Public policy and saving in the United States and Canada

JOHN SABELHAUS Congressional Budget Office

Abstract. Canadians have largely unrestricted access to tax-preferred saving through the Registered Retirement Saving Plan (RRSP) programs. No comparable program exists in the United States. Previous research has noted that household saving in Canada grew relative to saving in the United States after the RRSP program was initiated, suggesting that a program like the RRSP can increase saving. This paper shows that the difference in household saving in the United States and in Canada is more plausibly characterized as a simple life-cycle response to differences in the overall intertemporal income reallocation built into tax and public pension systems, rather than as a response to RRSP availability.

Politique publique et épargne aux Etats-Unis et au Canada. Les Canadiens ont un accès à peu près sans restriction à une épargne exemptée d'impôt par le truchement du Régime Enregistré d'Epargne-Retraite (REER). Il n' y a pas de programme similaire aux Etats-Unis. Des recherches antérieures ont noté que l'épargne des ménages a augmenté au Canada par rapport à celle des ménages aux Etats-Unis après la mise en oeuvre du REER. Voilà qui suggère qu'un programme comme le REER peut augmenter l'épargne. Ce mémoire montre qu'on peut attribuer l'écart entre les taux d'épargne entre les deux pays à une réponse correspondant au cycle de vie à des différences dans le mécanisme global de redistribution du revenu dans le temps qui est inscrit dans les régimes de taxation et de rentes publiques des deux pays, plutôt qu'à la possibilité d'utiliser les REER.

I. INTRODUCTION

This paper investigates the effect of public policy on household saving using a comparative analysis of the United States and Canada. The comparison is useful

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because the two economies are generally similar, with one notable exception in public policy towards household saving – Canadians have largely unrestricted access to before-tax saving through the Registered Retirement Saving Plan (RRSP) program. In the United States access to tax-preferred saving is limited by employer-sponsorship of 401(k) or other voluntary salary-reduction plans, or limited by low contribution ceilings on Individual Retirement Account (IRA) contributions for those lacking employer-sponsored pension coverage. After the RRSP program was introduced in the early 1970s, household-level saving in Canada grew faster than saving in the United States, and the differential trends cannot be attributed to macroeconomic conditions or other underlying influences (Carroll and Summers 1987), which suggests that RRSPs increased Canadian saving. This conclusion is supported by microeconomic evidence that shows younger Canadian cohorts, who have been exposed to RRSPs longer, are saving more than older cohorts (Venti and Wise 1994).

This paper takes an alternative approach to assessing how a program like the RRSP affects saving, because a clear relationship between policy changes and aggregate saving rates over time is difficult to identify. Although the increased availability of RRSP accounts in the early 1970s occurred at the beginning of a strong upward trend in Canadian saving, that trend has since reversed. Much of the relative growth in Canadian saving through the early 1980s was associated with a dramatic cyclical reduction in household gross borrowing, which drove a wedge of nearly 6 percentage points between U.S. and Canadian saving rates in 1982. After the early-1980s the Canadian saving rate settled down to around 2 percentage points above that in the United States, even though a simple causal link between tax preferences and saving would imply that Canadian saving should have increased even more relative to saving in the United States.

In addition, a closer look at the aggregate saving data shows much more similarity between the two countries than a simple causal relationship between tax preferences and saving would suggest. Most important, decomposition of saving into before-tax (expecially retirement-oriented) and after-tax accounts indicates the same general patterns of wealth accumulation in the two countries over time. The only notable difference is that before-tax saving in the United States is primarily through employer-sponsored accounts, while in Canada the individual accounts play a much larger role.

This underlying similarity in the way people save in the United States and in Canada helps to motivate the alternative approach to assessing policy effects used here. The analysis begins by measuring the extent of intertemporal income reallocation built into public pension and tax systems in the two countries. The calculations show how replacement rates – the ratio of consumption in retirement to consumption while working – vary across income groups and for alternative saving rates, thus effectively mapping out the empirical intertemporal budget constraints faced by consumers. The stylized calculations suggest that, holding income constant, a Canadian needs to save more than a comparable American to achieve the same intertemporal consumption smoothing.

The empirical budget constraints generated by the stylized calculations can in principle be used to assess whether differences in wealth accumulation across groups are consistent with stable patterns of consumption smoothing across groups. As noted in the section on aggregate trends, however, pension-wealth accumulation accounts for the bulk of personal saving in both the U.S. and Canadian economies, so differentials in non-pension wealth holdings will not be very informative. The empirical strategy suggested, therefore, is to assess whether pension coverage across income groups in the two economies is consistent with the differences in intertemporal income reallocation. In fact, Canadian pension coverage rates are much higher in the middle of the income distribution, which is consistent with the replacement rate differentials generated in the consumption-smoothing calculations.

Pension coverage rates are lower in Canada than in the United States at the upper tail of the income distribution, however, which is problematic for the consumption-smoothing view, because the differences in policy towards saving most affect high-income families. This observation actually completes the description of why saving behaviour differs, because only high-income families in Canada make persistent and quantitatively significant use of the RRSP program. Further, there is an important parallel here, because the most important part of voluntary retirement saving in the United States (through employer-sponsored 401(k) plans) also has a strong correlation with income.

The paper proceeds as follows. In the next section a closer look at aggregate saving trends shows there has been significant compositional change in saving in both countries over time. In particular, most of the fluctuation in household saving over the last fifteen years in both countries has been associated with large swings in gross borrowing, as opposed to gross saving. Also, there has been a dramatic secular increase in the amount of saving accounted for by pensions and other retirement-oriented saving. In the third section a simple analytical framework is presented, which is designed to highlight key differences in the ways that public policy in the United States and Canada redistributes income intertemporally. In the fourth section the framework is combined with public pension and tax system parameters in calculations that show the relationship between saving and intertemporal consumption smoothing. In the last section some observations are presented about the distribution of saving and pension coverage across both countries, which also indicate the importance of using a realistic intertemporal budget framework.

