WHY HAVE PRIVATE SAVINGS RATES IN THE UNITED STATES AND CANADA DIVERGED?*

Chris CARROLL

Massachusetts Institute of Technology, Cambridge, MA 02139, USA

Lawrence H. SUMMERS

Harvard University, Cambridge, MA 02138, USA

One of the central questions in macroeconomics for many years has been whether government policy can affect private saving rates, and if so, to what extent and through what channels. The question has remained controversial because, as with other macroeconomic questions, experiments to check divergent hypotheses cannot be deliberately performed, so economists must rely upon the often dubious evidence from the limited experiments with which nature and history have endowed us. This paper discusses the results of an exceptionally good natural experiment that has been provided by Canada and the U.S. over the past thirty-five years. After moving in tandem for almost twenty-five years, American and Canadian private saving rates have diverged dramatically over the last decade. The primary conclusion emerging from our analysis of this phenomenon is that tax policies can have a potent impact on private savings behavior. Differences in tax structures and in the interactions of taxation and inflation appear to be important factors explaining the divergent behavior of the American and Canadian private savings rates. Recognizing the importance of asset revaluations, caused partially but not entirely by tax effects, also helps to explain the different behavior of U.S. and Canadian savings. There may also be a relationship between government deficits and the private savings differential.

1. Introduction

Macroeconomists are unable to do controlled experiments. *Ceteris paribus* is a frequent analytic assumption but a rarely satisfied empirical condition. The absence of controlled experiments forces macroeconomists to rely on much less satisfactory statistical analyses of time series data on economic aggregates. Time series data are less satisfactory than experimental data because it is difficult to sort out causation from the observed pattern of correlations. The identification problems posed by natural experiments are the principal reason why even the most basic macroeconomic relationships remain controversial after decades of study.

This paper reports on the results of one of the few reasonably well controlled experiments in the determinants of savings behavior that nature has provided. After moving in tandem for almost 25 years, American and Canadian

private saving rates have diverged dramatically over the last decade. While the private saving rate in the United States has fallen slightly from 8.7% of GNP over the 1971–1975 period to 6.2% over the 1981–1985 period, the private saving rate in Canada has risen rapidly from 7.8% to 11.9%. Because the American and Canadian economies have so much in common geographically and institutionally but have followed very different fiscal policies during the last decade, recent experience provides an ideal natural experiment for study-ing the effects of fiscal policies on savings.

Our approach is more agnostic than the currently fashionable one of fitting complex structural models. This reflects our conviction that movements in private savings rates are determined by processes too complex to represent by any sort of formulation embodying the preferences and budget constraint facing a 'representative consumer'. Rather than trying to postulate a single 'correct' model of savings behavior which is applicable to both the U.S. and Canada, instead we simply relate differences in private savings rates to a variety of factors that seem plausibly related to savings behavior. The hope is that convincing patterns will emerge, though we recognize that our approach cannot provide reliable quantitative estimates of the effects of plausible policy changes on the savings rate. In light of the rather mixed conclusions of studies examining consumption behavior through the prism of optimizing models, experimenting with a more loosely structured approach seems worthwhile.

The primary conclusion emerging from our analysis is that tax policies can have a potent impact on private savings behavior. Differences in tax structures and in the interactions of taxation and inflation appear to be important factors explaining the divergent behavior of the American and Canadian private savings rates. Recognizing the importance of asset revaluations, caused par-tially but not entirely by tax effects, also helps to explain the different behavior of U.S. and Canadian savings. There may also be a relationship between government deficits and the private savings differential.

The paper is organized as follows. Section 2 documents the very different behavior of the U.S. and Canadian savings rates over the last ten years. We show that the observed patterns are robust with respect to measurement adjustments involving inflation accounting, and we demonstrate that most of the changes in relative U.S. and Canadian private saving rates can be attri-buted to changes in the Canadian personal saving rate. Section 3 notes the broad similarity in the macroeconomic environment in the two countries and then uses an econometric model to examine the extent to which differences in cyclical conditions, interest rates, and inflation can account for movements in the two countries' relative savings rates. It finds that relatively little of the variation in savings rates can be traced to differences in macroeconomic conditions.

Section 4 examines the impact of structural and institutional differences on the private savings rates in the United States and Canada. We show that the

divergence in U.S. and Canadian private savings rates coincides quite closely with the introduction of major savings incentives in Canada in the early 1970s. There is also some evidence that it may be associated with large increases in Canadian government deficits that has taken place in recent years. Finally, we examine the role of changes in wealth caused by capital gains and losses in determining private savings rates. We adduce evidence suggesting that the non-deductibility of consumer interest payments in Canada in conjunction with rising nominal interest rates contributed to the relative increase in its private savings rate.

Section 5 attempts to determine the relative importance of the factors examined in section 4 by placing them in the macroeconomic framework developed in section 3. Section 6 concludes.

