments to income for model consistency (line 21).

Line 23: All Transfer Income

At the federal level, transfer income includes family allowances, OAS benefits, GIS benefits, unemployment insurance benefits, CPP or QPP benefits, spouses' allowances, social assistance (federal payments under CAP), taxable other government income (manpower training and adult training allowances), non-taxable other government income (such as veterans' pensions, veterans' widows' pensions, and workers' compensation payments), and the Quebec tax abatement (the refundable excess, if any). At the provincial level, it includes provincial family allowance programs (for Quebec, so far), social assistance (provincial payments under CAP), and the GIS provincial top-ups. These items are all modelled in the SPSD.

Not included in transfer income are refundable sales and property tax credits. This treatment of tax credits is the same as that in the SNA and SCF but different from that in the SPSD/M. The SPSD/M considers tax credits to be similar in content to other transfer payments and treats these items as part of transfer income. We consider the federal sales tax credit and provincial sales and property tax credits to be an integral part of the tax system. These credits are delivered through the tax system; transfer payments proper are generally delivered independently of the tax system. More

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[83] See supra footnote 82.

important, these refundable tax credits were designed specifically to off-set the regressive impact of commodity and property taxes on families in lower income groups. In other words, the tax credits were designed to be an integral part of the overall tax system, which would reduce the tax burden on lower income families.

Our modification of the SPSD/M program deducts sales and property tax credits both from transfer income and from taxes paid in the SPSD/M. This results in a slightly less regressive tax incidence pattern for com-modity and property taxes than under unmodified SPSD/M tax credit assumptions.[84] The effect on the overall pattern of tax incidence is fairly small, though noticeable.[85]

Line 24: Broad Income
Broad income is the sum of pre-fisc income (line 22) and transfer income (line 23).

Table A.3: Average Family Taxes and Total Taxes Paid, Standard Case, by Broad Income Group, Level of Government, and Revenue Source, Canada, 1988
Average taxes paid per economic family are shown by type of tax and level of government for each income group (in dollars). The final column shows total taxes (in millions of dollars) paid by all families, by level of government and type of tax.

Line 1: Personal Income Tax
The personal income tax is borne by the taxpayer and is not shifted. It is distributed by the series, income tax payable in the SPSD model ($47,594 million at the federal level). Note that income taxes are gross of the re-fundable commodity tax credit.

Line 2: Corporate Income Tax
The share of the corporate income tax and capital taxes up to the world (US) average tax rate on capital is borne by corporate capital. Any differ-ential Canadian tax rate above the common rate is borne by less mobile factors or consumers in Canada.

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[84] The commodity tax rate for the bottom three broad income groups is reduced from 12.19 percent under the unmodified SPSM tax credit assumptions, to 11.74 percent, while the commodity tax rate for the top three income groups is reduced by only 0.02 percent from 6.07 to 6.05 percent. The property tax rate for the bottom three income groups is reduced from 5.56 percent under the unmodified SPSM tax credit assumptions, to 5.19 percent, while the property tax rate for the top three income groups remains virtually un-changed (2.64 versus 2.63 percent). An earlier version of this paper employed the unmodi-fied tax credit assumptions of the SPSM.

[85] When sales and property tax credits are deducted from total taxes paid and from broad income, the effective tax rate (taking into account all taxes) for the lowest two income groups is reduced by 1.26 percent, while the effective tax rate for the upper three income groups is reduced by only 0.03 percent.

Table A.3   Average Family and Total Taxes Paid, by Income Source and Broad Income Group, Canada, 1988

Line	Up to 10,000	10,001-20,000	20,001-30,000	30,001-40,000	40,001-50,000	50,001-60,000	60,001-70,000	70,001-80,000	80,001-90,000	90,001-100,000	100,001-150,000	150,001-300,000	Over 300,000	All	Total
Number of families by broad income base	871	1,505	1,389	1,234	1,094	921	735	599	493	385	825	328	84	10,464	10,464
								thousands							
Share of total by broad income base	8.3	14.4	13.3	11.8	10.5	8.8	7.0	5.7	4.7	3.7	7.9	3.1	0.8		100.0
								percent							$ million
								average per family, dollars							
Federal taxes															
1 Personal income tax	35	408	1,150	2,097	3,125	4,287	5,354	6,316	7,355	8,407	11,321	19,823	55,294	4,519	47,283
2 Corporate income tax	13	44	87	133	186	265	325	440	526	671	963	4,539	48,261	782	8,181
3 Commodity taxes	476	843	1,357	1,838	2,251	2,622	2,901	3,153	3,355	3,687	4,255	5,996	13,555	2,335	24,430
4 Payroll taxes	89	330	833	1,426	1,876	2,369	2,757	3,029	3,375	3,648	4,045	4,206	3,189	1,875	19,623
5 Total federal taxes	613	1,624	3,427	5,494	7,439	9,542	11,338	12,938	14,610	16,413	20,583	34,563	120,298	9,510	99,517
Provincial taxes															
6 Personal income tax	12	247	734	1,351	2,020	2,815	3,506	4,162	4,669	5,557	7,177	11,682	36,203	2,885	30,191
7 Corporate income tax	8	27	53	81	113	161	198	268	320	409	586	2,765	29,395	476	4,983
8 Commodity taxes	548	929	1,412	1,876	2,260	2,603	2,863	3,075	3,281	3,620	4,122	5,807	13,136	2,331	24,395
9 Payroll taxes	66	211	443	692	970	1,195	1,343	1,422	1,530	1,598	1,663	1,618	1,718	885	9,263
10 Other taxes	340	424	525	626	723	799	870	943	1,006	1,075	1,230	1,850	6,636	789	8,259
11 Total provincial taxes ...	974	1,838	3,167	4,627	6,087	7,572	8,781	9,869	10,806	12,259	14,778	23,721	87,089	7,367	77,090
Local taxes															
12 Property tax	492	831	1,148	1,459	1,725	1,910	2,164	2,359	2,613	2,783	3,356	4,858	15,454	1,887	19,750
13 Other taxes	33	51	69	87	104	118	130	140	152	163	189	264	639	109	1,144
14 Total local taxes	525	881	1,217	1,546	1,829	2,027	2,294	2,499	2,764	2,946	3,545	5,123	16,094	1,997	20,894

