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Chapter Author: James B. Davies

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4 Tax Incidence: Annual and Lifetime Perspectives in the United States and Canada

James B. Davies

4.1 Introduction

There is a popular belief that Canada is "more equal" than the United States. As shown in this paper, there is some truth in that notion. The purpose of this paper is to examine the role of differences in the two countries' tax systems in determining the relative degree of income inequality on the two sides of the border. Attention is paid not only to differences at a point in time, but also to how income distributions are changing over time, and to the relationships of these changes to recent tax reform initiatives in the two countries.

What determines the overall impact of taxes on income distribution? Important determinants of the impact of a single tax are its base and rate structure. The incidence of the overall system is in addition affected by the relative reliance on different types of taxes, that is, by the *tax mix*. In analyzing the overall effect of taxes on inequality in Canada and the United States it will therefore be important to look at differences in tax mix, tax bases, and rate structures. Of course, tax effects on income distribution are also affected by how particular taxes are *shifted* in the general equilibrium of the economy. For the most part it is likely that similar taxes would be similarly shifted in the two countries, so that comparisons of shifting are not a major element in the international comparison.

Given the limits of available data, it is not surprising that estimates of the impact of taxes on the distribution of real income have mostly been made in an annual framework. Recently, however, there has been interest in generating estimates of the overall lifetime incidence of taxes (Davies, St-Hilaire, and

James B. Davies is associate professor of economics at the University of Western Ontario and a member of the NBER's Conference on Research in Income and Wealth.

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Whalley 1984; Rogers 1988; Poterba 1989). This paper argues that important insights, relevant to the comparison of tax structures in Canada and the United States, can be gained from such work. For example, general sales taxes look considerably less regressive over the lifetime than they do in annual data, since consumption is approximately proportional to permanent income. Since Canada relies much more heavily on sales and excise taxes, a significant difference in the comparison of overall tax progressivity in the two countries is implied, depending on whether an annual or lifetime framework is used.

Section 4.2 presents background evidence on before- and after-tax income inequality, and how it has changed in the last few decades, for the two countries. The impact of transfer payments and other forms of government expenditure is also discussed. Section 4.3 then reviews estimates of overall tax incidence in Canada and the United States for the early 1970s. These estimates are available on a consistent basis for the two countries and provide a useful starting point for the examination of changes in the impact of taxes on income distribution in the two countries over the last two decades, in sections 4.4 and 4.5. Section 4.4 looks at the period up to the recent tax reforms, which are in turn explored in section 4.5. How the conclusions reached in the preceding sections are altered when one takes a lifetime, rather than an annual, viewpoint is examined in section 4.6.

4.2 The Distribution of Annual Income in Canada and the United States

4.2.1 Pretax Distributions

Table 4.1 shows, according to the standard survey data sources, that there is considerably greater inequality in before-tax income in the United States than in Canada, and that the gap has been widening for about the past fifteen years. Income inequality was roughly constant in both countries from the mid-1960s to the mid-1970s. Gini coefficients were in the neighborhood of .32–.33 in Canada and .35–.36 in the U.S.; the bottom 5% had 6.2% of total income in Canada and 5.2–5.4% in the U.S.; and the share of the top 20% was 39–40% in Canada and about 41% in the U.S. Since 1975 there have been only minor changes in the Canadian distribution, but notice that the share of the bottom 20% has risen slightly, to about 6.5%. In contrast, in the U.S. there has been a continuous increase in inequality, which shows no sign of having stopped. The shares of bottom and top 20% are now at 4.6% and 44.0% respectively, and the Gini coefficient has risen to .395, 10% above its 1975 U.S. value, and 20% above the current Canadian value.

While the data shown in table 4.1 provide the best time series on income inequality in the two countries, it is important to realize that they have serious limitations. These estimates come from sample surveys, which are affected by problems of differential response according to income level and by misreport-

Table 4.1 **Quintile Shares and Gini Coefficients for Families (Money Income before Tax)**

Year	Quintile					Gini
	1	2	3	4	5	
1. *Canada*						
1965	6.2%	13.1%	18.0%	23.6%	39.0%	.319
1969	6.2	12.6	17.9	23.5	39.7	.326
1975	6.2	13.0	18.2	23.9	38.8	.326
1980	6.2	13.0	18.3	24.1	38.5	.323
1981	6.5	12.9	18.3	24.1	38.3	.318
1982	6.4	12.6	18.0	24.0	38.9	.326
1983	6.3	12.4	17.8	24.1	39.5	.334
1984	6.2	12.4	18.0	24.1	39.4	.334
1985	6.4	12.4	17.9	24.1	39.2	.330
1986	6.4	12.4	17.9	24.0	39.3	.331
1987	6.5	12.4	17.8	24.0	39.4	.330
1988	6.5	12.4	17.9	24.0	39.2	.328
2. *United States*						
1965	5.2	12.2	17.8	23.9	40.9	.356
1970	5.4	12.2	17.6	23.8	40.9	.354
1975	5.4	11.8	17.6	24.1	41.1	.358
1980	5.1	11.6	17.5	24.3	41.6	.365
1981	5.0	11.3	17.4	24.4	41.9	.370
1982	4.7	11.2	17.1	24.3	42.7	.381
1983	4.7	11.1	17.1	24.3	42.8	.382
1984	4.7	11.0	17.0	24.4	42.9	.383
1985	4.6	10.9	16.9	24.2	43.5	.389
1986	4.6	10.8	16.8	24.0	43.7	.392
1987	4.6	10.7	16.8	24.0	43.8	.392
1988	4.6	10.7	16.7	24.0	44.0	.395

Sources: **Canada**— Quintile Shares: Statistics Canada, *Size Distribution of Income in Canada, 1978, 1990* (13-207); Gini Coefficients: Statistics Canada, *Income After Tax Distributions by Size in Canada, 1990* (13-210), and Statistics Canada, *Income Inequality: Statistical Methodology and Canadian Illustrations, 1976*, R. Love and M. Wolfson (13-559). **United States:** U.S. Bureau of the Census, Current Population Reports series P-60, no. 162, *Money Income of Households, Families and Persons in the United States, 1987*, and no. 166, *Money Income and Poverty in the United States, 1988*.

ing (generally underreporting) of income sources. In Canada, the net result of these nonsampling errors is that the survey-based estimates of income aggregates understate transfer income by about 40% and investment income by about 20%. The survey aggregate for wage and salary income, in contrast, is quite close to that in the national accounts. Additionally, these surveys omit capital gains.

While the data shown in table 4.1 may not give an enormously reliable estimate of income inequality for a particular year, it is likely that they capture *trends* in inequality reasonably well. However, the Canadian data miss at least

one very interesting trend. The last two decades have been extremely good ones for a small number of Canadian families in the stratosphere of the income distribution. *Fortune*'s 1989 enumeration of the world's billionaires indicated that out of 157 billionaire families worldwide, six were wholly or partly Canadian (see Slovak 1989). Moreover, the Canadians were not at the bottom of the heap. Three of the top eleven families were Canadian. Altogether the six billionaire families had estimated net worth of $29.3 billion (Canadian).

There is a widespread perception in Canada that the reason that a small number of Canadian families have done so well lies in a combination of light taxation and loose regulation. In any case, it may well be that the extreme upper tail of the Canadian income distribution has lengthened considerably over the last two decades. While this would not necessarily increase very much the share of the top quintile, or the Gini coefficient, it is an interesting aspect of the Canadian income distribution.[1]

Part of the reason for the continuing increase in before-tax inequality in the U.S. is no doubt the tendency toward more conservative economic and social programs under President Reagan, including deregulation, declining real minimum wages, and cutbacks in welfare programs. Total government spending on income support, Social Security, and welfare declined from 11.0% of GDP in 1980 to 9.6% in 1988, for example; this decline would by itself account for a little less than half the fall in the share of the bottom 20% (assuming that income maintenance programs all shrank in equal proportion). But note that there had been a significant rise in inequality between 1975 and 1980–81, *before* "Reaganomics" had taken effect. There is likely a "non-Reagan" component of the trend toward greater inequality in the U.S., caused by such factors as changing household structure, large-scale unskilled immigration, technological change, and perhaps declining unionization.[2]

4.2.2 Role of Transfer Payments and Direct Personal Taxes

The standard income distribution figures used as a barometer of the rise and fall of inequality in Canada and the U.S. include cash transfers from government to persons, but make no deduction for taxes paid. They therefore allow partially, and it would seem rather arbitrarily, for the redistributive role of government. Official statistical agencies in both countries are, of course, highly aware of this curious situation, and have published supplementary "after-tax" distributions which deduct some of the important direct personal taxes. While the results still fall far short of a complete analysis of fiscal inci-

1. The aggregate income of the top quintile in Canada, according to the table 4.1 data, would be about $160 billion. Adding several billionaires, each with true economic income of, say, $100–200 million, would not increase this total very much, although it might well "lengthen the upper tail" considerably.

2. Note that any explanation for the secular rise in inequality in the U.S. must identify factors that were not at work in Canada. (This immediately brings the role of technological change into question.) Thus the Canada-U.S. comparison may be very useful in finding out why inequality is steadily rising in the U.S.

dence, they are of some interest. Table 4.2 allows for an instructive Canada-U.S. comparison.

Part 1 of table 4.2 shows the impact of cash transfers and personal income taxes estimated by the Canadian Survey of Consumer Finance (SCF) for families and unattached individuals. The first three lines of part 2 show corresponding data for U.S. households. The U.S. data are only available for *households;* families and unattached individuals are the most closely corresponding category in the Canadian data. However, the difference in family unit definitions has a significant effect on the comparison.[3] Note that for the same income definition as used in table 4.1, total money income (line 2 in both parts of table 4.2), Canada and U.S. appear to be closer together in table 4.2 than in table 4.1. This is likely to be simply the result of the mismatch in family unit definitions in the available data.

Table 4.2 indicates that, without transfer payments, the distribution of money income before taxes in Canada and the U.S. would be much more unequal. In both countries the share of the bottom 20% would decline by over half. Perhaps surprisingly, while the relative importance of transfer payments in the two countries differs by quintile, there is no systematic difference. The introduction of transfers changes income shares, in terms of percentage points, more in Canada than in the U.S. in the second and fifth quintiles, and less in the remaining quintiles. Thus, the great differences in form of transfer payments in the two countries do not lead to one country's transfer payments being systematically more equalizing than the other's. The absence of a systematic difference also reflects the fact that the fraction of national income expended in transfer programs is similar in the two countries. As shown in table 4.3, transfers made up 12.3% of GDP in Canada in 1986, and 11.8% in the U.S.

The income tax comparison made possible by table 4.2 tells a story similar to that for transfers. Like transfers, income taxes reduce income inequality considerably in both countries, although the impact is relatively stronger at high incomes than low. And again, while the comparison of impacts in Canada and the U.S. varies by quintile, there is not a systematically more equalizing impact in one country than the other. U.S. income taxes reduce the share of the top quintile by a greater amount than Canadian taxes do, but they also *increase* the share of the second highest quintile. This absence of a clear-cut difference is somewhat surprising, unlike the finding on transfers, since personal income taxes loom larger in Canada than in the U.S.—12.3% of GDP versus 10.2%, respectively, in 1986. One would perhaps expect Canadian income taxes to have been more strongly equalizing.

Part 2 of table 4.2 also shows what happens to the U.S. distribution when Social Security payroll taxes, as well as income taxes, are deducted from in-

3. While the difference in family unit concept affects a comparison of the *level* of inequality between Canada and the U.S. slightly, it may not affect appreciably the comparison of the *changes* in inequality caused by taxes and transfers in the two countries.