2. Documenting diverging saving rates

The divergence between the behavior of the Canadian and American private savings rates which provides the motivation for this paper is illustrated in fig. 1a. (See appendix for data corresponding to figs. 1.) While the two saving rates moved in parallel prior to 1971, beginning at about that time saving behavior in the two countries diverged sharply. Canadian saving increased rapidly from a relatively constant level of about 7% of GNP to an unprecedented 10.5% in 1975 and continued to increase to about 12% in the mid-1980s, while the U.S. rate declined slightly over the entire period. The surge in Canadian saving in the early 1970s appears in retrospect to have been the beginning of a permanent and fundamental difference between the U.S. and Canadian economies.[1]

Figs. 1b and 1c examine differences in the behavior of the two components of private saving – personal and corporate saving. It is apparent that most of the reason for the relative increase in Canadian private saving is the increase in the Canadian personal saving rate. The Canadian personal saving rate averaged 3.3% of GNP for the period 1957 to 1971 and exhibited relatively little variance around this level. By contrast, from 1972 to 1985 the average level was 7.6% of GNP, and saving was less than 7% of GNP in only two years after 1974. It rose as high as 10.9% in 1982. Patterns of corporate saving behavior are similar in the two countries, showing mild declines reflecting reduced profitability after 1975 in general and during the sharp 1982 recession in particular (fig. 1c). The roughly similar behavior of corporate saving in the two countries suggests that the U.S.–Canadian comparison cannot enlighten debates about the extent to which individuals 'pierce the corporate veil' in

---

[1] We focus here on private saving rates because they seem to us the most natural object for the application of theory. Others, to whom the Ricardian equivalence proposition seems plausible on *a priori* grounds, would work with national saving rates. We address this issue explicitly below in treating the effects of government deficits.
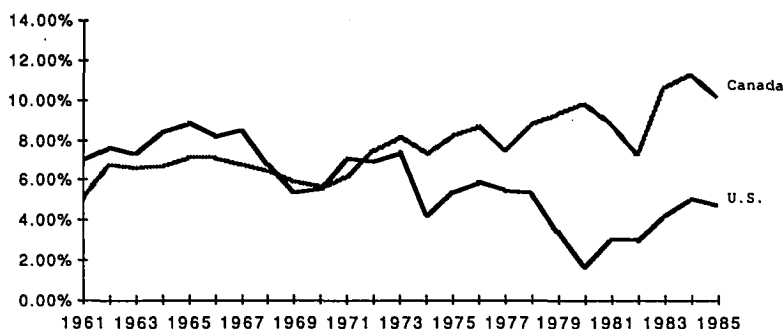
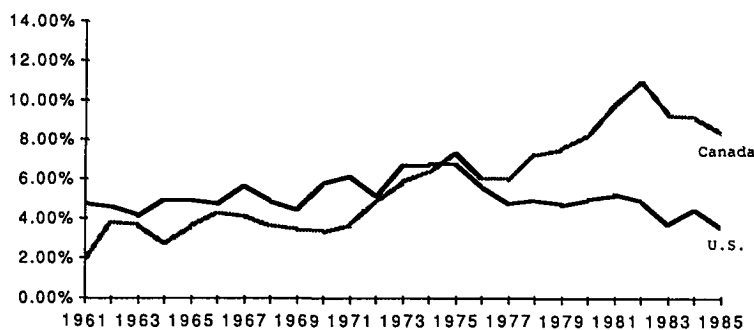Fig. 1a. Private saving rates as a percentage of GNP.

Fig. 1b. Personal saving rates as a percentage of GNP.

making their saving decisions. This also suggests that we should focus on the determinants of personal savings in explaining the differing American and Canadian experiences.

A number of authors, notably Jump (1980), have stressed the distortion in measured private saving rates created by the effects of inflation. The main argument is that measures of saving are distorted by their treatment of the inflationary component of interest rates as income rather than return of principal. Fig. 1d depicts movements in an estimate of inflation-adjusted private saving for both the U.S. and Canadian economies. In brief, the inflation-adjusted saving rate is arrived at by deducting from saving the erosion in the value of money-denominated assets due to inflation.[2] The divergence in saving rates for the two countries remains evident even after the inflation adjustment.