(Table A.3 is concluded on the next page.)

Table A.3   Concluded

Line	Up to 10,000	10,001-20,000	20,001-30,000	30,001-40,000	40,001-50,000	50,001-60,000	60,001-70,000	70,001-80,000	80,001-90,000	90,001-100,000	100,001-150,000	150,001-300,000	Over 300,000	All	Total
	average per family, dollars														*$ million*
Total															
15 Personal income tax	47	655	1,884	3,448	5,146	7,101	8,861	10,477	12,024	13,964	18,498	31,504	91,497	7,404	77,474
16 Corporate income tax ...	21	70	140	214	300	426	523	708	846	1,079	1,549	7,303	77,656	1,258	13,164
17 Commodity taxes	1,024	1,772	2,769	3,714	4,511	5,225	5,765	6,228	6,636	7,308	8,376	11,802	26,692	4,666	48,825
18 Payroll taxes	155	541	1,276	2,118	2,847	3,563	4,101	4,451	4,904	5,247	5,708	5,824	4,906	2,760	28,886
19 Property tax	492	831	1,148	1,459	1,725	1,910	2,164	2,359	2,613	2,783	3,356	4,858	15,454	1,887	19,750
20 Other taxes	373	475	594	713	827	916	1,000	1,083	1,158	1,238	1,419	2,114	7,275	899	9,403
21 Total taxes	2,112	4,344	7,812	11,667	15,355	19,142	22,413	25,306	28,181	31,618	38,906	63,407	223,480	18,874	197,501

Source: See the descriptive notes accompanying this table.

The treatment of the common rate is derived as follows. In a general equilibrium, income sources, income uses approach, as a first step in the analysis, when a fully integrated corporation income tax and personal income tax are introduced (each tax having the same effective tax rate), the after-tax rate of return falls by an equivalent amount in the corporate and the unincorporated sector, capital does not flow between sectors, and the owners of capital in the corporate sector bear the fully integrated tax. A fully integrated corporation income tax is defined as a corporation profits tax that is integrated with the personal income tax (through devices such as gross-ups and credits) such that all earnings generated in the corporate sector (both dividends and capital gains) are taxed at the personal income tax rate of the individual.

As a second step in the analysis, assume that the corporation income tax rate is increased and that the increase is not fully integrated. Therefore the after-tax rate of return to corporate source income falls relative to the return in the unincorporated sector, and capital flows out of the former into the latter until the after-tax rates of return are once more equated at a lower rate. Capital in both sectors has borne this differential in tax rate.

The second step can be taken as a stylized description of the extent to which the corporation income tax is less than fully integrated with the personal income tax. The differential tax rate can be approximated by the average effective rate of tax (corporation income tax plus personal income tax) on corporate earnings minus the average effective rate of personal income tax on earnings generated in the unincorporated sector. We estimated the average rate of federal tax on corporate earnings (including corporate profits tax plus income taxes on dividends net of the dividend tax credit plus income taxes on realized capital gains net of the capital gains exemption) at 20 percent for 1988 (green book data and SNA). The average rate of federal tax on personal income, interest income, and other net income generated in the unincorporated sector is 23 percent.

In other words, the differential tax rate is in favour of, not against, the corporate sector. This occurs because, even though the corporation income tax is not fully integrated with personal income tax, the favourable tax treatment of capital gains income (through partial inclusion of capital gains in income and the lifetime capital gains exemption) more than compensates for this. Given that our estimates are based on broad aggregates and could be subject to some margin of error, we hesitate to adopt the differential tax rate in favour of corporate capital income. We assume, more conservatively, that the differential is zero. Consequently, the owners of capital in the corporate sector bear the common share of the tax, and none is borne by owners of capital in the unincorporated sector. This portion of the corporation income tax is distributed by the series, corporate earnings, which combines dividends received and capital gains income, as discussed in line 17, table A.2.