Table 4.2 **Effects of Transfers and Taxes on Income Distribution, 1986, by Units (Ranked by Total Money Income)**

Income Concept		Quintile				
Transfers Included?	Taxes Deducted?	1	2	3	4	5
1. *Canada: Families and Unattached Individuals*						
No	No	2.1%	8.0%	16.7%	26.2%	47.1%
Yes	No	4.7	10.4	17.0	24.9	43.1
Yes	Yes: PIT[a]	5.6	11.3	17.5	24.8	40.9
2. *United States: Households*						
No	No	1.1	8.2	16.0	25.6	49.2
Yes	No	3.8	9.7	16.4	24.0	46.1
Yes	Yes: PIT	4.5	11.0	17.4	24.5	42.6
Yes	Yes: PIT & Social Security	4.8	11.1	17.5	24.3	42.2

Sources: **Canada**—Statistics Canada, *Size Distribution of Income in Canada, 1988* (13-207); Statistics Canada, *Income After Tax Distributions by Size in Canada, 1990* (13-210). **United States**—U.S. Bureau of the Census, Current Population Reports series P-60, no. 164-Rd-1, *Measuring the Effect of Benefits and Taxes on Income and Poverty, 1986.*

[a]Computed using effective tax rates for families of two or more members.

come. U.S. income inequality is further reduced slightly, but the Canada-U.S. comparison is left ambiguous (even if it were appropriate to neglect social security payroll taxes in Canada; doing so would be a dubious procedure since, although smaller than U.S. payroll taxes, they amounted to 4.2% of GDP in 1986). Overall, after adding transfer payments and deducting income taxes, both Canadian and U.S. income distributions are much more equal than the underlying distributions of private income, but there is not a major difference in the degree of redistribution.

Table 4.2 only allows us to scratch the surface of fiscal incidence in Canada and the U.S. In the next section we discuss the results of taking the entire panoply of taxes into account, and of modeling the tax-shifting process. However, even this does not allow one to answer the question of which country has the most redistribution. In order to answer that question one would have to take into account the many forms of noncash transfers from governments to persons in the two countries. A systematic study of these transfers is beyond the scope of the present paper, but table 4.3 allows a few remarks to be made.

Table 4.3 shows the changes in relative importance of different forms of government expenditure in Canada and the U.S. since 1965. While total expenditures are a larger fraction of GDP in Canada (partly, but not wholly, due to Canada's relatively larger interest payments), transfer payments and public expenditures on education are a similar percentage of GDP in the two countries. Where there is a major difference, is in expenditures on national defense and health. In 1987, Canada spent 1.8% of its GDP on defense and 5.9% on health. U.S. expenditures in these two categories—6.6% on defense and 1.6% on health—can be obtained, roughly, by reversing the Canadian figures

Table 4.3 Composition of Government Expenditures

Year	Total Expenditure	Expenditure Categories				
		Transfers	Defense	Health	Education	Other
1. *Canada*						
As % of GDP						
1965	25.0%	6.1%	2.7%	2.8%	4.6%	8.8
1970	32.1	8.0	2.1	4.9	6.9	10.3
1975	36.9	10.1	1.8	5.2	6.2	13.6
1980	37.6	9.8	1.5	5.1	5.8	15.4
1981	38.7	9.8	1.5	5.3	5.9	16.2
1982	43.5	11.7	1.8	5.8	6.2	18.1
1983	44.3	12.3	1.8	6.0	6.2	18.1
1984	43.9	12.0	1.8	5.7	5.8	18.5
1985	44.1	12.1	2.0	5.9	6.0	18.1
1986	43.8	12.3	1.9	5.9	5.7	18.0
1987	42.8	12.2	1.8	5.9	5.6	17.5
1988	41.8	11.8	1.7	5.9	5.3	17.0
1989	41.8	11.7	n.a.	n.a.	n.a.	n.a.
As % of Total Expenditure						
1965	100.0	24.2	11.0	11.1	18.5	35.2
1970	100.0	25.0	6.5	15.1	21.4	32.0
1975	100.0	27.5	4.8	14.1	16.8	36.9
1980	100.0	26.2	4.1	13.5	15.5	40.8
1981	100.0	25.4	4.0	13.7	15.1	41.8
1982	100.0	26.8	4.1	13.3	14.3	41.6
1983	100.0	27.8	3.9	13.4	13.9	40.9
1984	100.0	27.4	4.1	12.9	13.2	42.1
1985	100.0	27.5	4.5	13.4	13.6	41.1
1986	100.0	28.0	4.2	13.6	13.1	41.2
1987	100.0	28.5	4.1	13.8	13.1	41.0
1988	100.0	28.4	4.2	14.0	12.6	40.8
1989	100.0	28.0	n.a.	n.a.	n.a.	n.a.
2. *United States*						
As % of GDP						
1965	27.4%	5.5%	7.2%	1.0%	4.5%	9.2
1970	31.8	7.7	7.4	1.3	5.7	9.6
1975	34.9	11.2	5.4	1.6	6.2	10.5
1980	33.6	11.1	5.1	1.6	5.7	10.2
1981	33.8	11.2	5.3	1.6	5.5	10.4
1982	36.1	12.0	5.9	1.6	5.6	11.0
1983	35.9	12.0	6.1	1.6	5.5	10.6
1984	34.3	11.8	6.3	1.5	5.2	9.5
1985	35.3	11.8	6.5	1.5	5.3	10.2
1986	35.4	11.8	6.6	1.5	5.4	10.1
1987	35.0	11.6	6.6	1.6	5.4	9.9
1988	34.2	11.5	6.2	n.a.	n.a.	n.a.
1989	34.2	11.6	5.8	n.a.	n.a.	n.a.
As % of Total Expenditure						
1965	100.0	20.0	26.3	3.7	16.3	33.6
1970	100.0	24.3	23.4	4.2	17.9	30.2

(*continued*)

Table 4.3 (continued)

Year	Total Expenditure	Expenditure Categories				
		Transfers	Defense	Health	Education	Other
1975	100.0	32.0	15.5	4.6	17.9	30.0
1980	100.0	32.9	15.1	4.7	17.0	30.3
1981	100.0	33.0	15.6	4.6	16.2	30.7
1982	100.0	33.2	16.4	4.4	15.5	30.5
1983	100.0	33.3	17.1	4.5	15.4	29.7
1984	100.0	34.3	18.3	4.3	15.3	27.8
1985	100.0	33.4	18.5	4.3	15.0	28.9
1986	100.0	33.3	18.6	4.3	15.2	28.5
1987	100.0	33.1	18.8	4.4	15.4	28.4
1988	100.0	33.6	18.0	n.a.	n.a.	n.a.
1989	100.0	33.8	17.0	n.a.	n.a.	n.a.

Sources: **Canada**—Statistics Canada, *National Income and Expenditure Accounts*, (13-201), various issues (for total expenditures, transfer payments, and defense expenditures); Statistics Canada, *Consolidated Government Finance, 1965, 1970, 1975* (68-202) and Canadian Tax Foundation, *The National Finances, 1988–89*, for other years (health and education expenditures, consolidated, i.e., net of intergovernmental transfers). **United States**—U.S. Department of Commerce, *Survey of Current Business*, various July issues; Department of Commerce, *The National Income and Product Accounts of the U.S., Statistical Tables 1929–76*, September 1981.

for the two items. The U.S. can deter foreign aggressors, but has embarrassing inequities in medical treatment. Canada, on the other hand, cannot deter anyone but has universal, free socialized medicine.

The expenditure figures point to the great difference between Canada and the U.S. in the allocation of medical care, which pushes the balance toward Canada's being more redistributive than the U.S. But these figures do not tell the whole story: they do not call attention to the fact that all postsecondary education available in Canada is heavily subsidized, that many Canadian transfer programs embody the principle of "universality," or that unemployment insurance is more lavish in Canada than in the U.S.[4] What all this adds up to is that Canadians have more *security* in health, education, and income than do U.S. residents. A Canadian citizen is endowed with "cradle to grave" public health care, education, and income security. The system is more extensive, *and* it is more difficult to fall through its cracks than in the U.S. This fact indicates, together with the greater equality in private money income, that there is likely truth in the perception that Canada is "more equal" than the

4. Canada's major "universal" transfer programs are family allowances and old age security (OAS) pensions. While there are slight variations in payments between provinces, in most provinces the family allowance in 1989 was $65.48 per month per child. The OAS pension was $326 per month. Both family allowances and OAS have been part of taxable income for some time. However, in the April 1989 budget it was announced that they would be taxed back at a rate of 15% on individual net income exceeding $50,000. Even such a progressive measure is widely viewed with concern by those who favor a more redistributive government, since it erodes the principle of universality.

U.S. It remains to be seen whether the tax system has any impact on the comparison.

4.3 Comparisons of Tax Impacts on Inequality in the Early 1970s

The previous section looked at simple indications of the effect of taxes and transfers on the distribution of real income in Canada and the United States. The range of taxes considered was limited, and zero tax shifting was assumed. Here we move to a more complete analysis, looking at estimates of overall tax incidence in Canada and the U.S. in the early 1970s. One advantage of proceeding in this way is that it sets the stage for a discussion of changes over the last two decades. But an equally important motivation is that, as we shall see, it is only for the early 1970s that estimates of overall tax incidence have been done on a comparable basis for the two countries.

Attempts to estimate the overall burden of taxes in the U.S. began in the 1940s and 1950s (Colm and Tarasov 1940; Musgrave et al. 1951), and have continued to the present with important contributions from Pechman and Okner (1974), Pechman (1985, 1987), Browning (1978), Browning and Johnson (1979), Musgrave et al. (1974), and others. The situation in Canada is quite different. Irwin Gillespie developed complete estimates of fiscal incidence (i.e., both taxes and expenditures) for Canada for the years 1961 and 1969 (Gillespie 1976, 1980), and Whalley (1984) provided estimates for 1972; but those 1972 estimates are the most recent estimates of *overall* tax incidence available for Canada.[5]

While Gillespie used methods similar to those employed by U.S. authors, a number of differences in procedure—in the income definition, for example, as well as in shifting hypotheses—mean that no direct Canada-U.S. comparison can be made with his 1961 or 1969 results.[6] However, Whalley (1984) replicated the methods used by Pechman and Okner (1974) and Browning and Johnson (1979), using Canadian data for 1972, allowing a direct comparison of estimates of overall tax effects on economic inequality between the two countries at the start of the 1970s.

4.3.1 Comparisons Using Pechman's Approach

Table 4.4 shows Pechman's estimates of the incidence of the overall U.S. tax system, by type of tax, for 1970. The effective tax rates are expressed using a very broad income definition, gross of both transfers and taxes. Both

5. A number of authors have, however, looked at the incidence of particular components of the Canadian tax system using more recent data (see, e.g., Vaillancourt and Poulaert 1985; Meng and Gillespie 1986; Maslove 1989).

6. An attractive feature of Gillespie's work is that, in Gillespie (1976) he published all the underlying data series one requires to perform alternative incidence calculations using almost *any* income definition or set of shifting hypotheses. Thus, in the absence of Whalley's work it would be possible to do Canada-U.S. comparisons by applying the shifting hypotheses used by U.S. authors to Gillespie's published data series.