[2] When definitions are changed to correspond with those in Jump (1980) our estimates for the inflation-adjusted U.S. personal saving rate correspond closely with Jump's, although we used a simplified version of his procedure. This gives us confidence in our Canadian results as well, since both inflation rates and the level of financial assets in the U.S. and Canada are similar.
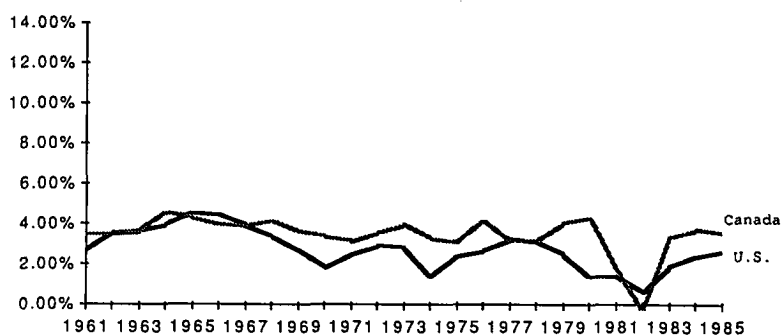
Fig. 1c. Corporate saving rates as a percentage of GNP.
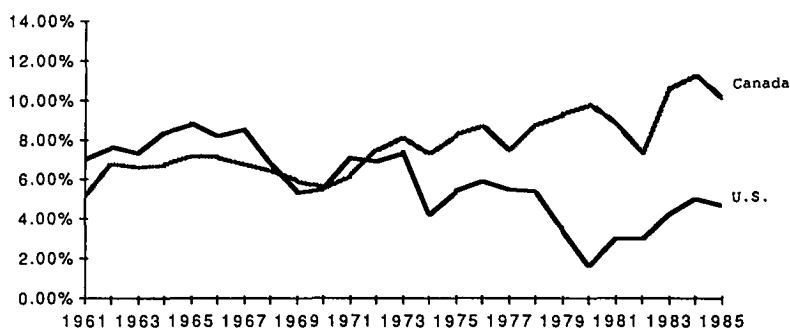
Fig. 1d. Inflation-adjusted private saving rates as a percentage of GNP.

A fair conclusion is that the divergent behavior of American and Canadian private saving behavior is a phenomenon requiring explanation. We consider possible explanations below.

3. Macroeconomic variables and the saving rate

Macroeconomic fluctuations are often thought to affect personal saving through a variety of mechanisms usually derived explicitly or implicitly from a life cycle or permanent income model of consumer behavior. Cyclical fluctuations also influence corporate profits and the therefore corporate savings. While macroeconomic conditions in the U.S. and Canada are highly correlated (which is why we choose to compare U.S. and Canadian savings rates), it is possible that differences in performance such as those documented by Ashenfelter and Card (1986) may account for some of the divergence in savings rates. In order to examine this possibility we ran a battery of regressions relating differences in contemporaneous and lagged values of the rate of inflation, the rate of growth of personal disposable income, the GNP

Table 1

Private saving rate and macroeconomic variables; dependent variable in all regressions is the difference between U.S. and Canadian private saving rates (measured as a fraction of GNP); all regressions over the period 1961–1985; corrected t-statistics in parentheses.

Eq.	Constant	Inflation difference	Disposable income difference	Unemploy-ment rate difference	GNP gap difference	3-month T-bill interest difference	$\bar{R}^2$	ρ
1	0.014 (0.759)	0.390 (1.235)	1.138 (1.213)				0.0287	0.870
2	0.005 (0.446)	0.444 (1.491)		1.359 (2.763)			0.4124	0.676
3	0.008 (0.400)	0.490 (1.430)			0.285 (0.849)		0.2921	0.854
4	0.005 (0.399)	−0.087 −(0.257)	1.054 (1.206)			1.207 (2.023)	0.2721	0.668
5	−0.002 −(0.259)	0.050 (0.172)		1.204 (3.189)		0.985 (2.382)	0.5719	0.506
6	0.000 −(0.028)	0.010 (0.030)			0.237 (0.755)	1.182 (1.970)	0.2706	0.578

gap, the unemployment rate, and the short-term interest rate to differences in personal and total private saving. All of the equations reported in this paper are estimated using ordinary least squares. Despite substantial positive serial correlation in the residuals, we did not make a serial correlation correction because quasi-differencing would raise the sensitivity of the results to short-run rather than long-run considerations. Given that our right-hand side variables are measured imperfectly, it would also exacerbate errors in variables problems. The reported standard errors are corrected for the effects of serial correlation assuming that the OLS residuals follow an AR(1) process. The general conclusion from the regression results reported in table 1 is that macroeconomic variables cannot explain the bulk of the relative movements in U.S. and Canadian savings rates. We now examine the justifications and results for each of the individual variables included in the regressions, beginning with the inflation rate.

Had there been persistent and significant differences in U.S. and Canadian inflation in recent years it might have been plausible to attribute the savings divergence at least partially to mechanisms like those described by Jump (1980), Cawdery and Prefontaine (1982), and others in recent papers. Casual examination of the data makes it clear, however, that inflation differences have been small and unsystematic both historically and recently. It is no surprise, therefore, that in our regressions coefficients on the differential between the two national inflation rates were virtually never statistically significant, either

in the reported regressions or in a large body of unreported ones. Similar results are obtained from equations (not shown) using inflation-adjusted savings rates as the dependent variable.