Given the approximate equality of the effective tax rate calculated on the marginal unit of investment in the corporate sector for Canada and the United States (see the discussion in the paper), we consider that it is rea-

sonable to assume that there is no differential above the common share. In other words, the entire corporation income tax is borne by owners of capital in the corporate sector. Non-residents owned 31 percent of the capital invested in the Canadian economy in 1988; given the existence of the foreign tax credit, this portion of the tax is borne by non-residents, and has to be deducted from the total, before the tax is allocated to Canadian households in the model.

As a result, corporation income tax revenues of $8,181 million at the federal level ($11,857 million in the SNA, less the foreign share of $3,676 million) are distributed to corporate owners by the series on corporate earnings. Given this analysis, the entire corporation income tax borne by Canadian households in proportion to corporate earnings is shifted backward, and consequently it has to be added into the income base.

Line 3: Commodity Taxes

Note that commodity taxes are net of the federal refundable commodity tax credit.

Sales and excise taxes are borne by consumers of the taxed items in proportion to consumption expenditures on those items.

The SPSD models the distribution of six commodity taxes at the federal level (customs import duties; excise duties on alcohol and tobacco; excise taxes on gasoline, tobacco, wine, air transportation, etc.; other energy excises, phased out in 1986; the MST; and the GST, which is not operable until 1991), and six at the provincial level (liquor commission profits, liquor gallonage tax, gasoline tax, amusement taxes, tobacco taxes, and the retail sales tax). The totals correspond approximately to the SNA amounts ($25,803 million at the federal level and $25,688 million at the provincial level, for a total of $51,491 million).

It is assumed that consumers paid these commodity taxes, including the commodity taxes on business inputs. The SPSD models these indirect taxes by pushing them through to final consumption in the household sector of final demand (using the input-output model). The model distributes to households only the taxes falling on final demand purchased by the household sector. This approach is consistent with our standard shifting hypothesis, which assumes that sales and excises are ultimately borne by consumers in proportion to expenditures on the taxed items.

Purchasers in the other three sectors of final demand paid the remaining commodity taxes, however, and ultimately some household in the economy bore the tax. It is necessary to distribute these residual amounts to some households in the model in order to account for the incidence of all commodity taxes. The other three sectors to deal with are government purchases, investment in the capital stock, and purchases in the export and inventories sector.

Government sector purchases: The government sector purchased goods that bore $2,655 million in taxes. There are two conceptual aspects in modelling the incidence of these commodity taxes: the government's budget

constraint, and the counterfactual source of tax revenues. If the government desires to finance a given level of real public goods spending for voters, and decides for efficiency reasons to introduce a commodity tax, which it knows will raise the prices of goods (including the nominal price of the goods that it buys), then it will set the commodity tax rate high enough to raise the amount of tax revenues from households that will finance the real government spending (and the amount of tax revenues raised from the government's purchases will finance the increased nominal cost of the public goods). Given the initial budget constraint of real public goods spending, the taxes paid by the government to itself are not counted in the taxes that households pay to finance real public spending; likewise the nominal increase in government expenditures is not counted in total government expenditures. Therefore, in a fiscal incidence study, taxes paid by the government itself would be deducted from both sides of the budget.

If one government introduces a commodity tax to finance its spending, and the tax increases the prices of goods purchased by a different level of government, then this latter government has to either increase one of its taxes to finance its budget constraint, or lower its expenditures. Either way, the counterfactual behaviour of the other government will result in a burden on some private households in the economy. This burden is the incidence of the part of the commodity tax that initially is levied by a different level of government. A practical issue that arises in allocating this tax burden is that there is no analytically preferred tax source through which the burden is imposed.

The first step is to divide the $2,655 million of commodity taxes paid on government purchases into the portion that is the result of each government's own commodity taxes and the portion that is the result of a different government's taxes. We used the breakdown of government sector commodity taxes for the 12 sales taxes modelled in the SPSD by the six input-output categories of government purchases. Given the lack of complete separation between provincial and municipal sectors in the input-output data and the close ties between provincial responsibility for spending in areas such as education and hospitals, we treated the provincial-municipal sector as one level of government. In addition, given federal transfer payments to provinces for expenditures on education and health, we assumed that half the commodity taxes paid in those areas could be treated as a tax paid by the same level of government. Finally, we assumed that the common part of the taxes paid by each level of government to the other could be treated as a tax on the same level of government (and would likely be negotiated as such between the federal and provincial governments).

This resulted in $1,077 million of federal taxes on goods purchased by the federal and provincial governments being deducted from the analysis, as well as $1,160 million of provincial taxes on goods purchased by the provincial and federal governments. The methodology resulted in $418 million of federal taxes on goods purchased by the provinces (this is the excess over the common share of $371 million of taxes paid by each government to the other government). This $418 million will lead to an equivalent

increase in provincial taxes. We assumed that provinces would raise these extra funds through their biggest tax source, the personal income tax. Alternative tax counterfactuals could be used.