Table 4.4 Pechman's Estimates of U.S. Effective Tax Rates (1970)

Decile	PIT	CIT	Sales and Excise	Property	Social Insurance Contributions	Total
Most Progressive Variant						
1	3.1%	1.9%	7.6%	3.6%	2.2%	18.8%
2	3.5	1.8	7.1	3.4	3.2	19.5
3	4.0	1.5	7.2	2.8	4.8	20.8
4	5.8	1.4	6.9	2.5	6.3	23.2
5	6.8	1.3	6.7	2.2	6.8	24.0
6	7.6	1.1	6.3	2.1	6.7	24.1
7	8.2	1.2	6.0	2.1	6.4	24.3
8	9.1	1.4	5.6	2.2	5.9	24.6
9	10.3	1.6	5.1	2.3	5.4	25.0
10	13.8	5.3	3.5	5.3	2.7	30.7
Total	9.7	2.6	5.3	3.3	4.9	26.1
Least Progressive Variant						
1	3.1	4.0	7.5	7.3	3.5	25.9
2	3.4	3.5	7.0	5.9	3.9	24.2
3	3.8	3.2	7.0	4.8	5.0	24.1
4	5.6	3.0	6.8	4.2	6.0	25.8
5	6.6	2.7	6.5	3.8	6.4	26.4
6	7.3	2.7	6.1	3.7	6.1	26.3
7	8.0	2.7	5.8	3.6	5.9	26.2
8	9.0	2.6	5.5	3.4	5.5	26.4
9	10.0	2.5	5.0	3.1	5.2	26.1
10	14.2	3.4	3.6	3.4	3.0	27.8
Total	9.7	3.0	5.3	3.7	4.8	26.7

Source: Pechman, (1985), table A-2, p. 78.

income totals and the income concept are adjusted to be consistent with the national accounts. Income includes not only the money income reflected in tables 4.1 and 4.2, but also imputed rental income, income-in-kind, and capital gains. The two variants shown in table 4.4 reflect Pechman's "most progressive" and "least progressive" sets of incidence assumptions, which are shown in table 4.5.

Table 4.4 reflects Pechman's well-known result that even in the most progressive variant, the U.S. tax structure as a whole is not very progressive: the tax bite is 18.8% in the bottom decile and 30.7% in the top decile. In the least progressive variant, the overall tax system is approximately proportional at a rate of 25–26%. Strong progressivity of individual income taxes is largely offset by regressivity over some portions of the income distribution in all the other taxes. A further important aspect of this offsetting is that federal taxes are much more progressive than state and local income taxes. This is due, to a large extent, to the greater relative importance of individual income taxes at the federal level.

Table 4.5 Pechman's Shifting Hypotheses

Tax	Most Progressive	Least Progressive
PIT	not shifted	not shifted
CIT	½ to capital, ½ to dividends	½ to capital, ½ to consumption
Property:		
Land	capital	landowners
Structures & Improvements	capital	shelter and consumption
Sales and Excise	consumers of taxed goods	consumers of taxed goods
Social Security	labor	labor

Source: Pechman (1985).

Table 4.6 Whalley's Estimates of Effective Tax Rates for Canada Using Pechman's Methods (1972)

Income Group (thousands of $)	% of Households	PIT	CIT	Sales and Excise	Property	Social Insurance Contributions	Total
Most Progressive Variant							
<6.5	16.6%	1.4%	2.6%	13.9%	2.5%	2.3%	22.9%
6.5–7.3	3.5	3.7	3.0	12.3	3.3	3.8	26.1
7.5–8.5	6.9	5.7	2.7	12.1	2.8	5.0	28.4
8.5–10	8.0	7.9	2.1	11.7	2.2	4.6	28.6
10–11.5	8.9	9.0	2.1	11.5	2.6	3.9	29.3
11.5–16	24.4	11.4	1.7	10.4	2.1	3.5	29.4
16–25	19.3	13.4	2.4	9.2	2.9	2.6	30.7
>25	8.6	12.5	7.5	5.6	6.6	1.7	33.9
Least Progressive Variant							
<6.5	16.6	1.3	4.1	13.6	5.8	2.6	27.6
6.5–7.5	3.5	3.6	4.0	12.0	6.7	3.5	30.0
7.5–8.5	6.9	5.6	3.8	11.8	5.9	4.4	31.6
8.5–10	8.0	7.7	3.3	11.4	4.6	4.1	31.3
10–11.5	8.9	8.8	3.5	11.3	3.9	3.6	31.4
11.5–16	24.4	11.1	3.1	10.1	3.5	3.3	31.3
16–25	19.3	13.2	3.2	9.1	3.2	2.7	31.5
>25	8.6	13.2	4.6	5.9	3.0	1.9	28.9

Source: Whalley (1984), table 3, p. 662.

Table 4.6 shows the corresponding Canadian numbers for 1972 presented by Whalley (1984). For the overall tax system, the story is quite similar to what Pechman found for the U.S. for 1970. On the most progressive variant there is mild overall progressivity, while on the least progressive variant there is approximate proportionality. The only significant difference between the overall Canada and U.S. incidence patterns is that in the least progressive variant Canada shows slight regressivity at the top of the income scale, while the U.S. shows some slight regressivity at the bottom.

When we examine the individual taxes in tables 4.4 and 4.6, we again find considerable similarity between Canada and the U.S. However, there are some

interesting differences, for example with respect to social security payroll taxes. In both countries these are progressive at low-income levels, but become regressive at higher levels. The reason for this pattern lies partly in the fact that a large fraction of income comes from transfer payments, rather than from earnings, for those in the lowest income groups, and partly in the rate structure of these taxes. Tables 4.4 and 4.6 show that in the U.S., social security payroll taxes turned regressive at about the median income level in 1970, whereas in Canada this occurred lower in the distribution—at about the 30th percentile.

A second significant difference revealed by tables 4.4 and 4.6 is that the personal income tax (PIT) is more progressive in Canada than in the U.S. at the bottom of the income scale, and less progressive at the top. American households in the bottom group in 1970 paid 3.1% of their income in PIT in both of Pechman's variants, whereas Canadians in the bottom group in 1972 paid only 1.3–1.4%. The explanation lies with state and local income taxes in the U.S.; the burden of *federal* PIT in the U.S. was only about 1%. At the top of the scale, while the PIT burden jumps from 10.0% to 14.2% from the second highest to the top decile in the least progressive variant, the burden is flat at 13.2% for the top two Canadian groups. In the most progressive variant, Canadian PIT is actually regressive at the top end, whereas U.S. PIT remains significantly progressive.

4.3.2 Comparisons Using Browning and Johnson's Approach

After the range of shifting variants first used in Pechman and Okner (1974) were devised, Browning (1978) and Browning and Johnson (1979) demonstrated a plausible justification for a much more progressive variant of such calculations. Their interest focused on sales and excise taxes. They noted, first, that since transfer payments are largely indexed, to the extent that one's income is derived from transfers one is fully protected against general increases in broad-based sales taxes. This implies that it is not adequate to treat sales and excise taxes as if the burden were entirely on consumers of the taxed items without regard to the composition of their income. In other words, sales and excise taxes have an important sources side, as well as uses side effects. Second, Browning and Johnson argued that the portion of income saved does not escape sales and excise taxes, as assumed in all of the Pechman and Okner variants, since saving provides for future expenditure on consumption, which can generally be expected to be taxed at rates similar to those in force today. The upshot of these two arguments is that the burden of a general sales tax is on factor income, rather than on consumption.

Allocating the burden of sales and excise taxes in proportion to factor income, rather than in proportion to consumption, has a radical effect on estimated overall tax incidence. It also affects the Canada-U.S. comparison, as shown in table 4.7. Table 4.7 reports the result of adopting the Browning and Johnson argument in each country. Part 1 of the table shows the impact for the

Table 4.7 **Effective Tax Rates under Forward Shifting and Browning and Johnson Assumptions on Sales and Excise Tax Burdens**

1. *United States* (1966)

Decile	Sales and Excise Taxes		Overall Tax System	
	Forward Shifting	Browning & Johnson	Forward Shifting	Browning & Johnson
1	8.9%	2.2%	16.8%	10.1%
2	7.8		18.9	13.3
3	7.1	4.5	21.7	19.1
4	6.7		22.6	20.4
5	6.4	5.1	22.8	21.5
6	6.1		22.7	21.7
7	5.7	5.4	22.7	22.4
8	5.5		23.1	23.0
9	5.0	5.7	23.3	24.0
10	3.2		30.1	32.6
Total	5.1	5.1	25.2	25.2

2. *Canada* (1972)

Income Group (thousands of $)	% of Households	Sales and Excise Taxes		Overall Tax System	
		Forward Shifting	Browning & Johnson	Forward Shifting	Browning & Johnson
<6.5	16.6%	13.9%	3.5%	22.9%	12.8%
6.5–7.5	3.5	12.3	6.6	26.1	21.2
7.5–8.5	6.9	12.1	7.7	28.4	24.4
8.5–10	8.0	11.7	8.7	28.6	25.8
10–11.5	8.9	11.5	9.1	29.3	27.3
11.5–16	24.4	10.4	9.4	29.4	28.6
16–25	19.3	9.2	9.7	30.7	31.4
>25	8.6	5.6	10.0	33.9	37.4

Sources: **United States**—Browning (1978), tables 2, 3, pp. 660, 661. **Canada**—Whalley (1984), table 3, pp. 662, 663.

Note: The "forward shifting" estimates for the U.S. are from Pechman and Okner's "most progressive" variant calculations. For Canada, they are from Whalley's calculations using Pechman's "most progressive" variant. Both assume that the burden of sales and excise taxes falls entirely on the consumers of the taxed items.

U.S., based on Pechman and Okner's original study using 1966 data, while part 2 uses Whalley's calculations for Canada in 1972. In both countries, sales and excise taxes become strongly progressive under the Browning and Johnson argument, and the overall progressivity of the tax system is considerably increased. However, note that the impact on overall progressivity is greater for Canada, simply because sales and excise taxes are almost twice as large, overall, as a fraction of income than in the U.S. Thus, going from the Pechman and Okner most progressive variant to the Browning and Johnson case in

Canada reduces the tax bite for the lowest group by fully 10.1 percentage points, and increases the burden on the top group by 3.5 percentage points. The corresponding figures for the U.S. in 1966 are only 6.7 and 2.5 percentage points, respectively. Since, as shown in table 4.8, the gap between Canada and the U.S. in the use of indirect taxes has remained roughly constant since the early 1970s, it remains very much the case today that one's view of the relative progressivity of the U.S. and Canadian tax systems depends on perceptions of the likely incidence of sales and excise taxes.

The second part of the Browning and Johnson argument—the absence of uses side effects of a general sales tax—provides an interesting echo of Pechman's argument for ignoring the spurious uses side effects of property taxes in annual data (see the Appendix to this chapter). In both cases the argument, roughly speaking, is that the uses side effects will largely disappear if we take a longer view than that of a single year. In other words, a lifetime tax incidence argument is being imported into an annual incidence study. The temptation to make such piecemeal adjustments to annual calculations is understandable. However, this approach ignores the fact that many other things will change when we move to a lifetime framework. As discussed in section 4.6, Davies, St-Hilaire, and Whalley (1984) found that not all the changes that occur when explicit lifetime calculations are substituted for annual calculations are in the direction of making the tax system appear more progressive. In fact, there is an approximate offsetting, so that the overall lifetime incidence pattern is not much different from the annual.

4.4 Changes in Tax Effects on Inequality over Time: Prereform Period

Changes over time in the impact of taxes on economic inequality in Canada and the United States have come about due to changes in tax mix, tax bases, and rate structures. For the U.S., we are fortunate in having a consistent series of tax incidence calculations, performed by Joseph Pechman, which sum up the impact of these factors over the period since 1966. This allows the U.S. side of the Canada-U.S. comparison performed in the previous section for the early 1970s to be brought up to date. Unfortunately, on the Canadian side we can only assemble the evidence on changes in tax mix, tax bases, and rate structure, in order to guess what has been happening to the overall impact of taxes on inequality.