If inflation does not seem to have been an important contributor, what about cyclical variables? The life cycle theory and the permanent income hypothesis both indicate that unexpectedly fast disposable income growth should be associated with high saving, and low saving should accompany low growth. Canada experienced a somewhat faster growth in disposable income than did the U.S. in the 1970's, but the recession in the early eighties reduced disposable income in Canada more than in the U.S., so the growth patterns of the economies have been less similar than their inflation experiences. Still, regressions attempting to explain the savings differences by the differences in disposable income growth and its lagged values were not successful, with coefficients remaining near zero whether the private saving rate (table 1) or the personal saving rate was the dependent variable, and whether or not lagged values were included in the regressions. In a similar vein, the GNP gap was also tested as a predictor of saving rates; it too was found to be insignificant in both current and lagged formulations.

An alternative indicator of the level of economic distress in an economy, and therefore perhaps of the need for cyclical saving, is the unemployment rate. A temporarily high unemployment rate might be expected to lead to a temporarily low private saving rate as unemployed individuals drew down their savings, while an unusually low rate of unemployment might be associated with high savings for life cycle reasons. The unemployment rate differential proved to be the only macroeconomic variable which was statistically significant in our regressions – highly so, in fact, with R^2's for associated regressions ranging up to 50% – but the coefficients on the unemployment rate were positive rather than the expected negative. Increased relative unemployment appears to be associated with increased saving.

An explanation for this behavior consistent with received theory holds that the sharp increase in Canadian savings, which coincided with an increase in Canada's relative unemployment rate, was the result of a perception by Canadians that their economy had become a significantly more risky working environment, necessitating a higher rate of precautionary savings. This hypothesis is loosely supported by polls which indicate a large drop in the confidence of Canadians in their economy in the late 1970s[3] and by the observation that the unemployment differential is statistically insignificant when only data for the period prior to 1976 are studied.

Finally, we examine the impact of differences in interest rates on differences in savings rates. Given the other variables included in the equations, it is probably appropriate to think of differences in nominal rates as largely

[3]Jarrett (1981, p. 32).

reflecting differences in real interest rates. While theory does not permit an unambiguous judgement about the effects of changes in interest rates on savings rates, Summers (1981,1986) argues that the likely effect of an increase in interest rates is an increase in private savings. The coefficients on the interest rate variable are in fact positive and significant in all table 1 regressions, but they explain only a relatively small fraction of the saving behavior observed.

In sum, differences in macroeconomic conditions in the U.S. and Canada do not explain the very different behavior of private savings in the two countries. This conclusion should not be surprising given the broad similarity in the shocks experienced by the two countries and the magnitude of the divergence in savings rates. In the next section we turn to possible institutional explanations.

4. Explaining the divergence

If the recent macroeconomic experiences in Canada and the U.S. are not sufficient to account for the remarkable divergence in national accounts basis private saving rates, a natural supposition might be that fiscal policy differences, either in the tax structures of the two countries or in the government deficits, may provide the explanation. A focus on such differences as the most profitable field to explore in U.S./Canadian comparisons was suggested by Blinder (1982), who wrote: 'Comparisons between Canada and the United States come about as close to a controlled experiment as economists are ever likely to get. The two countries are similar in so many ways that we can feel almost justified in attributing whatever difference we observe to legal-institutional differences.' Of the many differences in the U.S. and Canadian fiscal policy, three in particular might be expected to have had an especially strong impact on the personal saving rate recently: differences in the sheltered savings opportunities provided by the tax codes, differences in the level of the government deficit/surplus, and the differing status of deductibility of consumer and mortgage interest payments.[4] Another approach to the whole question is to consider a different definition of saving, which unlike the National Income Accounts (NIA) measure incorporates capital gains and losses, to determine whether it might be a better object for study than the NIA measure, or might help to explain trends in NIA saving. We treat these issues in three parts: first a discussion of sheltered savings, next a discussion of deficits, and finally a discussion of trends in capital gains and personal wealth which contains an analysis of the impact of tax differences in the treatment of liabilities.

---

[4]We did investigate the consequences of several other fiscal policy differences in the two countries, including differences in the level of income and capital gains taxes, but we have concluded that none of these topics was as important as those we are examining in detail. For more information on this subject, see Carroll (1986).