Investment in the capital stock (plant and equipment): This sector purchased goods that bore $10,553 million in taxes. We assume that in a long-run equilibrium, firms are able to pass the share of sales taxes on capital goods, up to the common or world (US) rate, forward to consumers of output. This assumption follows from the open economy nature of the Canadian economy in the fiscal incidence model, and is similar to the general equilibrium model underlying the GST working paper. This part of the tax is distributed to households in the model proportionally to total consumption expenditures.

The share of sales taxes on capital goods above the common rate cannot be shifted to consumers and is shifted backward to the more immobile factors of production. We assume, in the first instance, that this part of the tax is borne by labour through a reduction in wages and salaries, and is distributed by the series, earnings from employment. We estimated the average sales tax rate in Canada as twice the rate in the United States and slightly less than the rate in the other OECD countries (using the ratio of commodity taxes at all levels of government to gross domestic product).[86] This is consistent with Thirsk's findings on average indirect tax burdens in Canada and the United States.[87] Given that almost three-quarters of Canada's trade is with the United States, we assumed that the common share and the differential share of the tax were 65 and 35 percent, respectively.

This procedure results in federal commodity taxes on capital goods of $5,882 million being partly ($3,823 million) borne by consumption and allocated by total consumption expenditures, and partly ($2,059 million) shifted back to labour and allocated by earnings from employment. It also results in provincial commodity taxes on capital goods of $4,671 million being partly ($3,036 million) borne by consumption and allocated by total consumption expenditures, and partly ($1,635 million) shifted back to labour and allocated by earnings from employment. The backward-shifted portion of the tax has to be added into the income base.

The export and other sector: This sector generated output that bore $3,516 million in commodity taxes. Most of those taxes are a result of the indirect taxes on business inputs. Some of the direct taxes are the result of re-export of imports that have paid duty and excise taxes, and some are the result of excises on inventory withdrawals, a category that is included with the export sector. A similar analysis as applied to sales taxes on capital goods applies here: the common portion is borne by consumers and the differential portion is shifted backward to labour.

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[86] Organisation for Economic Co-operation and Development, *OECD in Figures*, supplement to [June/July 1992], no. 176 *The OECD Observer* 42-43.

[87] Thirsk, supra footnote 22, at 14-15 and 25.

This procedure results in federal taxes on exports of $2,301 million being partly ($1,496 million) borne by consumption and allocated by total consumption expenditures, and partly ($805 million) shifted back to labour and allocated by earnings from employment. It also results in provincial taxes on exports of $1,215 million being partly ($790 million) borne by consumption and allocated by total consumption, and partly ($425 million) shifted backward to labour and allocated by earnings from employment. The backward-shifted portion of the tax has to be added into the income base.

In summary, commodity taxes at the federal level valued at $16,270 million are distributed to households in the SPSD model (this derived value is slightly different from the value in the documentation, cited above). In addition, we have distributed the remaining commodity taxes valued at $8,601 million as follows: $418 million by provincial personal income taxes paid, $5,319 million by total consumption expenditures, and $2,864 million by earnings from employment.

Line 4: Payroll Taxes
Payroll taxes at the federal level include unemployment insurance contributions and Canada Pension Plan and Quebec Pension Plan contributions. These taxes are borne by labour (the total employee and employer contribution) and allocated proportionally to "covered" wages and salaries.

Unemployment insurance contributions: Employee contributions of $5,298 million (in the model) and employer contributions of $6,338 million (see table A.2, line 16, for explanation) borne by employees and distributed by employee contributions (a variable in the model) for a total value of $11,637 million in the SNA.

CPP/QPP contributions: Employee and self-employed contributions of $4,234 million (in the model) and employer contributions of $3,702 million (see table A.2, line 16, for explanation) borne by employees and distributed by CPP/QPP contributions (by a variable in the model), for a total value of $7,936 million in the SNA.

Line 5: Total Federal Taxes
The value for total federal taxes is the sum of lines 1-4.

Line 6: Personal Income Tax
The personal income tax is borne by the taxpayer and is not shifted. It is distributed by the series, income tax payable in the SPSD model ($30,315 million at the provincial level). Note that the personal income tax is gross of refundable sales tax credits (in Ontario and Manitoba) and of refundable property tax credits (in Quebec, Ontario, and Manitoba).

Line 7: Corporate Income Tax
The corporate income tax is treated the same as for the federal level. Revenues of $4,983 million at the provincial level ($5,729 million of corporate

income tax revenues and $1,493 million of other corporation capital taxes in the SNA, less the foreign share of $2,239 million) are distributed by corporate earnings.

Line 8: Commodity Taxes

Commodity taxes at the provincial level valued at $18,606 million are distributed to households in the SPSD (this value also differs slightly from the documentation value). In addition, we have distributed the remaining commodity taxes valued at $5,886 million as follows: $3,826 million by total consumption expenditures, and $2,060 million by earnings from employment. See the discussion in line 3 above.