II. AGGREGATE SAVING IN THE U.S. AND CANADA

The methodological approach used in this section – studying the relationship between public policy and saving over time using United States and Canada as a natural experiment – follows that of an earlier study by Carroll and Summers (1987). They observed that Canadian saving was rising rapidly at the same time as U.S. saving was stagnant or falling, and they looked to differences in public policy as (at least part of) the explanation. In this section more recent data and conceptual corrections to the saving measures are used to suggest that private saving in the United States and Canada is more similar than Carroll and Summers found.

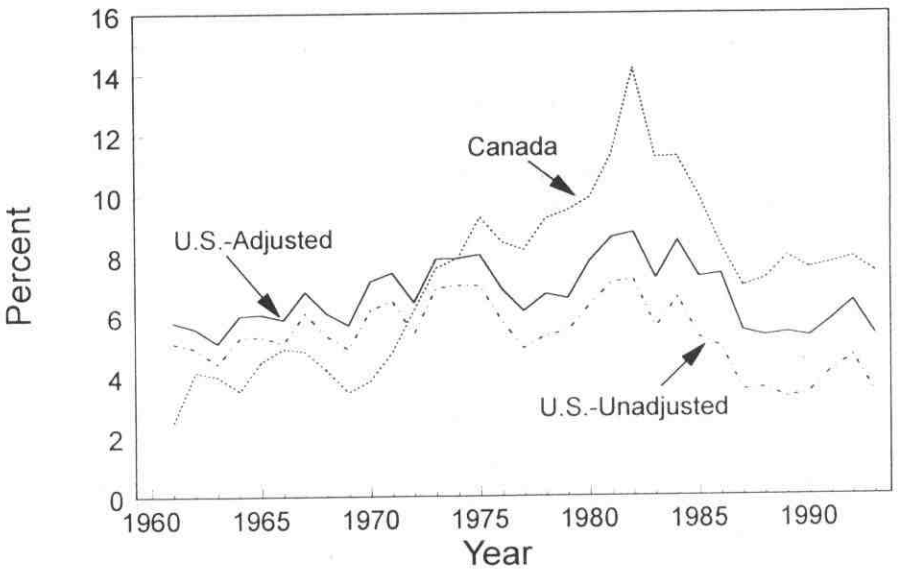

FIGURE 1 Personal saving as a share of Net National Product

SOURCES: U.S. National Income and Product Accounts; Canadian Income and Expenditure Accounts

The underlying saving differential Carroll and Summers observed is shown in figure 1 – though it is important to note a few reasons why the saving trends they observed are no longer as evident in the data. First, the data series available to Summers and Carroll ended in 1985, which was near the peak in Canadian saving. Second, the unadjusted National Income and Product Accounts (NIPA) personal saving rate they presented is not comparable to the Canadian personal saving rate, because it does not include accumulation in insured government employee pension funds (Bosworth, Burtless, and Sabelhaus 1991). Federal Reserve Board data on net acquisitions by government pension funds are used to supplement NIPA personal saving in figure 1 and lead to an adjusted saving rate that is some 2 percentage points higher. Though the pattern is similar, the gap in U.S. and Canadian saving rates is only half as large. Finally, the estimates in figure 1 differ from those available to Summers and Carroll because of data revisions – the U.S. saving rate was revised upward for the early 1980s after their paper was written, and thus the decline in saving was shifted past 1985.

In retrospect, it is still clear that there was a growing divergence between U.S. and Canadian saving rates in the 1960 to 1985 period. Canadian personal saving – shown in figure 1 as a percentage of Net National Product (NNP) – rose from an average of about 4 per cent in the 1960s to nearly 12 per cent in the early 1980s. In the United States, personal saving in the early 1980s was little changed from what it had been in the 1960s and 1970s, even after accumulations in government

pension funds are included. Carroll and Summers conjectured that, along with other possible causes, the trend divergence in saving rates was caused by the expansion of tax preferences for saving in Canada.

But the trend divergence in saving rates that motivated Summers and Carroll to recommend Canadian saving policy as a model for the United States reversed after the mid-1980s, even though the difference in tax policy was actually expanding. The Canadian saving rate declined to an average of about 8 per cent in the late 1980s and thereafter, at the same time as RRSP availability and limits were being expanded. In the United States, personal saving is averaging about 6 per cent of NNP. The low and stable rate of personal saving in both U.S. and Canadian saving rates since the late 1980s is the new phenomenon to be explained. Thus, in the remainder of this section we focus on the underlying components of aggregate saving.

The patterns of gross borrowing and saving in the United States and Canada over time are shown in table 1. The first point to note is that the spike in Canadian net saving in the early 1980s was caused largely by a decrease in borrowing associated with the recession. Gross borrowing fell from 6.8 per cent of net national product in the 1970s to only 2.9 per cent in the early 1980s. In contrast, gross borrowing in the United States did not fall much, and gross positive saving in both countries was virtually unchanged. After 1990 gross borrowing fell in both countries, after having been at historically high levels in the late 1980s.[1] Gross saving fell in both countries after 1990 as well, so that net saving remained at the low rates observed in the late 1980s.

The long-run composition of net saving in both countries shown in table 1 is remarkably stable. In the United States, gross saving and borrowing rates, and hence the net saving rate, are currently about the same as they were in the 1960s. The only significant change is the shift in the composition of borrowing from consumer debt to mortgages. In Canada, overall gross borrowing is about the same now as it was in the 1960s, but the gross saving rate is some 3 percentage points higher.

The long-run constancy of U.S. saving and moderate increase in Canadian saving, however, obscure a dramatic change in the allocation of saving across before- and after-tax vehicles that has occurred in both countries. The primary before-tax vehicles for saving are directly retirement related, meaning pensions and individual retirement accounts, though life insurance also gets partial prefer-

1 Engen and Gale (1995) also study the increase in borrowing rates in the United States after 1985, focusing on the ratio of mortgage debt to the value of owner-occupied real estate. It is interesting to note in table 1 that the growth in Canadian mortgage borrowing occurred at the same pace as it did in the United States, despite the fact that mortgage interest is not tax deductible in Canada. In Canada, however, borrowing through consumer debt also increased after 1985, while in the United States it fell dramatically. The shift away from consumer debt in the United States (relative to Canada) after 1985 is consistent with the results on taxation and debt composition in Maki (1995).