4.1. Sheltered savings

Canada has a complex system of government-registered private retirement income and pension plans which was instituted in 1957 and expanded significantly during the early seventies. Employer-sponsored Registered Pension Plans (RPPs) and individual Registered Retirement Savings Plans (RRSPs) are the two largest programs in the system, and most of the smaller plans are minor variants on the structure of the RPP/RRSP programs. The principal feature of the system is that the sum of an individual's tax sheltered contributions and his employer's contributions on his behalf can be at most $3500 a year. Originally the maximum contribution was $1500, but changes to the tax laws in 1972, 1974, and 1976 expanded the limits and allowed certain new types of contributions.[5] In addition, a $1000 deduction for investment income was introduced in 1974. This permitted a considerable portion of total savings to go untaxed. Jump (1982), however, has calculated that in 1979 two thirds of all investment income was earned by taxpayers with income of more than $20,000, while the average level of investment income for taxpayers in this bracket was $3624, far above the $1000 maximum deductible amount, leading Jump to conclude that most personal investment is not sheltered at the margin. Although Jump's point is well taken, it should also be noted that persistently over 70% of all taxable returns claimed some deduction (most of which must have been less than the $1000 maximum), and between 25% and 30% of total reported investment income during the mid to late 1970s *was* deducted from taxable income.[6] Even if we assume that two thirds of these deductions were by people with investment income in excess of the $1000 limit (and therefore unsheltered at the margin), this still leaves perhaps 10% of ordinary (non-RRSP) investment which is sheltered at the margin. Making the assumption that 10% of investment income (in addition to that sheltered by RRSPs) was sheltered by this tax rule would somewhat strengthen the results of the regressions and other analysis that follows.

In the U.S. sheltered savings opportunities have been more limited. Individual Retirement Accounts, available to all taxpayers, and Keogh plans, limited to the self-employed, are the chief programs which allow discretionary sheltered saving. Prior to the *Economic Recovery Tax Act* (ERTA) of 1981 only a small percentage of taxpayers were eligible to participate in these plans, but the ERTA expanded IRA eligibility to all taxpayers and increased the maximum

---

[5]For more detailed information on the chronology and nature of change in the Canadian tax code, see Carroll (1986) or Jarrett (1981, p. 61). A further sheltered savings program, the Registered Home Ownership Savings Plan (RHOSP), was created in 1974, but is now being phased out. For simplicity, total RRSP and RHOSP sheltered saving in Canada will henceforth be referred to as RRSP saving; likewise the sum of IRA and Keogh contributions will be called IRA saving.

It is interesting to note that at the time of this writing the Canadian Parliament was debating a further expansion of the RRSP program as a response to the considerable success of the program so far.

[6]Calculations based on Revenue Canada, *Taxation Statistics, 1979*.

Table 2a

Rates of return on financial saving and borrowing; nominal and real market rates of return.

Year	3-month government bond interest rate		Mortgage interest rate		CPI inflation rate		Real pre-tax interest rate on 3-month bonds[c]		Real pre-tax interest rate on mortgages[c]	
	U.S.[a]	Can.[b]	U.S.[a]	Can.[b]	U.S.[a]	Can.[b]	U.S.	Can.	U.S.	Can.
1960	2.93%	3.30%	—	6.75%	1.60%	0.93%	1.33%	2.37%	—	5.82%
1961	2.38%	2.83%	—	6.71%	1.01%	0.66%	1.37%	2.17%	—	6.05%
1962	2.78%	4.00%	—	6.50%	1.12%	1.30%	1.66%	2.70%	—	5.20%
1963	3.16%	3.57%	5.89%	6.35%	1.21%	1.54%	1.95%	2.03%	4.68%	4.81%
1964	3.55%	3.74%	5.82%	6.25%	1.31%	1.27%	2.24%	2.47%	4.51%	4.98%
1965	3.95%	3.97%	5.81%	6.25%	1.72%	2.00%	2.23%	1.97%	4.09%	4.25%
1966	4.88%	5.00%	6.25%	6.83%	2.86%	3.31%	2.02%	1.69%	3.39%	3.52%
1967	4.32%	4.57%	6.46%	7.34%	2.88%	3.44%	1.44%	1.13%	3.58%	3.90%
1968	5.34%	6.25%	6.97%	8.64%	4.20%	4.13%	1.14%	2.12%	2.77%	4.51%
1969	6.68%	7.15%	7.80%	9.40%	5.37%	3.85%	1.31%	3.30%	2.43%	5.55%
1970	6.46%	5.17%	8.45%	10.06%	5.92%	3.61%	0.54%	1.56%	2.53%	6.45%
1971	4.35%	3.60%	7.74%	9.04%	4.30%	2.35%	0.05%	1.25%	3.44%	6.69%
1972	4.07%	3.55%	7.60%	8.95%	3.30%	4.00%	0.77%	-0.45%	4.30%	4.95%
1973	7.04%	5.39%	7.96%	9.40%	6.23%	7.31%	0.81%	-1.92%	1.73%	2.09%
1974	7.89%	7.80%	8.92%	8.95%	10.97%	11.29%	-3.08%	-3.49%	-2.05%	-2.34%
1975	5.84%	7.37%	9.00%	9.40%	9.14%	10.55%	-3.30%	-3.18%	-0.14%	-1.15%
1976	4.99%	8.90%	9.00%	11.78%	5.77%	8.16%	-0.78%	0.74%	3.23%	3.62%
1977	5.27%	7.35%	9.02%	10.36%	6.45%	8.08%	-1.18%	-0.73%	2.57%	2.28%
1978	7.22%	8.59%	9.56%	10.60%	7.66%	7.60%	-0.44%	0.99%	1.90%	3.00%
1979	10.04%	11.55%	10.78%	11.98%	11.26%	9.26%	-1.22%	2.29%	-0.48%	2.72%
1980	11.51%	12.75%	12.66%	14.32%	13.52%	10.70%	-2.01%	2.05%	-0.86%	3.62%
1981	14.03%	17.77%	14.70%	18.38%	10.37%	11.73%	3.66%	6.04%	4.33%	6.65%
1982	10.69%	13.81%	15.14%	18.04%	6.13%	10.88%	4.56%	2.93%	9.01%	7.16%
1983	8.63%	9.32%	12.57%	13.23%	3.22%	5.80%	5.41%	3.52%	9.35%	7.43%
1984	9.58%	11.06%	12.38%	13.58%	4.26%	3.98%	5.32%	7.08%	8.12%	9.60%
1985	7.48%	9.43%	—	12.13%	3.57%	4.20%	3.91%	5.23%	8.81%	7.93%