Commodity taxes are net of provincial sales tax credits (available in Ontario and Manitoba).

Line 9: Payroll Taxes

Payroll taxes at the provincial level include workers' compensation contributions; flat rate payroll taxes, designated as health or education levies in some provinces; and medical-hospital premiums in several provinces. These taxes are borne by labour (the total employee and employer contribution) and allocated proportionally to "covered" wages and salaries.

Workers' compensation contributions: Employer contributions of $4,441 million (in the SNA) borne entirely by employees, and distributed by the series for "covered" wages and salaries, derived in table A.2, line 18.

Health and education payroll taxes: In 1988 Quebec and Manitoba had flat rate payroll taxes. The payroll tax in Quebec, at an effective rate of 3.22 percent of the employer payroll, is to finance health expenditures. The payroll tax in Manitoba (for payrolls under $100,000, exempt; for payrolls from $100,000 to $299,999, 2.25 percent; for payrolls over $300,000, 3.5 percent) is to finance part of the costs of health and education. The employer health tax in Ontario was introduced in 1990 (it ranges from 0.98 percent for payrolls up to $200,000, to 1.95 percent for payrolls over $300,000) and is to finance part of health expenditures.

These payroll taxes are borne by labour, and distributed by wages and salary income in each province ($2,288 million, with details for Quebec at $2,100 million from FMS data and Public Accounts data, respectively; see table A.2, line 18).

Medical-hospital premiums: Ontario, Alberta, and British Columbia used premiums to finance part of their health expenditures in 1988. These premiums are similar to direct taxes and are borne by the payee. Employer contributions ($1,569 million) are borne by the employees on whose behalf the contributions were made. We derived a series based on individual and family premium rates and the exemptions applicable to individuals receiving social assistance benefits and other low income persons. We used this series to distribute the medical-hospital premiums ($2,536 million in the SNA) to households in the relevant provinces.

Line 10: Other Taxes

Other taxes at the provincial level include motor vehicle licences, permits and other fees, natural resource revenues, and miscellaneous other indirect taxes.

Motor vehicle licences and permits, and other licences, fees, and permits: These licences and fees sum to $2,263 million in the SNA at the provincial level. These are mostly motor vehicle licences, and we have treated them as such. We assume that these taxes are borne by the payee, and we derived a series to approximate the average payment per family.

Natural resource revenues: Resource revenues of $4,225 million are recorded in the SNA ($825 million are miscellaneous taxes on natural resources and $3,400 million are royalty payments). The miscellaneous taxes are mostly resource rental payments (such as land rentals, ground rents and timber right charges, and resource bonus charges). They are similar to a property tax on land and are borne by the resource owner, who cannot shift them (they come out of profits). Consequently, $569 million ($825 million, less the non-resident share of $256 million) are distributed by the series on corporate earnings. These resource taxes are also added back into the income of owners in the income base.

Resource revenues in the form of royalties are treated in the standard case as they are in much of the literature—that is, they are similar to excise taxes, and assumed to be shifted forward to consumers. They are distributed by the series on total consumption expenditures.

Miscellaneous other taxes: At the provincial level, these are recorded at $2,969 million in the SNA. From this we deduct $507 million for the liquor gallonage tax, which is modelled in the commodity tax section, $188 million for the Manitoba payroll tax, which we have included in the social security tax section, and $400 million for the land transfer tax, which we have included in the property tax section, for a net amount of $1,874 million. The residual includes crop insurance premiums, hotel and motel meals tax, public utilities tax, fire prevention tax, tax penalties, telecommunications tax, farm insurance premiums, and smaller items.

These other miscellaneous taxes are an amalgam of sales taxes, which are borne by consumers. We have distributed them to consumers by the series on total consumption expenditures in the model.

Line 11: Total Provincial Taxes

The value for total provincial taxes is the sum of lines 6-10.

Line 12: Property Taxes

Note that property taxes are net of refundable sales tax credits (available in Quebec, Ontario, and Manitoba).

The portion of the property tax on land is borne by the landowner and there is no shifting of the tax. The portion of the property tax on structures is mostly borne by consumers of structures' services, through an increase

in the prices of structures' services relative to the prices of other items—that is, the tax tends to be shifted forward.

This is a fairly strongly "traditional" or old view of property tax incidence, with substantial excise effects of forward shifting. The "new" view aspects of the debate get picked up in the alternative shifting assumption models below.

We derived the breakdown of the property tax revenues across the three major sectors, the business and industrial sector, the farm sector, and the residential sector, and between the land and structures component within each sector from the sector weight survey of the Department of Finance used in the fiscal equalization program to calculate the tax base and the equalization entitlements for the provincial-local property tax. The estimates relate to property that is taxable (or subject to grants in lieu of property taxes). We derived the further breakdown within the residential sector (given the absence of comparable data) for owner-occupied and renter-occupied properties by estimating the share in the total return on residential properties for the gross imputed rent on owner-occupied homes (see line 8, table A.2) and for the gross rental income on renter-occupied homes (using the "gross rent paid" variable in the SPSD model).