TABLE 1
Gross saving, gross borrowing, and net saving in the United States and Canada (per cent of Net National Product)

	1961–70		1971–80		1981–5		1986–90		1991–3	
	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada
Gross personal saving	9.3	8.2	12.4	14.8	13.0	14.5	11.8	14.0	9.4	11.5
Less gross borrowing	3.3	4.3	5.3	6.8	5.0	2.9	6.0	6.3	3.6	3.8
Mortgage	2.2	2.9	3.9	4.8	3.5	2.2	5.0	4.8	3.3	3.5
Consumer	1.1	1.4	1.4	2.0	1.5	0.7	1.0	1.5	0.3	0.3
Equals net personal saving	6.0	4.0	7.2	8.1	8.1	11.6	5.8	7.6	5.9	7.7

SOURCES: U.S. National Income and Product Accounts and Flow of Funds Household Balance Sheets; Canadian Income and Expenditure Accounts and Household Balance Sheets

ential (untaxed build-up) treatment in both countries. The decomposition of net saving into retirement and other components over time is shown in table 2.[2]

Dramatic growth in retirement-oriented accounts has dominated saving trends in both the United States and Canada. Pension fund accumulation in the United States shot up from 2 per cent of NNP during the 1960s to over 4 per cent in the early 1990s and, combined with significant saving in individual retirement accounts, now comprises virtually all of net personal saving. Total retirement saving in Canada has grown in similar proportions, from less than 2 per cent of NNP in the 1960s to about 5 per cent now. Most of the growth in Canadian retirement saving, however, is attributable to increased use of RRSPs, which now account for as much saving as traditional pension plans.

The lion's share of retirement saving in the United States is in pension plans. Though the data used to produce the U.S. pension-saving series in table 2 do not allow us to distinguish types of pension plan saving, other research (e.g., Gale 1994) has indicated that a large and growing fraction of U.S. pension saving is in the form of voluntary 401(k) plans. There are important similarities between RRSPs and 401(k)s: both are voluntary salary reduction agreements, and both provide before-tax treatment on contributions up to about $10,000.[3] It may be the case that the 401(k) plan is serving the same institutional role as the RRSP does in Canada; the fact that employer-sponsorship is needed for the 401(k) may be unimportant.

Thus, the conclusion from table 2 is that retirement saving has grown to encompass nearly all of net personal saving, and the remaining component is mainly life insurance, which also has tax-preferred treatment. Combining this with the observations from table 1, before-tax saving in the 1990s is accounting for over 60 per cent of gross saving in both countries. The growing importance of retirement-oriented saving in both countries helps to motivate the consumption replacement-rate framework developed in the next section.

III. MODELLING THE EFFECT OF PUBLIC PENSION AND TAX SYSTEMS ON SAVING

The goal in this section is the development of a framework useful for assessing how differences in public pension and tax systems affect saving.[4] The approach is to model how consumption possibilities over the life cycle are affected by public

2 The decomposition of U.S. saving begins with the adjusted saving series in figure 1. The pension and life insurance saving estimates are from the Flow of Funds balance sheets, and the individual retirement saving is based on changes in IRA/Keogh balances reported in Employee Benefits Research Institute (1995). The retirement account saving estimates have estimated capital gains netted out. Other saving is simply the residual. This mimics the estimates generated by Statistics Canada that go directly into table 2. See Bosworth (1994) for an alternative decomposition of saving that leads to the same conclusion about trends in types of saving.

3 RRSP and 401(k) plans are even more important when viewed along with pension coverage trends. Since 1980 traditional private pension coverage rates in both countries are stable or falling (Leckie and Caron 1991; Beller and Lawrence 1992).

4 A good overview of U.S. and Canadian public policy towards saving can be found in Poterba (1994) and Burbidge and Davies (1994a).

TABLE 2
Decomposition of personal saving, United States and Canada (per cent of Net National Product)

	1961–70		1971–80		1981–5		1986–90		1991–3	
	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada
Net personal saving	6.0	4.0	7.2	8.1	8.1	11.6	5.8	7.6	5.9	7.7
Retirement	2.0	1.4	3.7	2.8	6.7	4.3	5.7	4.6	5.6	5.0
Pensions	2.0	1.3	3.7	2.0	5.4	2.7	4.4	2.4	4.2	2.5
Individual	na	0.1	na	0.8	1.3	1.6	1.3	2.2	1.4	2.4
Life Insurance	0.7	1.3	0.5	1.5	0.3	1.7	0.6	1.9	0.5	2.0
Other	3.3	1.3	3.0	3.7	1.1	5.6	−0.5	1.2	−0.2	0.7

SOURCES: U.S. National Income and Product Accounts, Flow of Funds Household Balance Sheets, and Employee Benefits Research Institute (1995); Canadian Income and Expenditure Accounts

pension and tax system parameters – in effect, solving for empirical versions of complicated intertemporal budget constraints. The comparison of derived Canadian and U.S. consumption possibility sets provides significant insight into the differentials in saving behaviour across the countries, and it is potentially useful for explaining the differences in saving across the two countries.

Consider a two-period model where earnings are equal to E in the first (working) period, there is a payroll tax schedule of τ^E and an income tax of τ^{YW}. Saving during the working period is denoted by S. Working-period consumption is then

$$C^W = E - \tau^E(E) - S - \tau^{YW}(E, S, \tau^E(E)). \tag{1}$$

Income taxes depend on earnings and the before-tax component of savings and possibly the payroll tax if it is excluded from the base, which is so in Canada and partly so in the United States.