[a] From Economic Report of the President.
[b] From Bank of Canada Review.
[c] Nominal value minus inflation rate.

Table 2b

Rates of return on financial saving and borrowing; calculation of after-tax rates of return.[a,b]

Year	Memo: fraction of personal saving in (non-pension) sheltered forms[c]		Real after-tax interest rate on unsheltered short-term investment[d]		Average after-tax real rate of return on sheltered and un-sheltered investment[e]		Differential between pre-tax and after-tax rates of return		Real after-tax interest rate on mortgage loans[d]		Differential of real after-tax interest rates on mortgage loans
	U.S.	Can.	U.S.	Can.	U.S.	Can.	U.S.	Can.	U.S.	Can.	U.S.–Can.
1960	0.00%	3.46%	0.45%	1.38%	0.45%	1.41%	0.88%	0.99%	—	5.82%	—
1961	0.00%	4.83%	0.66%	1.32%	0.66%	1.36%	0.71%	0.85%	—	6.05%	—
1962	0.00%	2.79%	0.83%	1.50%	0.83%	1.53%	0.83%	1.20%	—	5.20%	—
1963	0.08%	3.08%	1.00%	0.96%	1.00%	0.99%	0.95%	1.07%	2.91%	4.81%	-1.90%
1964	0.08%	4.77%	1.18%	1.35%	1.18%	1.40%	1.07%	1.12%	2.76%	4.98%	-2.22%
1965	0.10%	3.60%	1.05%	0.78%	1.05%	0.82%	1.19%	1.19%	2.35%	4.25%	-1.90%
1966	0.16%	4.47%	0.56%	0.19%	0.56%	0.26%	1.46%	1.50%	1.52%	3.52%	-2.01%
1967	0.21%	5.17%	0.14%	-0.24%	0.15%	-0.17%	1.30%	1.37%	1.64%	3.90%	-2.26%
1968	0.93%	6.87%	-0.46%	0.25%	-0.45%	0.37%	1.60%	1.88%	0.68%	4.51%	-3.83%
1969	1.51%	8.59%	-0.69%	1.16%	-0.66%	1.34%	2.00%	2.15%	0.09%	5.55%	-5.46%
1970	1.51%	9.61%	-1.40%	0.01%	-1.37%	0.16%	1.94%	1.55%	-0.01%	6.45%	-6.46%
1971	0.81%	10.41%	-1.26%	0.17%	-1.24%	0.28%	1.31%	1.08%	1.12%	6.69%	-5.57%
1972	0.97%	14.17%	-0.45%	-1.52%	-0.44%	-1.36%	1.22%	1.07%	2.02%	4.95%	-2.93%
1973	0.73%	14.74%	-1.30%	-3.54%	-1.29%	-3.30%	2.11%	1.62%	-0.66%	2.09%	-2.75%
1974	1.36%	18.60%	-5.45%	-5.83%	-5.41%	-5.39%	2.37%	2.34%	-4.73%	-2.34%	-2.39%
1975	3.00%	18.91%	-5.05%	-5.39%	-5.00%	-4.97%	1.75%	2.21%	-2.84%	-1.15%	-1.69%
1976	4.02%	28.36%	-2.28%	-1.93%	-2.22%	-1.17%	1.50%	2.67%	0.53%	3.62%	-3.09%
1977	5.04%	28.39%	-2.76%	-2.94%	-2.68%	-2.31%	1.58%	2.21%	-0.14%	2.28%	-2.41%
1978	5.06%	24.78%	-2.61%	-1.59%	-2.50%	-0.95%	2.17%	2.58%	-0.97%	3.00%	-3.96%
1979	5.44%	26.14%	-4.23%	-1.18%	-4.07%	-0.27%	3.01%	3.47%	-3.71%	2.72%	-6.43%
1980	5.22%	25.47%	-5.46%	-1.78%	-5.28%	-0.80%	3.45%	3.83%	-4.66%	3.62%	-8.27%
1981	5.99%	23.71%	-0.55%	0.71%	-0.30%	1.97%	4.21%	5.33%	-0.08%	6.65%	-6.73%
1982	22.38%	20.93%	1.35%	-1.21%	2.07%	-0.35%	3.21%	4.14%	4.47%	7.16%	-2.69%
1983	30.38%	22.93%	2.82%	0.72%	3.61%	1.37%	2.59%	2.80%	5.58%	7.43%	-1.85%
1984	28.06%	25.71%	2.45%	3.76%	3.26%	4.61%	2.87%	3.32%	4.41%	9.60%	-5.19%
1985	—	26.04%	1.67%	2.40%	1.67%	3.14%	2.24%	2.83%	5.10%	7.93%	-2.83%