This procedure results in the following weights, which when applied to the property tax revenues in the SNA ($20,828 million, as derived in table A.1 above) generate the associated disaggregation of revenues distributed in the incidence analysis.

Business and industrial: 45 percent of the property tax base is located in the business and industrial sector, with the division between land and structures being 19 and 81 percent, respectively. In addition, businesses are located in the corporate and unincorporated sectors roughly in an 80:20 proportion (from green book estimates of corporate sector income relative to income in the unincorporated sector); we adopt this breakdown of the two sectors in deriving any series for a tax that would fall on both sectors. The non-resident ownership share in the unincorporated sector is less than in the corporate sector, and lacking more informative estimates than are available from existing sources, we assume it is 10 percent. The portion of the property tax on land, $1,303 million ($1,781 million less the non-resident share of $478 million) is borne by the owners of business land and distributed by the series on corporate earnings and self-employment income. The portion of the tax on structures, $7,592 million, is distributed to consumers by total consumption expenditures.

Farm: 3 percent of the property tax base is located in the farm sector, with the division between land and structures being 76 and 24 percent, respectively. The portion of the property tax on land, $475 million (agricultural property is almost entirely Canadian-owned; therefore we assume there is no non-resident ownership), is borne by farm landowners and distributed by the series on farm income. The portion of the tax on structures, $150 million, is distributed by the series on food consumption expenditures in the model.

Residential: 52 percent of the property tax base is located in the residential sector, with the division between land and structures being 23 and 77 percent, respectively. In addition the owner-occupied and renter-occupied split is approximately 68 and 32 percent, respectively (this division emerges from the methodology noted above, and by residual derivation of the renter-occupied property taxes after residential property taxes paid and recorded in the SPSD are deducted from the total). The property taxes paid by owners in the owner-occupied residential sector, $7,371 million, are borne by the owners and distributed by the series in the model on residential properties by the owners' households in the model.

In the renter-occupied residential sector, $3,460 million in property taxes are paid by landlords. In addition we estimated that 23 percent of the rental properties are owned by landlords in the corporate sector, while 77 percent of rental properties are owned by landlords in the unincorporated sector (on the basis of reported rental income in the green book taxation statistics). The portion of the property tax on land owned by corporate landlords, $126 million ($183 million less the non-resident share of $57 million) is borne by the owners and distributed by the series on corporate earnings. The portion of the tax on land owned by unincorporated landlords, $552 million ($613 million less the non-resident share of $61 million) is borne by the owners and distributed by the series on rental income in the model. The portion of the tax on structures, $2,664 million, is borne by renters and distributed by the series on rent expenditures in the model.

The backward-shifted portion of the property tax is added to the incomes of the owners, who experience a reduced return because of the tax; this includes the business land portion, the farm land portion, and the residential, renter-occupied land portion.

Line 13: Other Taxes

At the local level, other taxes are recorded at $3,084 million in the SNA (they include retail sales tax, $34 million; amusement tax, $32 million; licences, fees, and permits, $310 million; and miscellaneous indirect taxes of $2,807 million, which includes business taxes of $1,940 million). We deducted the business taxes because we have included them in the analysis of property taxes above; this leaves a total of $1,144 million.

These other miscellaneous taxes are an amalgam of sales taxes, which are borne by consumers. We have distributed them to consumers by the series on total consumption expenditures in the model.

Line 14: Total Local Taxes

The value for total local taxes is the sum of lines 12-13.

Line 15: Personal Income Taxes

The value for personal income taxes is the sum of federal and provincial personal income taxes, lines 1 and 6.

Line 16: Corporate Income Taxes
The value for corporate income taxes is the sum of federal and provincial corporate income taxes, lines 2 and 7.

Line 17: Commodity Taxes
The value for commodity taxes is the sum of federal commodity taxes and provincial commodity taxes, lines 3 and 8.

Line 18: Payroll Taxes
The value for payroll taxes is the sum of federal payroll taxes and provincial payroll taxes, lines 4 and 9.

Line 19: Property Taxes
The value for property taxes is line 12.

Line 20: Other Taxes
The value for other taxes is the sum of other provincial taxes and other local taxes, lines 10 and 13.

Line 21: Total All Taxes
The value for total all taxes is the sum of total federal taxes, line 5; total provincial taxes, line 11; and total local taxes, line 14 (or alternatively, the sum of lines 15-20).

Table A.4: Effective Tax Rates, Broad Income Base, Standard Case, by Broad Income Group, Level of Government, and Revenue Source, Canada, 1988

The effective tax rates for each income group are calculated by dividing the total tax paid by all families in the income group (the values in table A.3 multiplied by the number of families) by the total broad income received by all families in the income group (line 24, table A.2).