Consumption in the retirement period depends on public pension benefits received, B, which in turn depend on earnings in the working period, saving in the first period, and the retirement period income tax rules τ^{YR}.[5] That is,

$$C^R = B(E) + S(1 + r) - \tau^{YR}(B, S(1 + r)). \tag{2}$$

The notation indicates that public pension benefits are included in the tax base in the second period. Canada's public pension system is basically before tax, while the U.S. system is a hybrid: employer contributions are before tax, employee contributions are after tax, and benefits are partially taxable for high-income recipients.

The standard approach to predicting the impact of tax and public pension policy on saving is to specify a utility function that has working and retired consumption as arguments and then use simplified versions of equations (1) and (2) to search for the point where the ratio of marginal utilities is equal to the rate at which resources can be moved across time periods. In the standard examples the rate at which resources can be moved from the working to retired periods is either the before or the after-tax interest rate.[6]

The more general specification for consumption possibilities in (1) and (2), however, indicates that the effect of public policy on saving is potentially more complicated. First, there is no obvious link established between payroll taxes levied

5 The calculations do not consider that the concept of consumption itself may be different across the two countries. One example is that medical care is purchased through the government in Canada; hence, that component of 'consumption' shows up as a tax. In the United States, out-of-pocket medical care not paid for by employers during the working period shows up in family budgets, but the employer share shows up as lower earnings. When retired, people in the United States receive most of their health care through Medicare, but there are still significant out-of-pocket expenses. See Acs and Sabelhaus (1995) for a discussion of trends in employer, government, and household sector shares of health care costs in the U.S. The differences in health care may be an important determinant of saving behaviour across the countries, and possibly more significant for explaining differences in retirement behaviour; Madrian (1994) shows that the availability of health insurance is an important determinant of retirement behaviour.

6 Two good examples of this approach in the case where limited tax-preferred saving vehicles are available are Ragan (1994) and Burman, Cordes, and Ozanne (1990).

during the working period and public pension benefits received. The actual link has varied across time as public pension systems were phased in, and across income groups within every time period, because the systems are set up to be redistributive. Public pension systems in both countries redistribute significant resources across income groups, and retirees over the last couple of decades have received significant intergenerational transfers as their benefits have exceeded contributions during their working lives (Burbidge 1995; Gokhale, Kotlikoff, and Sabelhaus 1996). Thus, predicting saving for current retirees and lower-income groups is complicated by the fact that their need to save is significantly reduced by public pensions.

The second point to make is that saving through tax-preferred accounts is often characterized as 'eliminating' the tax on saving, but in fact it may actually be providing better than backloaded (i.e., no tax on interest) treatment if marginal tax rates fall between working and retired periods (Engen, Gale, and Scholz 1994). Marginal tax rates do indeed fall for a significant portion of the income distribution over much of the feasible saving range, where 'feasible' is used to characterize loosely the levels of saving for which the ratio of retired to working consumption is reasonable. The extent of tax benefit beyond backloaded (or proportional consumption-tax) treatment depends on the underlying tax system parameters.

The calculations in the next section, using U.S. and Canadian policy parameters, are intended to highlight the points made above, that differentials in public pension benefits and tax treatment of saving may dramatically change empirical budget constraints. The calculations do not attempt to provide an exact solution for the allocation of consumption between working and retirement periods, because those types of solutions require assumptions about utility functions and expectations that are beyond the scope of this paper.[7] Rather, the calculations rely on the fact that empirical research on income and consumption over the life cycle (Burbidge and Davies 1994b; Robb, Magee, and Burbidge 1992; Robb and Burbidge 1989; Attanasio 1994; Sabelhaus and Schneider 1995) indicates a range of saving rates to be considered.

IV. PUBLIC POLICY TOWARDS SAVING IN THE UNITED STATES AND CANADA

In this section stylized calculations are presented that show how public policy towards saving differs between the United States and Canada. The goal is to identify salient differences rather than provide a comprehensive assessment, so the approach is to use a stylized set of assumptions with minimum parameterization that is just enough to indicate differences in public pension plans and the general structure of income taxation. After a brief description of important differences in policy

7 The assumptions needed to do those calculations would also beg the question of how saving responds to changes in tax incentives, which is the focus of several micro-level studies that reach varying conclusions. For example, Engen, Gale, and Scholz (1994) and Poterba, Venti, and Wise (1994) have focused on the effect of U.S. tax-based saving incentive programs, and Venti and Wise (1994) have looked at RRSPs in Canada.

TABLE 3
Public Pensions in the U.S. and Canada, 1992

	United States	Canada
Programs	Social Security	Old Age Security (OAS) Guaranteed Income Supplement (GIS) Canada/Quebec Pension (CQPP)
Taxes	Both employees and employers pay 6.2 per cent up to $55,500.	For CQPP, both employees and employers pay 2.4 per cent between $2,560 and $25,760.
Benefits	Benefit is 90 per cent of first $5,064 earnings, 32 per cent of next $25,476, and 15 per cent of next $24,960, where earnings is based on (up to) a thirty-five-year average of actual earnings adjusted for aggregate wage growth. When other income exceeds $25,000, 50 per cent of benefits are taxed.	Basic OAS is $3,600; basis GIS is $4,300. GIS is taxed back at a rate of 50 per cent on any income above OAS + GIS. OAS is included in taxable income and taxed back at 15 per cent for net income above $43,000, equal to zero at $67,000. CQPP benefit is 25 per cent of average earnings up to maximum taxable, where earnings is based on a ten-year average adjusted for aggregate wage growth.

NOTE: Canadian values are converted to U.S. dollars using the 1.25 PPP adjustment from Wolfson and Murphy (1994).
SOURCE: OAS and GIS values for 1992 are taken from *The National Finances* (1994).

parameters across the two countries, some simple calculations are used to show how policy interacts with saving behaviour to affect intertemporal consumption allocation.