[a] The Canadian figures do not include the effects of the 1974 tax revision which allowed a deduction of up to $1000 investment income a year. Including this tax break in the analysis would somewhat strengthen the main conclusions of the paper.

[b] For U.S., Mortgage interest rate * (1 − Tax rate) − Inflation; for Canada, Mortgage interest rate − Inflation.

[c] These figures are simply IRA and RRSP contributions plus imputed earnings on same over NIA savings.

[d] [Nominal interest rate * (1 − Marginal tax rate)] − Inflation rate. Marginal tax rate is assumed to be 30%.

[e] (Rate of return on unsheltered assets * Fraction of assets unsheltered) + (Return on sheltered assets * Fraction sheltered).
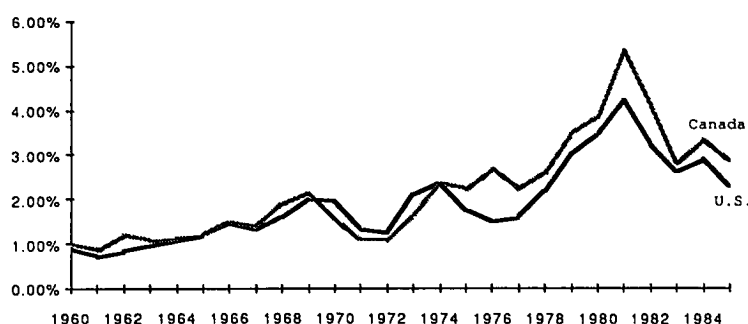
Fig. 2. Differential between rates of return on sheltered and unsheltered financial investment.

deductible contribution to $2000; newly legislated tax policies in the U.S. call for reducing the scope of the IRA program.

Table 2 presents nominal and real rates of return on three-month T-bills of the U.S. and Canadian governments (which are intended to represent a 'market' pre-tax rate of return available to consumer)[7] and estimates of after-tax rates of return on unsheltered investment in T-bills.[8] According to our calculations, the after-tax real rate of return on unsheltered financial investment was negative during almost the entire decade of the 1970s in both countries, although in the late 1970s the rate of return was much higher in Canada than in the U.S. Fig. 2 presents the differential between the rate of return available on sheltered and on unsheltered investment in both countries; it is clear from this chart that the incentives to save in sheltered as opposed to unsheltered forms were extremely powerful in both countries, but even stronger in Canada than in the U.S.

Table 3 presents data on levels of contribution to the RRSP and IRA programs. Between 1971 and 1976, i.e., from the year before the expansion in RRSP eligibility to the year of the last major change in the system, the sum of contributions to RRSPs and our estimate of income earned within RRSPs (see table 3 for details) rose as a percentage of Canadian disposable income from around 0.5% to 2.6%; by 1981 the figure had reached 3.4%. The expansions of RRSP contributions coincide fairly closely with the beginnings of the rise in

---

[7]In the United States the T-bill rate is not necessarily a good indicator of the pre-tax rate of return on financial saving during much of the period because the Federal Reserve's Regulation Q kept interest rates on many forms of personal saving artificially low after 1973. According to U.S. Flow of Funds statistics, more than half of direct personal holdings of interest-bearing assets in the 1970s and early 1980s were in 'time and savings deposits', and subject to the Regulation Q interest rate ceilings.

[8]The marginal rate of return on taxable (unsheltered) savings is measured by assuming that the marginal rate of taxation is 30%, so that the after-tax nominal rate of return is 30% less than the pre-tax rate.

Table 3

Contributions to sheltered savings plans: IRA contributions (contributions to IRAs and Keogh plans) and RRSP contributions (contributions to RRSPs and RHOSPs).