4.4.1 Changes in Tax Mix in Canada and the United States

Let us take a look at the evolution of the overall tax mix in Canada and the U.S. in recent years, with the help of table 4.8. Table 4.8 indicates that until the early 1980s, PIT was overall a less important revenue source in Canada than in the U.S., despite the fact that the Canadian provinces rely more heavily on income taxes than do U.S. states. In recent years, however, Canada has come to rely much more on PIT, and the U.S. less. There has been a steady

Table 4.8 Composition of Government Revenues

1. *Canada*

Year	Total Revenue	Taxes					
		PIT	Direct Corporate[a]	Indirect[b]	Property	Social Insurance[c]	Other
As % of GDP							
1965	26.4%	6.0%	3.9%	10.1%	3.9%	1.2%	1.7%
1970	32.2	10.1	3.5	10.0	3.8	3.0	1.7
1975	32.8	10.7	4.7	9.6	3.2	3.2	1.4
1980	30.3	10.4	3.9	8.5	2.9	3.1	1.5
1981	32.4	11.0	3.6	9.9	3.0	3.4	1.5
1982	32.9	11.7	3.1	9.6	3.2	3.6	1.6
1983	32.2	11.4	3.0	9.1	3.2	3.9	1.5
1984	32.1	11.2	3.4	9.2	3.1	3.9	1.4
1985	32.3	11.3	3.3	9.2	3.1	4.1	1.3
1986	33.6	12.3	2.9	9.6	3.1	4.2	1.4
1987	33.9	12.8	2.7	9.7	3.1	4.3	1.4
1988	34.5	13.2	2.8	9.8	3.0	4.4	1.4
1989	33.8	13.0	2.4	n.a.	n.a.	n.a.	n.a.
As % of Revenue							
1965	100.0	22.5	14.7	38.3	13.6	4.5	6.3
1970	100.0	31.4	11.0	31.1	11.9	9.2	5.4
1975	100.0	32.7	14.3	29.4	9.6	9.6	4.3
1980	100.0	34.3	12.9	28.1	9.7	10.2	4.9
1981	100.0	34.0	11.1	30.7	9.1	10.5	4.7
1982	100.0	35.7	9.5	29.3	9.8	10.9	4.7
1983	100.0	35.5	9.4	28.4	10.0	12.1	4.5
1984	100.0	34.7	10.5	28.8	9.7	12.1	4.3
1985	100.0	35.1	10.1	28.6	9.5	12.5	4.1
1986	100.0	36.8	8.5	28.6	9.3	12.6	4.3
1987	100.0	37.6	8.0	28.7	9.0	12.6	4.0
1988	100.0	38.2	8.0	28.5	8.6	12.7	4.0
1989	100.0	38.3	7.0	n.a.	n.a.	n.a.	n.a.

2. *United States*

Year	Total Revenue	Taxes					
		PIT	Corporate Profits	Indirect[c]	Property	Social Insurance	Other
As % of GDP							
1965	27.5%	8.1%	4.5%	5.7%	3.5%	4.4%	1.3%
1970	30.8	10.1	3.5	5.8	3.8	5.9	1.6
1975	30.7	9.4	3.3	5.7	3.5	7.2	1.6
1980	32.4	11.3	3.3	5.6	2.7	7.9	1.6
1981	32.9	11.7	2.8	6.0	2.7	8.1	1.6
1982	32.3	11.6	2.0	5.7	2.9	8.3	1.7
1983	31.7	10.7	2.3	5.8	2.9	8.4	1.7
1984	31.5	10.0	2.5	5.8	2.7	8.7	1.8

(*continued*)

Table 4.8 (continued)

2. *United States*

Year	Total Revenue	Taxes					
		PIT	Corporate Profits	Indirect[c]	Property	Social Insurance	Other
1985	32.0	10.4	2.4	5.7	2.7	8.9	1.8
1986	32.0	10.2	2.5	5.6	2.8	9.0	1.9
1987	32.7	10.7	3.0	5.4	2.8	8.9	1.9
1988	32.4	10.3	2.9	5.4	2.7	9.2	1.9
1989	32.2	10.5	2.5	5.3	2.7	9.2	1.9
As % of Revenue							
1965	100.0	29.5	16.4	20.9	12.7	15.9	4.6
1970	100.0	32.9	11.2	19.0	12.3	19.3	5.3
1975	100.0	30.5	10.8	18.4	11.5	23.6	5.2
1980	100.0	35.0	10.1	17.3	8.3	24.3	5.0
1981	100.0	35.5	8.5	18.2	8.1	24.7	4.9
1982	100.0	35.9	6.2	17.8	8.9	25.8	5.4
1983	100.0	33.6	7.3	18.3	9.0	26.4	5.3
1984	100.0	31.7	8.0	18.3	8.6	27.7	5.7
1985	100.0	32.4	7.6	17.8	8.6	27.9	5.8
1986	100.0	32.0	7.9	17.4	8.7	28.1	5.9
1987	100.0	32.9	9.1	16.6	8.4	27.2	5.8
1988	100.0	31.7	9.1	16.6	8.4	28.4	5.8
1989	100.0	32.7	7.7	16.5	8.4	28.6	6.1

Sources: **Canada**—Statistics Canada, *National Income and Expenditure Accounts* (13-201), various issues. **United States**—Department of Commerce, *Survey of Current Business*, various July issues; Department of Commerce, *The National Income and Product Accounts of the U.S., Statistical Tables 1929–76*, September 1981.

[a]Includes the petroleum and gas revenue tax, levied between 1981 and 1986, and provincial taxes on mining and logging profits, as well as corporate income taxes.

[b]Net of property taxes.

[c]Includes contributions to the Canada and Quebec Pension Plans, unemployment insurance, public health insurance, and workmen's compensation.

rise in the fraction of government revenue coming from PIT in Canada, until in 1988, 38.2% of revenue was from that source, whereas in the U.S. after 1982, PIT revenues fell from 35.9% of total revenue to 31.7% in 1988. The decline in importance of PIT in the U.S. has been made possible by the steady increase in social insurance contributions, which now provide almost as large a fraction of revenue as the PIT—28.6% versus 32.7% in 1989.

Over the longer haul of the last twenty or twenty-five years, both Canada and the U.S. have seen a relative decline of direct corporate taxes, most importantly the corporate income tax (CIT), indirect taxes (i.e., sales and excise taxes), and property tax. The greater buildup of social insurance contributions in the U.S. has been used largely to allow the PIT to keep an approximately

level relative position over the last two decades, whereas in Canada the decline in corporate, indirect, and property taxes has required a relative increase in PIT revenues.

Later in this paper it is argued that PIT is the most progressive element in the tax mix, from either an annual or lifetime viewpoint. Social insurance contributions, on the other hand, rank quite low in the progressivity stakes, because their proportional rates only apply on income up to some ceiling. While they are proportional, or mildly progressive in the case of the Canada Pension Plan (CPP), in the lower range of the distribution they are regressive over a wide upper range. From a lifetime viewpoint, the results of Davies, St-Hilaire, and Whalley (1984) indicate that social insurance contributions are in fact the *most* regressive form of tax. Differences in the trend of the U.S. and Canadian tax mix over the last two decades therefore suggest quite powerfully that overall tax incidence in Canada has likely been becoming more progressive relative to U.S. incidence.

4.4.2 Changes in Tax Effects on Inequality: United States

Table 4.9, taken from Pechman (1985) summarizes changes in overall U.S. tax incidence over the period 1980–85, and can be compared with the numbers in table 4.3 for 1970. Over both the whole period from 1970–85 and over 1980–85, progressivity declined according to either variant of the calculations (most markedly for the most progressive variant). Similar conclusions were reached by others, for example Kasten and Sammartino (1987) of the Congressional Budget Office in a comparison of overall federal tax incidence in the U.S. in 1977 and 1984.

The most important reasons for the overall decline in tax progressivity over the period 1970–85, according to Pechman (1985), were the 1981 PIT cut,

Table 4.9 **Pechman's Estimates of Effective Overall Tax Rates, (1980 and 1985)**

	Most Progressive Variant		Least Progressive Variant	
Decile	1980	1985	1980	1985
1	20.6%	21.9%	28.9%	28.2%
2	20.4	21.3	25.7	25.6
3	20.6	21.4	24.6	24.6
4	21.9	22.5	25.2	25.2
5	22.8	23.1	25.8	25.3
6	23.3	23.5	25.9	25.6
7	23.6	23.7	26.0	25.4
8	25.0	24.6	27.1	26.3
9	25.7	25.1	27.2	26.1
10	27.3	25.3	24.9	23.3
Total	25.2	24.5	26.3	25.3

Source: Pechman (1985), table 5-2, p. 68.

the declining importance of CIT, and the shift toward Social Security payroll taxes. (The 1981 tax cut reduced burdens for those in the top 10% by about one percentage point of income, and was offset among low-income taxpayers by the lack of indexation. See Pechman 1985, pp. 69–70.) Pechman emphasizes that all these changes occurred at the *federal* level. The overall incidence of state and local taxes did not change greatly in any of the variants he considered. These underlying factors can readily be compared with corresponding factors at work in Canada.

4.4.3 Changes in Tax Effects on Inequality: Canada

In 4.8, we see that the changes in tax mix in Canada over the period 1970–85, although qualitatively similar to those in the U.S., were quantitatively different. (The 1965–70 period featured some major changes in the Canadian tax mix, which were quite unlike those in the more recent period.) The most significant difference is that the increase in the importance of social security payroll contributions was much smaller in Canada than in the U.S. Between 1970 and 1985, the fraction of overall government revenue coming from social insurance contributions in Canada rose from 9.2% to only 12.5%, whereas in the U.S. it rose from 19.3% to 27.9%. Some idea of the possible impact can be gained by noting that if the incidence of social security payroll taxes had not changed in the U.S. after 1970, according to Pechman's most progressive variant the tax burden of the lowest U.S. decline in 1985 would have been about 15% of income instead of 22%, and that of the highest decile would have been about 26% instead of 25%.

It should also be noted that, unlike the U.S., Canada introduced full indexation of exemptions and tax brackets in the mid 1970s, so that "bracket creep" effects, such as those reflected in Pechman's estimates for the period 1981–85, were absent. This difference, together with the divergence in payroll-tax trends, strongly suggests that if Canada and the U.S. had about the same overall tax progressivity in the early 1970s, by 1985 Canada likely had a significantly more progressive overall system.

An important footnote on changes in tax mix in Canada is the disappearance of all estate and gift taxes in Canada over this period, which suggests an erosion of the long-run progressivity of the Canadian tax system at very high income levels. This change began with the removal of federal estate and gift taxes when capital gains taxation was introduced in the early 1970s. The provinces then, one by one, removed their succession duties. The absence of estate and gift taxes, the evidence that many rich Canadian families are largely able to avoid PIT, and the lengthening of the extreme upper tail of the Canadian income distribution noted earlier all powerfully suggest that an extremely favorable tax environment has been created in Canada for the genuinely wealthy. This should be borne in mind in interpreting the available evidence on changes in progressivity over time in Canada, which has little to say about taxation of the rich and super-rich.