Table 3 highlights the principal parameters of public pension systems in the United States and Canada. All values are in U.S. dollars for 1992, for a single individual, with Canadian dollar amounts converted to U.S. dollars using the 1.25 Purchasing Power Parity (PPP) adjustment suggested by Wolfson and Murphy (1994). Both the United States and Canada have public pension systems that begin to provide benefits for retirees between ages 60 and 62 and 65, where 65 is the full-benefit age. In the United States, the earnings-based Social Security system is the principal program, though Supplemental Security Income (SSI) is important for some of the elderly. In Canada, public pensions are composed of three programs: and Old Age Survivor (OAS) demogrant, a means-tested Guaranteed Income Supplement (GIS), and an earnings-based Canada and Quebec pension and disability plan (CQPP).

Both funding and benefits of the programs differ significantly. In the United States, Social Security is funded using a 6.2 per cent payroll tax on employees and employers up to a maximum of $55,500. In Canada, the CQPP is funded using a 2.4 per cent payroll tax on employers and employees on the amount between $3,200

TABLE 4
Income taxes in the United States and Canada, 1992

	United States	Canada
Exempt amount	Standard deduction plus personal exemption is $5,900; rises to $6,800 for people 65+.	Personal exemption is $5,170; rises to $7,960 for people 65+.
Brackets and rates	15 per cent below $21,450 28 per cent $21,450 to $51,900 31 per cent over $51,900.	17 per cent below $23,670 26 per cent $23,670 to $47,340 31 per cent over $47,340.
Non-federal add-on	Varies, approximately 30 per cent.	Varies, approximately 50 per cent.
Treatment of saving	Employer-sponsored defined-benefit or 401(k); the limit is $9,000 on employees, $30,000 overall. Also, some self-initiated IRA/Keogh, very limited, depends on pension coverage, etc. Employer social security contributions are excluded from base.	Employer-sponsored Registered Pension Plans (RPPs) and self-initiated Registered Retirement Saving Plans (RRSPs): the limit on a combination of the two is the lesser of $10,000 or 18 per cent of earnings. CQPP contributions are excluded from base.
Other	Deductibility of mortgage interest, state and local taxes, property taxes and charitable contributions in excess of standard deduction, etc.	Exclude first $1,000 of pension income, charitable contributions deductible, lifetime capital gains exclusion, etc.

NOTE: Canadian values are converted to U.S. dollars using the 1.25 PPP adjustment from Wolfson and Murphy (1994).

and $32,200.[8] The OAS and GIS are funded through general revenues. Thus, Social Security imposes a much higher tax over a much larger range of earnings than the CQPP, but the comparison of overall public pensions is more complicated, because the personal taxes paid to fund the OAS and GIS components should be counted as well.

Table 4 compares the personal income tax sysems in Canada and the United States. The tax codes in both countries were significantly reformed during the 1980s, with the goals of simplification and lower marginal rates. Both countries have a three-bracket structure, with comparable exemption, bracket, and rate parameters. The typical provincial add-on in Canada is much higher than the state and local add-ons in the United States, which significantly raises Canada's top marginal rate.

Similarities and differences in before-tax saving plans in the United States and Canada have been discussed several times throughout the paper, though table 4 provides a few more details about the tax treatment of 410(k), RRSP, and other types of plans. Basically, in both countries, a person can save up to about $10,000 in a retirement account, with the proviso in the United States that the employer makes the account available. One difference in retirement saving is indicated – the

8 CQPP contribution rates have risen significantly in the last few years and are scheduled to rise even further over the near term.

6.2 per cent employee share of Social Security tax (up to the maximum taxable earnings of $55,500, table 3) is included in the income tax base. In Canada, CQPP contributions are excluded from taxable income.

The last panel of table 4 highlights a few remaining differences in Canadian and U.S. income tax systems. The U.S. tax system allows for significant (though increasingly restricted) itemized deductions, including mortgage interest, state and local income and property taxes, charitable contributions, and a few other categories. It is important to note that itemized deductions affect taxable income only at levels above the standard deduction. In the calculations below, in order not to impute itemized deductions, the standard deduction is used in both the working and the retired periods.

The Canadian income tax system also has a number of credits and deductions. The Canadian system allows deduction of charitable contributions and includes credits for tuition payments and other selected spending categories; these deductions and credits are ignored in the calculations here. The tax system also excludes the first $1,000 of pension income, which means any retirement income that is annuitized (i.e., RRSP balances converted to an income stream). Finally, the Canadian income tax allows a lifetime exclusion of capital gains – which were untaxed in previous years – equal to $100,000.[9]

Table 5 shows the basic calculations used to indicate how differences in public pension and tax systems in Canada and the United States generate different intertemporal consumption possibilities. The calculations assume that the earnings level used to classify people is a constant value for the thirty-year working period. All saving is expressed as a fraction of gross earnings and is deposited in a before-tax account earning 4 per cent. The assumption of before-tax saving makes the calculations much simpler, because tax liability is constant for the thirty-year working period as well.[10] Accumulated saving at the end of the working period is annuitized, and then the stream of retirement consumption (annuity plus public pension benefits less taxes) is calculated. As they are in the working period, annual taxes are constant in the fifteen-year retirement period, which greatly simplifies the calculations.

There are several striking observations about public pension and tax policy that come out of the calculations. The difference between countries in the pattern of retirement to working consumption possibilities, holding saving constant, is significant. The Canadian replacement rate is above the U.S. rate for very low incomes combined with low to modest saving, but then it quickly drops below the U.S. replacement rate as income or saving rises. The dropoff is mainly due to the differences in public pensions – Canada has a higher floor, but the floor drops out quickly as retirement income rises. The gap between U.S. and Canadian

9 One important omission in these calculations is the failure to model the excise and property tax components of each system. The Canadian system, in particular, recently underwent significant change with the introduction of the Goods and Services Tax (GST).

10 Note that all saving is tax preferred at the highest saving/income combination in the tables: 10 per cent of $100,000 is roughly the maximum in 401(k) and RRSP accounts.