Table A.5: Effective Tax Rates (All Taxes), Under Alternative Shifting Assumptions, by Income Concept and Income Group, Canada, 1988

Table A.5 provides the overall effective tax rates (all taxes, all levels of government) under alternative shifting assumptions (standard, progressive, and regressive case) and alternative income bases (broad income base and pre-fisc income base), by income groups.

Note that the income groups (columns) for each line are in terms of the income base (the denominator in the effective tax rate calculation) appropriate for that line. The same numerical cutoff points (shown at the top) are used for all lines, but because each line uses a different income concept, the number of economic families in each column differs from line to line.[88]

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[88] Note that the number of families changes not only as one moves from broad income to pre-fisc income but also as one moves from the standard case to the progressive case and

For each experiment the number of economic families is provided first, followed by the average effective tax rate.

Line 1: Broad Income Base, Standard Case
Line 1 is the same as line 21, table A.4. It is included here again for comparison purposes.

Line 2: Broad Income Base, Progressive Case
Total taxes for each income group have been calculated using the progressive case shifting assumptions and have been divided by broad income. The backward-shifted taxes portion of broad income has been adjusted from the standard case to be consistent with the progressive case shifting assumptions.

The shifting assumptions of the progressive tax incidence case are the same as in the standard case for the personal income tax and the corporation income tax. For commodity taxes, the differential portion (above the common world rate) of the commodity taxes paid on purchases of capital goods and exports is borne by owners of capital and distributed to them by the series for corporate earnings (the share purchased in the corporate sector) and self-employment income (the share purchased in the unincorporated sector). The portion borne by non-residents is excluded from the analysis. This backward-shifted tax is also added to the income base.

For payroll taxes, the employer portion is assumed to be borne by employers and to come out of business profits. The tax is distributed by the series on corporate earnings and self-employment income (similarly to the commodity tax differential).

The property tax on structures is assumed to be similar to a tax on capital and is borne by the owners of capital in their respective sectors. This results in the property tax on structures being distributed similarly to the tax on land (with appropriate exported shares).

Natural resource revenues are assumed to be similar to a tax on capital and distributed identically to natural resource taxes on land.

Line 3: Broad Income Base, Regressive Case
Total taxes for each income group have been calculated using the regressive case shifting assumptions and have been divided by broad income. The broad income amounts in the denominator are consistent with the regressive case shifting assumptions.

The shifting assumptions of the regressive tax incidence case are the same as in the standard case for the personal income tax, the property tax,

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[88] Continued . . .

the regressive case. This is so because of the inclusion of backward-shifted taxes in total pre-fisc and broad incomes (line 21 in table A.2 for the standard case). As the shifting assumptions change, so does the income base.

Table A.4   Effective Tax Rates, Broad Income Base by Broad Income Group, Standard Case, Canada, 1988

Line	Up to 10,000	10,001-20,000	20,001-30,000	30,001-40,000	40,001-50,000	50,001-60,000	60,001-70,000	70,001-80,000	80,001-90,000	90,001-100,000	100,001-150,000	150,001-300,000	Over 300,000	All
Number of families by broad income base	871	1,505	1,389	1,234	1,094	921	735	599	493	385	825	328	84	10,464
							thousands							
Share of total by broad income base	8.3	14.4	13.3	11.8	10.5	8.8	7.0	5.7	4.7	3.7	7.9	3.1	0.8	100.0
							percent							
Federal taxes														
1 Personal income tax	0.5	2.7	4.6	6.0	7.0	7.8	8.3	8.4	8.7	8.9	9.5	10.2	8.7	8.0
2 Corporate income tax	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.8	2.3	7.6	1.4
3 Commodity taxes	6.8	5.7	5.5	5.3	5.0	4.8	4.5	4.2	4.0	3.9	3.6	3.1	2.1	4.1
4 Payroll taxes	1.3	2.2	3.4	4.1	4.2	4.3	4.2	4.1	4.0	3.8	3.4	2.2	0.5	3.3
5 Total federal taxes	8.7	10.9	13.8	15.8	16.6	17.4	17.5	17.3	17.2	17.3	17.2	17.8	19.0	16.8
Provincial taxes														
6 Personal income tax	0.2	1.7	3.0	3.9	4.5	5.1	5.4	5.6	5.5	5.9	6.0	6.0	5.7	5.1
7 Corporate income tax	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5	1.4	4.6	0.8
8 Commodity taxes	7.8	6.2	5.7	5.4	5.0	4.7	4.4	4.1	3.9	3.8	3.5	3.0	2.1	4.1
9 Payroll taxes	0.9	1.4	1.8	2.0	2.2	2.2	2.1	1.9	1.8	1.7	1.4	0.8	0.3	1.6
10 Other taxes	4.8	2.9	2.1	1.8	1.6	1.5	1.3	1.3	1.2	1.1	1.0	1.0	1.0	1.4
11 Total provincial taxes	13.9	12.3	12.7	13.3	13.5	13.8	13.5	13.2	12.7	12.9	12.4	12.2	13.8	13.0
Local taxes														
12 Property tax	7.0	5.6	4.6	4.2	3.8	3.5	3.3	3.2	3.1	2.9	2.8	2.5	2.4	3.3
13 Other taxes	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2
14 Total local taxes	7.5	5.9	4.9	4.4	4.1	3.7	3.5	3.3	3.3	3.1	3.0	2.6	2.5	3.5
Total														
15 Personal income tax	0.7	4.4	7.6	9.9	11.5	12.9	13.7	14.0	14.2	14.7	15.5	16.2	14.5	13.1
16 Corporate income tax	0.3	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.1	1.3	3.8	12.3	2.2
17 Commodity taxes	14.6	11.9	11.1	10.7	10.0	9.5	8.9	8.3	7.8	7.7	7.0	6.1	4.2	8.2
18 Payroll taxes	2.2	3.6	5.1	6.1	6.3	6.5	6.3	6.0	5.8	5.5	4.8	3.0	0.8	4.9
19 Property tax	7.0	5.6	4.6	4.2	3.8	3.5	3.3	3.2	3.1	2.9	2.8	2.5	2.4	3.3
20 Other taxes	5.3	3.2	2.4	2.0	1.8	1.7	1.5	1.4	1.4	1.3	1.2	1.1	1.2	1.6
21 Total taxes	30.1	29.2	31.4	33.5	34.2	34.9	34.5	33.8	33.2	33.3	32.6	32.7	35.3	33.4