In Canada there is an important discontinuity in the prereform period. For three years prior to the implementation of tax reform in the 1988 tax year, a series of major changes in federal taxation were put in place by the Conservative government elected in 1984. Although some of the initiatives in this period differed in spirit from those of the 1987 tax reform package, for the most part they were of much the same ilk. Fortunately, there has been some careful study of the incidence effects of at least the PIT changes occuring over this period.

The Conservative government elected in late 1984 faced two difficulties, which have had a major effect on all its tax policy initiatives right up to the present. The first was that towards the end of its predecessor's term a very serious deficit problem had emerged, one considerably more serious even than that faced in the U.S. The other was that a proliferation of tax expenditures under the previous regime had led to a situation in which large numbers of high-income taxpayers were able to escape tax entirely. This created a perception of unfairness in the tax system, which the new government was pledged to remedy. The new prime minister had promised that the rich would pay taxes, and that the taxes would be "handsome" ones.

In the prereform period, the Conservative government anticipated aspects of its June 1987 reform package by broadening the CIT base, lowering CIT rates, and eliminating the general investment tax credit, and by reducing the dividend tax credit and terminating various tax shelters and loopholes in the PIT. However, in addition to these moves, it made some changes which were a good deal less popular. In particular, in the May 1985 budget it announced that it would phase in a $500,000 lifetime capital gains exemption (now reduced to $100,000), and it partially de-indexed the tax system by removing indexation for the first 3 percentage points of inflation each year.[7] Attempts to regain some goodwill included the introduction of refundable sales tax credits and (for the first time in Canada) an alternative minimum tax under the PIT.

The incidence effects of the prereform PIT changes have been studied by Maslove (1989) using an innovative database assembled by Statistics Canada, the Social Policy Simulation Database (SPSD).[8] Maslove compares the distribution of tax burdens for a sample of taxpayers subject to the 1984 and "prereform" 1988 tax law in turn, finding that the burden fell disproportionately

7. Fears about the government's intentions were also encouraged by its abortive consideration of removing some of the indexation of Canada's universal transfer payments—old age security payments and family allowances. (The elderly kept their indexed pensions, but family allowances were partially de-indexed, again on the plan of no indexation for the first 3 percentage points of inflation.)

8. This database imputes information from taxation and unemployment insurance administrative data files, as well as Statistics Canada's Family Expenditure Survey (FES), to families and individuals in Statistics Canada's Survey of Consumer Finance (SCF). In addition to putting together many more variables than are available in any single data source, the SPSD uses sophisticated techniques to offset the misreporting and differential response to which the SCF, like any sample survey, is subject.

on middle-income groups. Overall there was a 2.7% decrease in disposable income, but the top 1% of taxpayers saw only a 1.3% decrease (thanks to the lifetime capital gains exemption, for example), and the bottom two deciles had *gains* of 3.7% and 1.7%. In contrast, taxpayers around the $30,000 income mark lost 3.5–3.6% of disposable income.

Thus, while there was a fairly clear prereform trend toward less progressivity in the U.S., the Canadian situation is a bit more complicated. Prior to 1985 Canada almost certainly saw less decrease in progressivity than in the United States. However, in the period 1985–87 PIT changes saw the middle lose out to bottom and top income groups, in relative terms. While it still seems likely that Canada at the immediate prereform point had a significantly more progressive overall tax system than the U.S., the changing incidence of PIT suggests that the gap might have closed somewhat, at least in the top half of the income distribution, over the last few years before reform.

4.5 The Effects of Tax Reform

In analyzing the effects on income distribution of the recent tax reforms carried out in the U.S. and Canada, it is important to keep in mind the starting point. An easily overlooked aspect of the initial situation is that both countries' PIT systems had important *consumption tax* aspects (as shown by the relatively light taxation of capital gains, generous sheltering of pension funds, etc., in both countries). However, Canada was positioned significantly more toward the consumption tax end of the spectrum than the U.S., with its $1,000 investment income deduction, dividend tax credit, more liberal RRSP/RPP contribution limits, and lack of consumer or mortgage interest deductibility.[9] Looking at other elements in the tax system, Canada's much greater reliance on sales and excise taxes reinforced the consumption tax aspect of its overall system. The greater use of social security payroll taxes in the U.S., and lack of integration of CIT with PIT means that other elements of at least the federal tax structure in the U.S. could be viewed as augmenting the income tax approach. Without exaggerating too much, one could claim that Canada was largely pursuing a consumption tax strategy, and the U.S. more of an income tax approach in the prereform period.[10]

9. Under the now-standard consumption tax approach, set out, for example, by Bradford in *Blueprints* (1984), taxpayers would have access to saving in both "qualified" and "nonqualified" forms. Qualified accounts correspond with IRAs and Keoghs in the U.S. and with RPPs and RRSPs in Canada, and provide essentially expenditure tax treatment. The income on nonqualified assets would not be taxed, providing, like any exemption for capital income, essentially wage tax treatment. Perhaps the most important breakthrough of *Blueprints* was to show how these two forms of treatment could, working side-by-side, create a workable personal consumption tax system. Nontaxation of nonqualified assets implies nondeductibility of interest, so that the Canadian approach to consumer and mortgage interest deductibility represents appropriate consumption tax treatment. See Davies and St-Hilaire (1987).

10. This assessment does not deny that the U.S. had been moving *in the consumption tax direction*, via erosion of the CIT and the buildup of payroll taxes, which in ideal form are equivalent to consumption taxes for life-cycle savers operating in a perfect capital market.

Tax reform in Canada has been more drawn out than that in the U.S. and has seen significant changes since its announcement in the June 1987 White Paper. The reform was scheduled to take place in two stages. Stage I, beginning with the 1988 tax year, would see the phasing in of PIT and CIT reforms over a two- or three-year period. Stage II, federal sales tax reform, was scheduled to take effect in January 1991. The White Paper indicated that Stage II would see the replacement of the federal manufacturers' sales tax (MST) by a broad-based "multistage sales tax," and the attendant elimination of PIT and CIT surtaxes and reduction in the middle PIT rate from 26% to 25%. The Stage II package was intended to be roughly revenue-neutral, so that it would see a shift in tax mix away from PIT and CIT toward sales tax. Three alternative forms of the new sales tax were suggested in the White Paper, one involving integration with existing provincial sales taxes. In April 1989 it was announced that the government would "go it alone" with a federal-only Goods and Services Tax (GST), is a destination-basis consumption-type credit invoice method value-added tax, levied at a rate of 9%. Public opposition led to a revised plan, announced in December 1989, with a GST rate of 7% and no accompanying PIT or CIT reductions. Thus, the originally anticipated shift in tax mix towards the sales tax seems to have been abandoned.

The most important features of the 1986 U.S. tax reform were: (1) revenue shift away from PIT towards CIT; (2) base broadening under CIT, including elimination of the investment tax credit; (3) base broadening under PIT, including, for example, elimination of the former 60% exclusion of capital gains, repeal of rapid acceleration of real estate depreciation, and limitation on passive activity losses; (4) increases in personal exemptions and standard deduction, removing six million individuals from the tax rolls; and (5) replacement of fourteen PIT tax brackets with marginal tax rates of 11–50% by (nominally) two brackets with rates of 15% and 28%, and reduction of the top CIT rate from 46% to 34%.

The key features of the Canadian reform, including both Stage I, implemented in the 1988 tax year, and the modified Stage II, are: (1) replacement of MST with GST; (2) base broadening under CIT, including decelerated depreciation allowances (general investment tax credit was already eliminated prior to reform); (3) base broadening under PIT, including an increase in the capital gains inclusion rate from 50% to 75%, capping of the lifetime capital gains exemption at $100,000, and reduction in the dividend tax credit rate from 33 1/3% to 25%; (4) conversion of personal exemptions and most deductions to (non-refundable) tax credits, and enhancement of refundable tax credits (child tax credit and sales tax credits); and (5) replacement of ten tax brackets with marginal tax rates of 6–34% by three brackets with rates of 17%, 26%, and 29%, and reduction in the CIT rate from 36% to 28%.

There is considerable similarity in the basic thrust of U.S. and Canadian tax reform. In line with the global trend, both countries have "broadened the base and reduced the rates" under both personal and corporate income taxes. However, although both countries have moved toward the income tax end of

the consumption tax–income tax spectrum, the gap between them on this scale has probably not altered very much. The conversion of exemptions to credits in Canada, and the enhancement of refundable tax credits (child tax credit and sales tax credits), is a notable difference in the Canadian rate reform. However, it is perhaps more important to note the *similarity* between the two countries in the desire to offset the redistributive consequences for low-income families of moving to a flatter rate structure by enhancing protection for low incomes.

4.5.1 Canadian versus U.S. Rate Structure

Table 4.10 explores the postreform comparison between direct federal taxes on persons in the U.S. and Canada. It shows average effective 1988 tax rates for single-earner married couples with two children receiving all income from wages and salaries. Most of the income levels represent particular percentile points in the respective countries' income distributions. In one case, the 95th percentile, an income figure was not available for Canada, so the U.S. income at this percentile was simply converted to Canadian dollars (at an exchange rate of .81 U.S. dollars to one Canadian dollar, the average 1988 noon exchange rate). In addition, incomes of $10,000 and $200,000 (U.S.) were selected to give some feel for the treatment of incomes at the extremes.

Table 4.10 indicates, first, that both the PIT and overall direct federal tax burdens were quite similar at the very high income level of $200,000 (U.S.). However, as one moves lower in the distribution, the overall Canadian rate becomes quite a bit lower than the U.S. rate. There is a floor under the overall U.S. rate, set by the 15.02% combined employer and employee OASDI contribution rate in 1988. On the other hand, Canadian federal PIT rates are quite a bit higher than U.S. rates at most positions in the income distribution. The difference is greatest at the top of the 60th percentile (top of the third quintile), where the Canadian rate was 20.6%, versus a U.S. average rate of just 14.6%.

If the taxes reflected in table 4.10 were the only taxes at the federal level in each country, one might be tempted to conclude that the official Canadian federal rate structure is now clearly more progressive than the U.S. structure. However, both countries have federal CIT and excise taxes, the U.S. has federal gift and estate taxes, and Canada has a federal sales tax. (In addition, Table 4.10 does not tell us what pattern would emerge if we included other family types and nonlabor income.) By far the most important item in this omitted category is Canada's federal sales and excise taxes. In 1988 they provided $17,197,000 in revenue, which was equal to 3.4% of personal income. Given the sharp regressivity typically displayed in calculations of sales and excise tax incidence using annual data, if appropriate allowance were made for this additional source of federal revenue in table 4.10 it is quite possible that the difference in progressivity between federal taxes in Canada and the U.S. would be wholly eliminated.