TABLE 5
Calculated ratio of retirement to working consumption (interest rate = 4 per cent)

	Saving rate (per cent of earnings)									
	0 per cent		2.5 per cent		5 per cent		7.5 per cent		10 per cent	
Earnings	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada
$ 10,000	0.72	1.12	0.88	1.18	1.06	1.25	1.24	1.31	1.44	1.38
20,000	0.58	0.65	0.76	0.70	0.95	0.81	1.14	0.96	1.32	1.11
30,000	0.55	0.46	0.72	0.55	0.91	0.69	1.08	0.84	1.25	1.00
40,000	0.49	0.36	0.68	0.47	0.87	0.61	1.04	0.76	1.22	0.92
50,000	0.45	0.30	0.65	0.41	0.83	0.56	1.01	0.72	1.20	0.87
60,000	0.41	0.26	0.61	0.38	0.78	0.53	0.96	0.69	1.10	0.82
70,000	0.35	0.23	0.55	0.36	0.73	0.51	0.90	0.66	1.00	0.80
80,000	0.31	0.21	0.51	0.34	0.68	0.50	0.83	0.64	0.96	0.79
90,000	0.28	0.19	0.48	0.32	0.65	0.48	0.77	0.62	0.92	0.76
100,000	0.26	0.17	0.45	0.31	0.62	0.47	0.74	0.61	0.89	0.74

NOTES: Calculations use tax and benefit information for single individuals as described in tables 4 and 5. Working period in thirty years; retirement period is fifteen years. All saving is before tax.

replacement rates varies with income and saving rates but is generally on the order of 10 to 20 percentage points.

There is a general hump shape to the gap in replacement rates centred around $50,000 per year; at this point the differences in public pensions in the two countries are most marked. In the United States, a $50,000 income is still subject to the full 6.2 per cent Social Security tax rate, while in Canada the CQPP effective tax rate has already fallen to about 1.2 per cent. On the other side of retirement age, people in the United States who retire at $50,000 per year are receiving a Social Security benefit still replacing over 30 per cent of gross earnings, while in Canada, the OAS and GIS are long since taxed away and the CQPP is replacing only about 13 per cent of gross earnings.

The difference in saving across the countries needed to reach given replacement rates varies significantly with income and the saving rate itself. At low saving rates, it is generally true that a Canadian in any income group above $20,000 per year needs to save about 2.5 per cent more than a comparable American to reach the same replacement rate. The target saving difference across countries is highest where the aforementioned public pension gap is concentrated, around $50,000. The difference also increases with the replacement rate itself, holding income constant. For example, an American earning $60,000 reaches 78 per cent replacement at a saving rate of 5 per cent, while a Canadian with the same income has to save about 10 per cent to reach roughly the same rate.

The same basic patterns in replacement rates across income and saving groups hold if the assumed rate of return is 6 per cent (table 6). The higher interest rate adds about 10 percentage points to replacement rates across income groups for low saving rates, rising to 30 or more percentage points for those who save significant amounts, which reflects the non-linearity of compounding.

The replacement rate values in tables 5 and 6 map out intertemporal budget frontiers across income groups and countries. It is interesting to identify calculated saving rates consistent with levels of retirement replacement rates that are in turn consistent with empirical evidence on income and consumption patterns. Burbidge and Davies (1994b) find that empirical replacement rates in Canada are near 50 per cent when after-tax income is used as an indicator, and only slightly higher (still well below one) when consumption-based measures are used. Attanasio (1994) finds similar declines in consumption at retirement in the United States. Tables 5 and 6 indicate that it does not take much saving in either country to reach these goals.

The dramatic result that saving rates consistent with actual replacement rates are zero or extremely low underscores the need to disentangle consumption and expenditure concepts.[11] The empirical replacement rates are measured using expen-

11 There is also a demographic aspect to replacement rates given income, because the parameters used in the calculations apply to single people, buth both countries have extensive spousal add-ons to public pensions. In the United States, for example, the basic benefit is raised 50 per cent if a non-working spouse is present. Steuerle and Bakija (1994) give a detailed breakdown on Social Security returns across demographic groups and time in the United States.

TABLE 6
Calculated ratio of retirement to working consumption (interest rate = 6 per cent)

	Saving rate (per cent of earnings)									
	0 per cent		2.5 per cent		5 per cent		7.5 per cent		10 per cent	
Earnings	United States	Canada	United States	Canada	United States	Canada	United States	Canada	United States	Canada
$ 10,000	0.72	1.12	0.98	1.20	1.25	1.29	1.53	1.38	1.83	1.61
20,000	0.58	0.65	0.86	0.74	1.15	0.96	1.40	1.19	1.66	1.44
30,000	0.55	0.46	0.83	0.62	1.08	0.85	1.34	1.08	1.60	1.31
40,000	0.49	0.36	0.79	0.55	1.05	0.78	1.32	1.00	1.48	1.21
50,000	0.45	0.30	0.75	0.50	1.02	0.73	1.23	0.94	1.44	1.16
60,000	0.41	0.26	0.70	0.47	0.98	0.70	1.15	0.91	1.39	1.10
70,000	0.35	0.23	0.65	0.45	0.90	0.67	1.09	0.89	1.33	1.06
80,000	0.31	0.21	0.61	0.43	0.82	0.66	1.05	0.86	1.28	1.03
90,000	0.28	0.19	0.57	0.42	0.78	0.64	1.01	0.83	1.24	1.02
100,000	0.26	0.17	0.55	0.41	0.75	0.63	0.98	0.81	1.21	1.01

NOTES: Calculations use tax and benefit information for single individuals as described in tables 4 and 5. Working period is thirty years; retirement period is fifteen years. All saving is before-tax.

ditures, or cash outlays, over the life cycle, rather than using true consumption.[12] Consumers make some expenditures during their working years that are intended to lower cash flow when they are retired. The most obvious example is that people generally pay off their mortgage when they are working, which lowers expenditures but not consumption when they are old. Consumers also generally pay for education and other child-rearing costs during their working years and build up a stock of durable goods that continue to generate service flows long after the expenditures are made.