Source: See the descriptive notes accompanying this table.

Table A.5 Effective Tax Rates (All Taxes), Under Alternative Shifting Assumptions, by Income Concept and Income Group, Canada, 1988

Line	Up to 10,000	10,001-20,000	20,001-30,000	30,001-40,000	40,001-50,000	50,001-60,000	60,001-70,000	70,001-80,000	80,001-90,000	90,001-100,000	100,001-150,000	150,001-300,000	Over 300,000	All
Broad income base														
1 Standard case														
Number of families (000)	871	1,505	1,389	1,234	1,094	921	735	599	493	385	825	328	84	10,464
Average tax rate (percent)	30.1	29.2	31.4	33.5	34.2	34.9	34.5	33.8	33.2	33.3	32.6	32.7	35.3	33.4
2 Progressive case														
Number of families (000)	793	1,574	1,422	1,267	1,097	943	727	583	480	372	780	331	96	10,464
Average tax rate (percent)	19.6	22.1	25.3	27.4	28.6	29.3	29.5	29.1	28.6	29.2	29.4	32.7	42.3	30.2
3 Regressive case														
Number of families (000)	903	1,578	1,460	1,286	1,129	905	727	566	472	345	720	296	77	10,464
Average tax rate (percent)	42.2	37.4	36.9	37.7	37.4	37.0	36.3	35.2	35.0	33.9	33.8	33.4	33.0	35.5
Pre-fisc income base														
4 Standard case														
Number of families (000)	1,987	1,243	1,179	1,084	959	834	666	549	457	342	775	307	83	10,464
Average tax rate (percent)	89.3	41.6	39.7	38.6	38.1	37.4	36.1	35.3	34.4	34.1	33.3	33.1	35.5	36.4
5 Progressive case														
Number of families (000)	1,933	1,305	1,224	1,109	950	839	668	531	437	327	734	313	95	10,464
Average tax rate (percent)	60.9	33.5	32.5	32.0	31.9	31.5	31.1	30.1	29.9	29.9	30.1	33.2	42.4	33.0
6 Regressive case														
Number of families (000)	2,036	1,336	1,223	1,141	974	814	657	527	418	311	671	280	76	10,464
Average tax rate (percent)	122.3	50.5	45.0	42.6	41.1	39.3	37.9	36.5	36.1	34.5	34.5	33.9	33.2	38.9

Source: See the descriptive notes accompanying this table.

and natural resource revenues. The corporation income tax is assumed to be borne half by the owners of corporate capital (as in the standard case) and half by consumers in proportion to their total consumption expenditures. This portion of the tax is distributed by total consumer expenditures.

For commodity taxes, the differential above the common rate of commodity taxes paid on purchased capital goods and exports is borne by consumers and distributed by total consumption expenditures. For payroll taxes, the employer portion is assumed to be shifted forward to consumers and is distributed by total consumption expenditures.

Line 4: Pre-Fisc Income Base, Standard Case
Total taxes for each income group have been calculated under the standard case shifting assumptions and have been divided by pre-fisc income.

Line 5: Pre-Fisc Income Base, Progressive Case
Total taxes for each income group have been calculated using the progressive case shifting assumptions and have been divided by pre-fisc income (adjusted from the standard case for the progressive case shifting assumptions).

Line 6: Pre-Fisc Income Base, Regressive Case
Total taxes for each income group have been calculated using the regressive case shifting assumptions and have been divided by pre-fisc income (adjusted for the regressive case shifting assumptions).