Table 4.10 **Average Federal Tax Rates for Single-Earner Married Couple with Two Children (1988)**

Percentile	Income in U.S. $	Income in Cdn $	PIT	Social Security	Unemployment Insurance	Total
United States						
n.a.	$10,000	$12,346	0.0%	15.0%	2.1%	17.1%
20	15,102	18,644	0.8	15.0	1.4	17.2
40	26,182	32,323	7.6	15.0	0.8	23.4
60	38,500	47,531	9.9	15.0	0.5	25.5
80	55,906	69,020	14.6	12.1	0.4	27.1
95	92,001	113,581	20.2	7.3	0.2	27.8
n.a.	200,000	246,914	27.1	3.4	0.1	30.6
Canada						
n.a.	10,000	12,346	n.a.	3.2	5.6	n.a.
20	17,825	22,006	2.4	3.5	5.6	11.6
40	28,426	35,094	11.5	2.7	4.7	19.0
60	38,792	47,891	17.0	2.0	3.5	22.5
80	52,546	64,871	20.6	1.5	2.6	24.6
n.a.	92,001	113,581	24.8	0.8	1.5	27.1
n.a.	200,000	246,914	27.9	0.4	0.7	29.0

Notes: **U.S. and Canada:** All income is assumed to be from wages and salaries. **U.S.:** The couple qualifies for $13,000 total in standard deduction ($5,000) and personal exemptions ($2,000 × 4). Marginal tax rates according to taxable income are: <$29,750, 15%; $29,750–71,900, 28%; $71,900–194,050, 33%; >$194,050, 28%. The lowest two income levels benefit from the earned-income tax credit, which equals 14% of wage and salary income up to $5,714, and is taxed back at a 10% rate on income between $9,000 and $17,000. The OASDI contribution rate (employer and employee) is 15.02% on the first $45,000. An unemployment insurance contribution rate of 3% on the first $7,000 is assumed. **Canada:** The couple qualifies for nonrefundable credits equal to 17% of $12,276 ($6,000 for taxpayer, $5,500 for spouse, and $776 for two children) plus CPP/QPP and UI contributions. There is also a refundable child tax credit of $559 per child, taxed back at a rate of 5% on family income above $24,000, as well as a refundable sales tax credit totaling $210 ($70 per adult and $35 for each child), taxed back at a rate of 5% on family income over $16,000. Marginal tax rates (including surtaxes) according to taxable income are: <$27,500, 17.51%; $27,501–55,000, 26.78%; >$55,000, 29.87%. Contributions at the combined employer and employee rate are 4% of income between $2,600 and $26,500 for CPP, and 5.64% of income up to $29,380 for UI.

4.5.2 Changes in Tax Bases

Tax brackets and rates of course only tell part of the story about the incidence of any tax. We also need to take into account the base. There are interesting differences in the base-broadening exercises carried out in the U.S. and Canadian tax reforms. These partly reflect the differing composition of prereform tax expenditures in the two countries. Canada went into reform with RRSP contribution limits more generous than those on IRAs in the U.S., the $1,000 investment income deduction, and a generous dividend tax credit, for example. The U.S., on the other hand, had unrestricted consumer and mortgage interest deductibility and serious problems with the use of passive activity losses to offset other income. Canada eliminated its investment income deduction, cut back the dividend tax credit, and slowed down the scheduled

phase-in of higher RRSP/RPP contribution limits. The U.S., on the other hand, restricted consumer and mortgage interest deductibility. It also separated income into three categories: ordinary (earned) income, investment income, and passive income. Losses in one category cannot be used to offset income in another.

Other differences in tax reform in the two countries cannot simply be explained in terms of the differences in preexisting loopholes. Both countries tightened up the treatment of capital gains, but the U.S. went much further, to full inclusion of realized capital gains in income. A further unexpected divergence in reform is in the treatment of interest deductibility for investors. In contrast to its rectitude on interest deductibility for consumers, Canada has always had wide-open deductibility on loans for investors. This feature was undisturbed in Canadian tax reform. The U.S. reform, in contrast, limited the interest deduction to the amount of investment income received (a reform frequently advocated in Canada). This implies a major continuing loophole in the Canadian PIT, relative to the U.S.[11]

4.5.3 Changes in Tax Mix

While there are broad similarities between Canadian and U.S. tax reform, there are also important differences. In addition to the differences noted above, the murky nature of the change in tax mix caused by tax reform in Canada contrasts sharply with the clearcut shifts in tax mix in the U.S. The shift toward increased CIT revenue in the U.S. showed up clearly in the 1987 and 1988 tax years (see table 4.8). Together with the continued rise in Social Security payroll taxes, it is in line with a long-run shift away from PIT. In contrast, what is happening to the federal tax mix in Canada is very confused.

The June 1987 tax reform White Paper in Canada projected that by 1991–92, with Stage I of tax reform fully phased in, PIT revenues would decline by $2.5 billion, CIT revenues would increase by $1.5 billion, and sales tax revenues would rise by $1.3 billion. In Stage II of tax reform, it was intended that PIT and CIT surtaxes would be removed, the PIT middle rate would be reduced from 26% to 25%, a much enhanced sales tax credit would be introduced, and the revenue losses from these measures would be made good by levying a sufficiently high new sales tax. Clearly, a tax mix shift away from PIT toward sales tax (and to a lesser extent CIT) was contemplated.

What is left out of this story is that in the immediate prereform period the series of measures taken to close PIT loopholes, and partial de-indexation,

11. Unlimited interest deductibility, unconstrained even by the alternative minimum tax, is one of the features of the Canadian tax system of greatest benefit to high-income taxpayers. It has always been objectionable, in that if the income generated by investments financed with the loans in question was in the form of capital gains, it would be taxed at an effective rate far below the subsidy rate on interest expense. The problem became more serious with the advent of the $500,000 lifetime capital gains exemption in 1985, although the implied hemorrhage has been reduced by the reduction in the lifetime exemption to $100,000 and the increase in the capital gains inclusion rate from 50% to 75%.

had resulted in a shift in tax mix toward PIT. Whatever the original intention, the relative importance of PIT revenues continued to increase in 1988 and 1989, as Stage I was being implemented. It is possible that the originally projected reform would have produced a shift in mix away from PIT with the implementation of Stage II in 1991 and 1992. However, the reduction in the planned GST rate from 9% to 7%, and the abandonment of plans to reduce PIT and CIT surtaxes and the PIT middle rate mean that this shift will not occur.

What is sometimes neglected in discussions of the tax mix changes under Canadian PIT is the fact that partial de-indexation, which began in 1985, creates a long-run tendency for a relative rise in PIT revenues and decline in PIT progressivity. The extraordinary public resistance to the GST, and international competitive pressures to keep CIT rates down, suggest that it may be difficult for governments to offset this tendency in the future via GST or CIT rate increases. A return to full indexation is unlikely in the forseeable future, since partial de-indexation is one of the strongest weapons the Canadian minister of finance has in his anti-deficit armory. Thus, at least for the present, Canada is set on a course, after 1991 or 1992, for an increasing shift away from CIT and sales tax revenues and toward PIT.

4.5.4 Estimates of Overall Incidence Effects of Reform

The United States

Initial assessments of the overall redistributive impact of the Tax Reform Act of 1986 (TRA86), by the Joint Committee on Taxation, for example, suggested that it would make the federal income tax slightly more progressive. Pechman (1987) has made a stronger statement, indicating that "the distributional effect of the act is distinctly progressive, especially if the increases in corporate income tax liabilities are taken into account." Assuming that CIT is a tax on capital in general, the top 1% of U.S. families would see an average 5% increase in federal taxes, whereas the bottom 10% would experience a 44% drop. Similar to Pechman, Ballentine (1986) and Feldstein (1988) have both argued in favor of calculations in which the CIT burden is not shifted onto consumers or workers.

Clearly, views on the redistributive impact of TRA86 must depend quite a bit on who one believes bears the burden of the corporate income tax. In addition, Koppelman (1988) has argued that the increase in progressivity would be less if behavioral responses and general equilibrium effects were taken into account. Galper, Lucke, and Toder (1988) find that GE effects do, in fact, erode the increase in progressivity. Finally, there has been some controversy about whether continuing increases in Social Security taxes after 1986 should be considered part of the tax reform package.

The numbers presented by Kasten and Sammartino (1987) and reported here in table 4.11, indicate the picture that emerges if some of these points are

Table 4.11 **Effective Combined U.S. Federal Tax Rates, with Constant 1988 Incomes (Estimates of Kasten and Sammartino)**

	Income-Indexed 1984 Tax Law: CIT Allocated to		Actual 1988 Tax Law: CIT Allocated to	
Decile	Capital Income	Labor Income	Capital Income	Labor Income
1	10.6%	10.5%	9.7%	9.6%
2	9.1	8.8	8.6	8.3
3	13.6	13.5	13.3	13.3
4	16.2	16.5	16.5	16.8
5	18.0	18.6	18.5	19.2
6	19.4	20.0	20.2	20.9
7	20.4	21.3	21.4	22.3
8	21.6	22.6	22.3	23.6
9	22.4	23.4	23.4	24.7
10	24.7	23.7	26.6	25.0
Total	21.5	21.6	22.7	22.7

Source: Kasten and Sammartino (1987), table 4, p. 159.

taken into consideration. They show that if an income-indexed version of all 1984 U.S. tax law had continued to apply in 1988, the overall federal tax system would have been quite a bit less progressive, irrespective of whether capital or labor bore the CIT burden. This comparison takes into account changes in Social Security taxes, as well as PIT and CIT. Thus, the impact of the full set of changes in federal taxes in the U.S. between 1984 and 1988 was very likely a considerable increase in progressivity.

Canada: Stage I

The main estimates of the incidence effects of Canadian tax reform are those produced by the federal government itself. On the government's assessment, the Stage I PIT changes would reduce by 1.5% the share of federal tax payable by the 76% of tax filers with income below $30,000, and increase it for groups above this level. Even those with incomes over $100,000 would experience an increased share of federal PIT, although a greater increase was projected for taxpayers in the $50,000–$100,000 range. As indicated in table 4.12, all income groups were projected to gain between 0.6 and 1.4% of income, with the percentage gains not moving up or down systematically as one goes up the income scale.

An alternative to the June 1987 White Paper calculations was provided by Maslove (1989), which, as described earlier, made use of the new SPSD database produced by Statistics Canada. For the most part his estimates were in reasonable agreement with the government's. However, he estimated a 2.1% gain for the top 1% of families, significantly higher than the government's figure for the top group, which gives the impression of marked regressivity at

Table 4.12 **Department of Finance Forecasts of Distributional Impacts of Canadian Tax Reform: Estimated Changes in Total Tax Burden**

Stage I Reform: PIT and CIT			Stage II Reform: GST[a]	
Income Group (thousands of 1988 $)	% of Households	Change as % of Income	Income (1991 $)	Change as % of Income
< 15	26.7%	−0.8%	15,000	−0.6%
15–30	30.9	−1.4	20,000	−0.9
30–50	24.0	−0.8	25,000	−1.6
50–100	16.2	−0.6	30,000	−0.8
> 100	2.2	−1.0	35,000	0.1
			40,000	0.4
			45,000	0.4
			50,000	0.4
			60,000	0.5
			75,000	0.8
			100,000	0.8

Sources: Stage I—Government of Canada, Department of Finance, *Tax Reform 1987, Income Tax Reform,* June 18, 1987, table 4.2, p. 33; Stage II—Government of Canada, Department of Finance, *Goods and Services Tax,* December 19, 1989, table 2, p. 34.

[a]The Stage II reform figures given here are for a single-earner couple with two children.

very high incomes. Part of the reason that Maslove obtained a larger gain for his top group than did the government is simply that his top group was cut off at a higher income level. As indicated in table 4.12, the government's top group included 2.2% of households, in contrast to Maslove's 1%. The government's own figures indicate rising benefits at the highest income levels, so that an income gain in excess of 1.0% for the top group would likely have been obtained for the top percentile, using the government's own procedures. The rest of the difference is apparently due to differences in how base changes were modeled.