V. DISTRIBUTIONS OF SAVING AND PENSION COVERAGE

The differentials in public policy towards saving and lifetime consumption possibilities in Canada and the United States identified in the calculations above are consistent with the general observation that Canadians save more than Americans. The calculations suggest that Americans may save less because Social Security replaces more income and reaches further into the income distribution than Canadian public pensions do, and, combined with a decrease in effective tax rates at retirement, reasonable rates of consumption replacement can be achieved with low to modest saving. In this section some evidence on the distribution of household-level wealth accumulation and pension coverage in the two countries is presented, which shows that the available micro data are also consistent with the calculations on replacement-rate saving.

Research on empirical patterns of household-level wealth accumulation has suggested a number of regularities that apply to both Canada and the United States. First, the typical person accumulates very little in the way of financial assets, even very close to retirement. Burbidge and Davies (1994b) show that median net financial asset holdings in Canada are negligible to small for most age and income groups, even those close to retirement.[13] Sabelhaus (1995) shows that the median ratio of financial wealth to income among 50 to 60 year-olds in the United States is

12 There are budget studies that have attempted to measure consumption, rather than expenditure, to characterize the changes that occur when people retire. Robb, Magee, and Burbidge (1992) construct a consumption measure in which housing expenditures are replaced by an imputation for the rental value of the home. Sabelhaus and Schneider (1995) use this imputation and an imputation for auto consumption to generate an even broader measure. Both of these studies still find a decline in consumption after retirement, however, which some characterize as a failure of life-cycle planning to explain behaviour. One exception to the pattern of declining consumption after retirement – an exception that helps to prove the rule – is the author's own estimates of average consumption across age groups and time for the United States (Gokhale, Kotlikoff, and Sabelhaus 1996; Auerbach et al. 1995). Those papers show that average consumption exhibits little or no decline after age 65, but the consumption measures in those papers (1) are a comprehensive composite measure, which includes household spending and government-provided goods and services (e.g., medical care) that don't show up in household budgets, and (2) are benchmarked to the National Income and Product Account aggregates by detail category, which raises outlays across various goods differentially.

13 One big problem encountered when the distributional part of this comparative work is attempted is the lack of a recent wealth survey for Canada. The Burbidge and Davies study relied on the 1984 Supplement to the Survey of Consumer Finances, which is well out of date.

less than one for married couples, and only 0.3 for single people. In both countries, financial asset holdings rise more strongly with income than with age.

Although there is little in the way of (median) financial asset accumulation at the household level, there is significant overall wealth accumulation. Both the Burbidge and Davies (1994b) study for Canada and the Sabelhaus (1995) study for the United States show that accumulation of housing wealth is the most important component of net worth at the household level. Median net worth in Canada is roughly ten times the level of median financial asset holdings for the 50 to 60 year-old groups in Canada, and median wealth to income ratios are two to three times median financial asset to income ratios for the same group in the United States.[14] Thus, the general observation is that, except for the highest-income groups in both countries, people typically pay off their homes but do not accumulate much in the way of financial assets.[15]

The observation that most people don't accumulate much financial wealth, even when approaching retirement, might lead one to believe that people are not planning well. But the calculations in the last section suggest that modest saving, as would be provided by most pensions, is approximately equal to what people need in order to maintain economic well-being after retirement. Thus, to the extent that the typical person is covered by a pension, one would not necessarily expect to see that person independently saving much more.

Table 7 presents some comparative data on pension coverage in the United States and Canada across income groups. Overall, pension coverage rates in the two countries are about the same. Coverage rates are fairly low for low-wage employees in both countries: only around 25 per cent. But coverage jumps dramatically as income increases. Coverage is 55 per cent in the United States for the income groups just below median and 59 to 74 per cent for (roughly) the same group in Canada. Differentials in coverage for the two highest income groups are interesting: between $30,000 and $48,000, employees in Canada enjoy higher coverage than their counterparts in the United States; over $48,000, coverage rates drop off in Canada, but continue to rise in the United States.[16]

The obervations about pension coverage and household-level wealth accumulation across the two countries are basically consistent with the replacement-rate calculations in section IV. The calculations indicate that the level of saving needed to meet targets rises with income in both countries, and one should expect to see higher saving rates (i.e., pension coverage) in Canada for all but the lowest in-

14 It is not possible to compare the relative financial/housing wealth accumulation across countries; ratios of medians and median ratios have very different properties in the data.

15 The observation that most households accumulate little financial wealth has been suggested as evidence in favour of the 'buffer-stock' alternative to the pure life-cycle model introduced by Deaton (1991). The observations here, however, reinforce an alternative interpretation put forth, for example, by Hubbard, Skinner, and Zeldes (1995) or Carroll (1997): low asset holdings by much of the population is consistent with life-cycle planning when one introduces realistic intertemporal budget constraints.

16 The drop in pension coverage for high-wage employees does not seem to be a data problem. Maser (1995) uses tax return data and shows that the fraction of tax filers with an RPP drops significantly for the highest-income groups.

TABLE 7
Pension coverage by earnings levels

United States		Canada	
Earnings level	Per cent covered	Earnings level	Per cent covered
Less than $12,000	25	Less than $16,000	27
$12,001 to $30,000	55	$16,001 to $24,000	59
		$24,001 to $32,000	72
$30,001 to $48,000	75	$30,001 to $48,000	82
Greater than $48,000	79	Greater than $48,000	73
All Earners	53	All Earners	49

NOTES: Income-breaks for Canadian tabulations are made comparable using the 1.25 PPP adjustment from Wolfson and Murphy (1994); i.e., the Frenken and Maser less than $20,000 Canadian group is shown in the table as less than $16,000 U.S. The U.S. sample is civilian non-agricultural employees 25 and older; the Canadian sample is paid workers over 20.
SOURCES: U.S. coverage rates are taken from Employee Benefits Research Institute (1993) based on the 1991 Survey of Income and Program Participation (SIPP); Canadian coverage rates are taken from Frenken and Maser (1992) based on the 1989 Labour Market Activity Survey.

come groups. The higher rates of pension coverage in Canada indicate that more retirement-oriented saving is indeed taking place in the middle of the income distribution; whether or not it is enough to offset the replacement rate effect depends on actual pension benefits.