Canada: Stage II

The rate of tax innovation in Canada has not slowed down much since the 1987 Stage I reform. In January 1991, under the Stage II reform, the MST will be replaced by the more broadly based GST, which will be levied at a rate of 7%. GST zero-rating for basic groceries and rent, the exemption of most services of financial intermediaries, and rebates intended to ensure that the tax burden on new houses does not rise, imply that the major change in federal sales tax coverage under GST is the extension of tax to nonfinancial services. There is very little implied change in the progressivity of the federal sales tax.[12] What is more important in redistributive terms is the enhancement of

12. According to the Department of Finance (1989) figures, for the most part the increase in sales tax liabilities is approximately proportional to income, breaking down only at very low income levels, where the increased burden is disproportionately large. This largely accounts for

the (refundable) sales tax credits. In 1990 the credits stand at $140 per adult and $70 per child, with a "phaseout threshold" of $18,000. The credit is taxed back at a 5% rate above this threshold. In 1991, the new GST credits will provide $190 per adult and $100 per child, or $580 for a family of four, versus $420 in 1990. In addition, the threshold will be raised to about $24,000.

The estimated net effect of replacing the MST by GST and increasing sales tax credits is shown here in table 4.12 for a single-earner married couple with two children. (Four other illustrative cases are detailed in the original Department of Finance document.) For the most part the impact appears to be progressive. Families with income below $30,000 gain between 0.6% and 0.8% of income, while there are increasing losses for higher-income groups. Note, however, that at the very lowest incomes gains are increasing relative to income, so that Stage II could be characterized as slightly regressive at the lowest income levels. (As argued in the next section, however, this may not be much of a concern when one takes a longer-term viewpoint than the annual.) And, once again, the impact at the highest income levels is obscured by not going very far into the upper tail. It is likely that losses as a percentage of income decline past the $100,000 family income level.

While the GST represents the official Stage II of tax reform, important income tax changes were introduced in the April 1989 budget, which modify the status of both the PIT and CIT. Continued concerns over the deficit led to an increase in the personal income surtax on all individuals from 3% to 5%, and the introduction of a high-income surtax at a rate of 3% on incomes over about $70,000. In addition, PIT phaseouts for family allowances and old age security pensions, which would see these payments taxed away at a rate of 5% for income in excess of $50,000, were introduced. The combined result of these measures is a considerable increase in marginal tax rates over the affected income range in Canada, and a pattern of declining marginal tax rates at high incomes for taxpayers with children or receiving OAS. These changes clearly go some way to reducing the divergence in treatment for high-income groups identified above in the official PIT reforms enacted in the two countries. They were supplemented by the introduction of a new Large Corporations Tax to be levied on corporate capital employed in Canada in excess of $10 million, at a rate of 0.175%.

4.6 Annual versus Lifetime Tax Incidence

As pointed out earlier in this paper, there is increasing impatience with the *annual* frame of most existing work on overall tax incidence. This finds

the fact that the percentage benefits indicated in table 4.12 (which include the impact of the enhanced sales tax credits) are lower for a family with an income of $15,000 than for a family with an income of $25,000.

expression in the work of Pechman (1985) and Browning and Johnson (1979), as discussed earlier and in the Appendix. There have been other notable examples of attempts to move toward something like a lifetime view of tax incidence. As argued earlier (e.g., with respect to indirect taxes), if lifetime views of the incidence of particular types of taxes differ from annual views, then the overall progressivity of Canada and the United States in tax mix may be quite different, depending on whether one takes an annual or lifetime viewpoint. It is therefore worth taking a closer look at how lifetime calculations differ from annual.

The tax rates we have been discussing each represent a ratio of a tax burden to some measure of income. It is therefore clear that lifetime tax rates can differ from annual because of nonproportionality of either lifetime tax payments or income with annual taxes or income. A complete move to a lifetime basis for incidence calculations requires estimates both of lifetime tax burdens and lifetime incomes. Pechman's "competitive" approach to property taxes and Browning and Johnson's approach to sales and excise taxes both correct the apparent tax burdens from annual data, essentially turning them into estimates of lifetime burdens. However, there is no attempt to adjust the denominator, and other tax payments continue to be annual rather than lifetime.

Other attempts to go part of the way toward lifetime incidence calculations include the approach to the estimation of sales and excise tax incidence pioneered by Davies (1959) and recently revived by Poterba (1989). The idea is to use consumption as a proxy for permanent income. This provides a reasonable correction in the case of sales and excise tax burdens, since if consumption is smoothed over the life cycle then the sales and excise tax payments in a particular year are also proportional to lifetime payments. Thus both the numerator (the tax burden) and the denominator (income) have been adjusted to a lifetime basis—if the permanent income model of consumption behavior is correct.

Both Davies and Poterba found that sales and excise taxes are much less regressive in their approach than in the usual procedure, embodied, for example, in the work of Pechman. Regressivity does not decline as much as in the work of Browning and Johnson, however, since the argument that there is a sources side effect between transfer and factor income is not taken into account.

While the Davies-Poterba technique works for sales and excise taxes, it would not work for taxes whose burdens fluctuate with changes in income from year to year or vary over the lifetime. Unfortunately, this category essentially includes most other taxes. Thus, in order to go any further it is necessary to make explicit estimates of lifetime tax burdens and lifetime income. Since we do not have longitudinal data covering entire lifetimes, and since if we did it would be of mostly historical interest, *simulation* of lifetime tax burdens and lifetime incomes is inevitably involved. Davies, St-Hilaire, and Whalley (1984) illustrated how such simulation could be carried out using only cross-

section data, under the assumption that cross-section data provides a snapshot of a society in balanced growth equilibrium.[13] Alternative approaches making some use of longitudinal data could of course be devised.

While the balanced growth assumption can be relaxed, and the simulation of lifetime income and tax stories can be made quite sophisticated, full estimates of lifetime tax incidence will inevitably remain somewhat less firmly grounded in actual observation than in annual estimates. Thus both approaches have a role to play, and one should expect to see both thrive in the future. It is not clear, however, that there is any benefit to "mixing and matching." As the following summary of the Davies, St-Hilaire, and Whalley ("DSW") results makes clear, a halfway house between annual and lifetime calculations may be worse than the pure form of either.

The DSW calculations used 1970 Canadian data and were based on the microsimulation model of earnings, saving, and inheritance reported in Davies (1982). They considered the pattern of hypothetical lifetime tax burdens for a cohort exposed to the 1970 tax system throughout their lives. Two main conclusions were emphasized. One was that, since the lifetime distributive series (e.g., consumption as a fraction of income) were much flatter than the annual, lifetime incidence calculations were much more robust to changes in shifting hypotheses than annual calculations. The other was that, somewhat surprisingly, overall lifetime incidence was about the same as annual. In both variants considered, both annual and lifetime incidence were mildly progressive.

The reason DSW did not find a sharp difference between annual and lifetime incidence lies in the fact that there are conflicting changes in the progressivity of different taxes when one moves to the lifetime. Both the personal income tax and taxes allocated to capital income become less progressive over the lifetime, but social security payroll taxes and taxes borne by consumers become less regressive. This is why it is dangerous to adopt lifetime incidence ideas piecemeal in conventional incidence analysis based on annual data. As we saw earlier, both Pechman, in his most redistributive variant, and Browning and Johnson denied the uses side effects of particular taxes, despite their effects on relative consumer prices, on the grounds that these uses side effects would disappear in the long run. What they did not realize, or at least did not take into account, is that other components of the tax system, such as PIT and CIT, would become less progressive over the lifetime.

There are other findings of DSW that become quite relevant in the current context. For example, the decline in PIT progressivity in going from the an-

13. If the cross-section represents a snapshot of a society in balanced growth, the incomes and tax burdens of successive age groups can be "blown up" to get estimates of the incomes and taxes of a *cohort* born in a particular year, as it moves through its lifetime. Alternative assumptions can be made about how individuals or families move around in the intracohort income distribution over time. These processes can be parameterized by reference to the considerable body of results now available on patterns of earnings and income mobility from longitudinal surveys.

nual to lifetime results featured a much larger change in effective tax rates at the bottom than at the top. Evidently earnings and income mobility at the bottom of the distribution ensures that the representative person with low lifetime income has moved around between the bottom several deciles of the annual income distribution, so that his lifetime tax rate is, roughly speaking, an average of the rates for the bottom several deciles. One implication is that the fact that, in both stages of Canadian tax reform the very lowest income groups benefit less, proportionally, than the slightly higher groups, may largely "wash out" in lifetime data. While the regressive incidence of the benefits in annual data is naturally of *some* concern, the lifetime viewpoint indicates that that concern should not be exaggerated.

Finally, table 4.13 summarizes the progressivity rankings of alternative taxes in annual and lifetime data, in alternative shifting variants. Table 4.13 shows, first, that in all variants and in both annual and lifetime data, personal income tax is always the most progressive element in the tax system. Thus, the recent increasing relative importance of PIT in Canadian tax mixes likely makes for a more progressive tax system, overall. But the table also indicates a remarkable contrast between annual and lifetime stories. Again, the lifetime results are much more robust, indicating a unique ranking of the alternative

Table 4.13 **Annual versus Lifetime Progressivity Rankings of Alternative Taxes (Canadian Data)**

	Incidence Variant		
Tax	Competitive	Noncompetitive	Browning & Johnson
1. *Whalley (1984): Annual*			
PIT	1	1	1
CIT	2	2	3
Indirect	5	5	2
Property	3	4	3
Social Insurance	4	3	5
2. *Davies, St-Hilaire, and Whalley (1984): Lifetime*			
PIT	1	1	1
CIT	2	2	2
Indirect	4	4	4
Property	2	2	2
Social Insurance	5	5	5

Sources: Part 1—Whalley (1984), table 3, p. 662. Part 2—Davies, St-Hilaire, and Whalley (1984), tables 2, 3, pp. 643, 644.

Notes: Part 1 estimates are based on 1972 Canadian data; Part 2 estimates are based on 1970 Canadian data. The "competitive" and "noncompetitive" cases in part 1 are, respectively, the Pechman and Okner most progressive and least progressive variants; in part 2, they are, respectively, the central and noncompetitive cases in Davies, St-Hilaire, and Whalley (1984). Progressivity is measured here by taking the ratio of the effective tax rate of the top income group to that of the bottom group; in part 1, the top group has 8.6% and the bottom group has 16.6% of the population; in part 2 the top and bottom groups are deciles.

taxes according to progressivity, whereas in the annual data the progressivity ranking depends very much on the incidence variant considered.

In the annual data the corporate income tax ranks next to the PIT in terms of progressivity, and indirect taxes (sales and excise) are the worst, except under the Browning and Johnson assumption, in which the apparent progressivity of sales and excise taxes becomes so great that they nudge aside CIT for the second most progressive position. The relative ranking of property taxes and social insurance contributions also varies between the shifting variants.

In the lifetime data, the taxes always rank as follows, in order of descending progressivity: PIT; CIT and property taxes; sales and excise taxes; social insurance contributions. For comparing overall U.S. and Canadian tax incidence, this ranking may be highly significant. By far the most important global difference in the U.S. and Canadian tax systems is that, in terms of revenue, sales and excise taxes occupy approximately the position in Canada that social insurance contributions have in the U.S. On the basis of the annual results, it would appear that the Canadian tax system is therefore less progressive, unless one adopts the Browning and Johnson viewpoint. However, the lifetime results tell a different story: sales and excise taxes are more progressive than social insurance contributions under each of the competitive, "non-competitive," and Browning and Johnson shifting scenarios. This agreement suggests that if we try to evaluate the difference in incidence between Canada and the U.S. from something like a lifetime viewpoint, the replacement of social insurance contributions by greater sales and excise taxes in Canada, relative to the U.S., tends to make the overall Canadian tax system more progressive than the U.S. tax system.