Above $48,000, however, the pattern of pension coverage across the two countries shifts, indicating that the highest-income Canadians need to do more saving beyond pension accumulation. Table 8 indicates that individual retirement-oriented saving does in fact rise with income, in the form of RRSP contributions. Over 60 per cent of Canadian families with incomes above $75,000 in 1992 made contributions to an RRSP in 1992.[17] More important, the fact that the fraction of families using RRSPs increases steadily with income is consistent with the calculated pattern of public pension replacement and observations on pension coverage – as income rises initially, the need for retirement income beyond public pensions grows, but private pensions meet most of that need. Above $50,000, however, pension coverage drops off and RRSP use jumps dramatically.

The pattern of net RRSP contributions as a share of income also supports the idea that RRSPs are used as retirement saving primarily by higher-income families. Net contributions are a negligible share of income except for the highest-income

17 Maser (1995) finds even stronger participation by income effects using tax return data and identifying participants as anyone who contributes to an RRSP in at least one of the three years she studied (1991, 1992, 1993). RRSP participation is over 80 per cent for the highest-income group.

TABLE 8
RRSP saving by family income in 1992

Family income	Per cent contributing	Average contribution as a percent of income
Less than $10,000	1.7	0.4
$10,000 to $19,999	7.5	−0.7
$20,000 to $29,999	10.3	0.0
$30,000 to $39,999	24.1	0.8
$40,000 to $49,999	29.2	1.4
$50,000 to $74,999	45.5	1.7
$75,000 and higher	60.9	2.9
All families	40.5	2.2

NOTES: Income-breaks for tabulations are set to U.S. dollars using the 1.25 PPP adjustment from Wolfson and Murphy (1994); that is, less than $10,000 U.S. is less than $8,000 Canadian. The sample includes only families with a head aged 25 to 64 years old, where the head or spouse is employed, and neither is self-employed.
SOURCE: Tabulations of the 1992 public-use Family Expenditure (FEX) survey.

groups – almost all of the net RRSP saving in 1992 was in the top income groups. In fact, average RRSP withdrawals significantly offset average contributions in most other income groups.[18] Thus, the extent to which tax-preferred saving is used is highly correlated with the extent to which it is needed, rather than as an additive component to a saving base determined by other factors.

VI. CONCLUSIONS

From many perspectives, saving behaviour in the United States and Canada is very similar. The two notable exceptions are that Canadians save a bit more than Americans on average, and that the Canadian saving rate grew a few percentage points relative to the U.S. saving rate after the early 1970s. The largely unrestricted tax preference for saving through RRSPs in Canada has been identified in previous research as a reason for the divergence between U.S. and Canadian saving. This paper casts doubt on the argument that a simple relationship between RRSP availability and saving behaviour underlies the identified differences.

Rather, the higher Canadian saving rate is consistent with evidence put forth here that public pension and income tax rules in the United States provide more intertemporal reallocation towards retirement for most consumers than is the case

18 There are no penalties for early withdrawal in RRSPs, as there are in most U.S. retirement incentive plans, so it makes sense to use the accounts for just about any type of saving, assuming the transactions costs do not outweigh the tax saving.

TABLE 9
Male labor force participation rates

	1978		1992		Change, 1978–92	
Age group	United States	Canada	United States	Canada	United States	Canada
50 to 54	89.7	93.6	89.0	84.0	−0.7	−9.6
55 to 59	82.8	88.5	78.9	78.3	−3.9	−10.2
60 to 64	61.8	75.2	54.7	54.6	−7.1	−20.6
65 to 69	30.1	38.5	25.9	26.3	−4.2	−12.6
70 to 74	14.2	15.9	10.7	10.1	−3.5	−5.8

SOURCES: Canadian values are taken from Family Expenditure Survey tabulations; U.S. values are taken from U.S. Department of Labor, based on Current Population Surveys.

in Canada. The replacement-rate calculations are also consistent with available evidence about the distribution of saving and pension coverage across income groups in the two countries. Also, an important lesson for micro-level saving research comes out of this study. Most consumers, except those in the highest income brackets, fail to accumulate much in the way of financial wealth in either country, but that observation is consistent with the intertemporal redistribution already provided by pensions and government policy.

The analysis here cannot explain, however, why the Canadian saving rates rose relative to those in the United States after the early 1970s. One possible reason is that the replacement-rate approach holds important variables like retirement age fixed. Table 9 shows that this assumption is problematic when an attempt is made to explain historical trends in saving in either country, because labour supply of males age 50 and older has fallen dramatically. The fact that retirement ages in Canada were higher than those in the United States twenty years ago but have since fallen relatively more is consistent with the idea that relatively higher economic growth in Canada during the 1960s and 1970s led to a relative increase in demand for leisure during retirement, which may be driving the upward shift in household saving. This may also explain why the increase in Canadian saving occurred when the CPP was initiated; holding retirement age fixed, saving should have fallen when CPP benefits were announced. But it seems reasonable that beneficiaries should take some of their increased wealth in the form of leisure, in which case the effect on saving is indeterminate. Assessing the validity of this evolutionary story is an important area for future research.

More generally, these findings suggest a very broad research strategy involving development of comprehensive wealth measures and comparative micro-level wealth accumulation and retirement studies across countries and time. The wealth accumulation measures should include financial, housing, and pension wealth in order to assess not only the extent to which overall wealth accumulation varies with policy, but also the extent to which specific types of behaviour (paying off the mortgage) may be changing. It will then be possible to assess more accurately

whether differences in saving are related to differences in underlying replacement rates.

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