4.7 Conclusion

This paper has studied the role of tax systems in Canada and the U.S. in helping to determine the distribution of real income and the overall degree of economic inequality. We have found that there are important similarities between the two countries. Transfer payments equalize the distributions of income to about the same extent, and individual taxes appear to have similar impacts on the shape of the income distribution. However, there are also some significant differences between the countries.

One important difference between Canada and the U.S. is that Canada now relies more heavily on the most progressive tax source, personal income tax. This is partly the result of recent PIT increases, but also reflects the fact that PIT is a relatively more important revenue source for Canadian provinces than for U.S. states. This difference in tax mix tends to reduce the overall progressivity of the U.S. tax structure relative to the Canadian.

Another important difference in tax mix between the two countries reflects the contrasting roles of sales and excise taxes and social insurance contributions. Sales and excise taxes are relatively more important in Canada, which

has a federal sales tax; social insurance contributions are more important in the U.S., which funds its old age pensions entirely from such contributions. In studies of overall tax incidence using annual data, this difference has ambiguous consequences. However, Davies, St-Hilaire, and Whalley (1984) found that sales and excise taxes are approximately proportional from a lifetime viewpoint, whereas social insurance contributions are markedly regressive. This conclusion is robust to alternative shifting hypotheses. Thus, the difference in tax mix also suggests that, overall, the Canadian tax structure is more progressive than the U.S.

The conclusion that the U.S. tax system is less equalizing than the Canadian is especially interesting in view of the fact that the distribution of income *before* transfers and taxes is now significantly more unequal in the U.S. than in Canada. As argued in section 4.2, there is therefore some truth in the perception that Canada is "more equal" than the U.S., and the differences in taxation act to widen the gap.

We have also examined how the overall impact of taxes on income distribution has changed in Canada and the U.S. over the last two decades. It is useful to consider the last two decades as a whole, and then to turn to the last five or six years separately. The early 1970s saw similar progressivity in estimates of overall U.S. and Canadian tax incidence. Since then, overall progressivity in the two countries has been affected by changes in tax bases, rate structures, and tax mix.

The trend in income tax bases over the last two decades initially was toward additional tax expenditures, but has recently been toward their removal, turning us in the direction of the early 1970s starting point. The absence of bracket and exemption indexation through most of the period reduced progressivity of the U.S. federal income tax sharply. Canada, in contrast, had indexation throughout the subperiod with highest inflation, and introduced measures like child and sales tax credits, which reduced tax burdens on low-income families significantly. Finally, the shift in tax mix in the U.S. has been toward rising social insurance contributions, whereas in Canada it has been toward increasing PIT. Hence, the U.S. has seen a buildup of one of the least progressive tax sources, while Canada, in contrast, has seen an increase in the importance of the most progressive form of taxation. The conclusion seems to be that, over the last two decades as a whole, the overall Canadian tax system has likely become more progressive than the U.S. tax system.

Turning to the last five or six years, underlying inequality in pretax income has continued to rise in the U.S., but U.S. tax reform has unambiguously increased overall progressivity. Since U.S. progressivity has not returned to its 1970 level, however, the much-increased underlying income inequality means that the U.S. after-tax distribution of income is now much less equal than it was in 1970. In Canada, PIT changes in the immediate prereform period (1985–87) produced a redistribution of relative income away from the middle toward both extremes. Families at the bottom gained disposable in-

come, whereas those at the top saw small losses. Stage I of tax reform was projected to reduce PIT burdens at all levels, but the introduction of federal surtaxes calls into question whether this has actually occurred. There is some evidence that the reduction in the top marginal tax rate was not sufficiently offset by base broadening to prevent the reform from reducing progressivity at very high income levels. Stage II is projected to be more definitely progressive, so that the overall reform may turn out to have been mildly progressive, overall.

Thus, although over the last two decades overall Canadian tax progressivity has likely increased relative to that in the U.S., and after-tax income inequality has increased markedly in the U.S. relative to Canada, in the last five or six years progressivity changes in Canada have been mixed, whereas in the U.S. they have clearly been in the direction of increased progressivity.

What is the outlook for the future? The most significant factor is that the Canada-U.S. contrast on bracket indexation has now switched. In the 1970s and early 1980s, Canadian taxpayers benefited from full bracket indexation, while taxpayers in the U.S. suffered every year from strong "bracket creep." Now the shoe is on the other foot. Canadian taxpayers will suffer regular 3% bracket creep, as long as the inflation rate remains in excess of 3%. The outlook is therefore for a continued shift in the tax mix toward PIT, and an increasingly less progressive PIT. Taking into account other factors, such as the absence of estate and gift taxes in Canada, indicates that the trend of the 1970s and early 1980s toward increased progressivity in Canada compared with the U.S. may be reversed. As far as taxes are concerned, it may become steadily less true that Canada is "more equal" than the U.S., even if greater inequality of pretax income in the U.S. and more generous Canadian health and welfare policies continue to make Canada less unequal overall.

Appendix
Methods of Assessing Tax Incidence in Annual Data

The goal of tax incidence studies, in a famous phrase, is to estimate "who pays the taxes." A fundamental difficulty is that the true incidence of a tax generally departs from its statutory incidence. Increased excise taxes on tobacco, for example, may hurt not only smokers (who bear the statutory incidence), but also tobacco farmers and the owners of the large tobacco companies and their workers. The corporate income tax may be borne partly by owners of capital other than corporate equity, workers, consumers, or even foreigners. Property taxes are shared in some fashion by landlords and tenants. And so we could go down the list. Clearly the task of estimating (in

truth, guessing) the ultimate incidence of all these taxes is extremely demanding.

Despite the conceptual and computational burdens of estimating overall tax incidence, such estimates have been painstakingly put together for both the United States and Canada, as well as for many other countries. There have been two main approaches. These are often labeled the *partial* and *general* equilibrium approaches, although this terminology is somewhat misleading. The general equilibrium approach specifies, and solves, a complete general equilibrium model of the economy with taxes. The partial equilibrium approach, on the other hand, is more of an accounting exercise. On the basis of often only implicit theorizing, its proponents propose a "shifting hypothesis" for each tax. With a consistent database, including all the relevant "distributive series," it is possible to compute the hypothetical incidence of each tax and to aggregate to get overall incidence. The difficulty with this approach is that one cannot be sure that the shifting hypotheses are mutually consistent, or could be generated by a fully specified model of an economy with taxes. There is nothing to stop the implicit theorizing from being general, rather than partial equilibrium in nature, however, or from being made explicit.

In order to understand the alternative shifting hypotheses that are typically employed in the partial equilibrium approach, note that taxes can have their incidence effects either on the *sources* or *uses* side of household budgets. If a proportional tax on labor, for example, reduces labor income relative to other factor incomes, there is a "sources side effect," which can be captured by distributing the relevant tax payments across households in one's dataset, in proportion to their labor income. In principle, the same tax could also have uses side effects, since it might alter the relative price of different goods. (This will not necessarily occur. If the stock of labor is fixed, in a competitive economy a tax on labor will be borne entirely by labor, and there will be no changes in relative prices of goods.) In practice, such a uses side effect would likely be ignored in partial equilibrium tax incidence calculations, on the grounds that it is too difficult to trace through the likely relative price changes and their effects. An excise tax on a particular commodity (e.g., alcohol or tobacco) may have its principal effect on relative prices of consumer goods, the impact on relative factor rewards being negligible. It then has its effect on the uses side, and the burden of the tax would be allocated in proportion to expenditures on the taxed commodity across different households. Finally, some taxes, like a flat comprehensive income tax, might be regarded as having *neither* sources nor uses side effects, if they did not disturb either relative factor rewards or relative consumer prices.

Partial equilibrium incidence calculations by Pechman have figured importantly in this paper, both in tracing changes over time in the impact of taxes on income distribution in the U.S., and in performing Canada-U.S. comparisons. Pechman's "most progressive variant" is based on an implicit competi-

tive model of the economy, with fixed stocks of all factors of production and free factor mobility (Pechman 1985, pp. 35–36). In such a model, given the fixed factor supplies, broad-based taxes on factor income, such as PIT and social security payroll taxes, are not shifted. The burden of a sector-specific factor tax, however, will affect factor owners outside the taxed sector equally with those in the taxed sector (since factor rewards are the same in all sectors due to free mobility), and may, in principle, be shifted onto consumers or workers. Harberger (1962) suggested that the corporate income tax could be modeled as a tax on capital used in the corporate sector, and computed the incidence of such a tax using U.S. data for the 1950s in a simple two-sector general equilibrium model. He found that capital appeared to bear about 100% of the burden of CIT. Pechman's most progressive variant is very much in this spirit, except that it allocates only one-half of the CIT burden to capital in general. The other one-half is allocated to holders of corporate equity (dividend recipients), presumably on the argument that in the real world there is some departure from perfect long-run sharing of CIT burdens among all capital owners.

Pechman's "most progressive" treatment of the property tax is based on reasoning that reflects the degree of sophistication in current discussions of tax incidence, as well as the increasing importance being placed on taking something more like a lifetime, rather than merely an annual, viewpoint.

For structures and improvements, Pechman's analysis of the property tax parallels that of the corporate income tax. A tax on a particular *type* of capital is analytically similar to a tax on capital in a particular sector, and so the competitive model would suggest that the component of the tax on structures and improvements borne by capital is shared equally by *all* capital. However, an interesting contrast with CIT is that it is not difficult to discern uses side effects in annual data. In equilibrium the tax on structures and improvements raises the price of housing relative to other goods, so that part of the burden should be allocated according to housing expenditures. Since housing is a fairly strong necessity in annual data, this part of the exercise would make the property tax appear regressive. Interestingly, Pechman (1985) decides to ignore such uses side effects in his competitive variants, on the grounds that the elasticity of housing expenditure with respect to *permanent* income is close to unity. In other words, he would ideally like to use a much longer time frame than a single year, and is prepared to ignore spurious annual incidence effects even if he is constrained to use annual data by the exigencies of available data. This kind of reasoning was extended further, by Browning and Johnson (1979) in their treatment of sales and excise taxes. Such accommodations to the lifetime viewpoint turn out to have major effects on perceptions of tax incidence, although it is questionable whether they should be performed on an ad hoc or piecemeal basis.

Turning to the other component of property taxes, the traditional assumption, embodied here in the "least progressive" variant, has been that a tax on

unimproved land is borne by landowners. Pechman (1985, p. 34) reports some recent interest in an alternative view that the tax on land may have no effect on landowners if it is part of a general tax on capital. The general tax reduces the after-tax rate of return, and therefore the discount rate applied to after-tax rents in computing the value of a piece of land. The result is that the value of the land does not change, and landowners do not suffer relative to owners of other capital. The tax on land is therefore borne by owners of capital in general, it is argued.

Finally, in Pechman's most redistributive variant, sales and excise taxes are assumed to have their effects solely on the uses side. While sources side effects of selective sales taxes are a possibility, as pointed out above, tracing them through is too daunting without an explicit general equilibrium model.

Pechman's "least redistributive variant" is based on various concessions to the view that, given conditions like imperfections of competition or immobility of some factors in the real world, things may not work as nicely as portrayed in the most progressive variant. It is still assumed that PIT and social security payroll taxes are not shifted, and that sales and excise taxes continue to be borne by consumers. The half of the corporate income tax attributed to dividends, however, is now allocated to consumers; the property tax on land is allocated to landowners, following the traditional view; and the property tax on improvements is allocated to shelter and consumption. The tendency to view more of the tax burden as shifted forward onto consumers results in reduced apparent progressivity of the overall tax system, since consumption declines fairly sharply as a fraction of income as we go up the income scale, in contrast to dividends or capital income.

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