	United States					
	As a percentage of personal disposable income				As a percentage of personal saving	
Year	Total direct contribu- tions	Total year-end IRA assets	Total saving in IRA assets	Inflation- adjusted IRA saving	Total direct contribu- tions	Total saving in IRA assets
1966	0.01%	0.06%	0.01%	0.01%	0.13%	0.16%
1967	0.02%	0.05%	0.02%	0.02%	0.19%	0.21%
1968	0.06%	0.07%	0.06%	0.06%	0.89%	0.93%
1969	0.09%	0.08%	0.10%	0.09%	1.45%	1.51%
1970	0.12%	0.07%	0.12%	0.12%	1.47%	1.51%
1971	0.07%	0.08%	0.07%	0.07%	0.78%	0.81%
1972	0.07%	0.07%	0.07%	0.07%	0.94%	0.97%
1973	0.06%	0.07%	0.07%	0.06%	0.69%	0.73%
1974	0.12%	0.14%	0.13%	0.11%	1.28%	1.36%
1975	0.27%	0.22%	0.27%	0.25%	2.91%	3.00%
1976	0.29%	0.38%	0.31%	0.29%	3.85%	4.02%
1977	0.31%	0.57%	0.33%	0.29%	4.73%	5.04%
1978	0.32%	0.81%	0.36%	0.30%	4.50%	5.06%
1979	0.30%	1.02%	0.37%	0.26%	4.43%	5.44%
1980	0.28%	1.15%	0.37%	0.22%	3.97%	5.22%
1981	0.32%	1.38%	0.45%	0.31%	4.24%	5.99%
1982	1.36%	2.26%	1.52%	1.38%	19.98%	22.38%
1983	1.44%	3.17%	1.64%	1.53%	26.80%	30.38%
1984	1.49%	4.13%	1.77%	1.60%	23.64%	28.06%
1985	—	5.30%	—	—	—	—

	Canada					
	As a percentage of personal disposable income				As a percentage of personal saving	
Year	Total direct contribu- tions	Total year-end RRSP assets	Total saving in RRSP asets	Inflation- adjusted RRSP saving	Total direct contribu- tions	Total saving in RRSP assets
1966	0.25%	0.92%	0.30%	0.27%	3.78%	4.47%
1967	0.28%	1.14%	0.33%	0.29%	4.34%	5.17%
1968	0.30%	1.33%	0.39%	0.33%	5.40%	6.87%
1969	0.35%	1.53%	0.46%	0.40%	6.54%	8.59%
1970	0.42%	1.82%	0.51%	0.45%	7.84%	9.61%
1971	0.53%	2.11%	0.61%	0.56%	9.11%	10.41%
1972	0.95%	2.70%	1.04%	0.94%	12.86%	14.17%
1973	1.16%	3.33%	1.34%	1.09%	12.76%	14.74%
1974	1.53%	4.14%	1.85%	1.38%	15.35%	18.60%
1975	1.70%	4.98%	2.07%	1.54%	15.56%	18.91%
1976	2.08%	6.12%	2.62%	2.12%	22.47%	28.36%
1977	2.06%	7.05%	2.57%	2.01%	22.68%	28.39%
1978	2.02%	7.69%	2.68%	2.10%	18.67%	24.78%
1979	2.03%	8.09%	2.96%	2.22%	17.90%	26.14%
1980	2.10%	8.02%	3.13%	2.27%	17.13%	25.47%
1981	1.89%	8.37%	3.37%	2.39%	13.26%	23.71%
1982	1.89%	9.40%	3.19%	2.17%	12.41%	20.93%
1983	2.04%	10.90%	3.06%	2.42%	15.31%	22.93%
1984	2.09%	11.80%	3.39%	2.92%	15.82%	25.71%
1985	1.93%	12.95%	3.15%	2.61%	15.96%	26.04%

the Canadian personal saving rate from below 6.5% of disposable income before 1972 to around 10% in 1976–1978, and higher still to 12–13% by the early 1980s.

A closer examination of patterns and levels of contribution to RRSPs, however, indicates that even under generous assumptions the direct effects of RRSPs can account for only a part of the increase in Canadian saving. If the entire increase in RRSP contributions is considered to constitute new saving (as opposed to a transfer of saving from other forms into RRSP accounts) the RRSP program can account for at most half of the overall 6% rise in the personal savings rate out of disposable income. Research has not determined definitively the proportion of RRSP saving which is 'new' saving which would not have been undertaken had the RRSP program not existed, but it seems certain that the figure should be substantially less than 100%. If the relatively generous assumption is made that two thirds of RRSP saving would not have been done had there been no RRSP program, then RRSPs can directly account for at most a third of the increase in Canadian personal saving.

However, at least two considerations can be invoked to justify attributing more importance to RRSPs. First, Katona (1964) and Cagan (1965) have, under different guises, proposed a 'recognition effect' hypothesis, whereby consumers are made more aware of the benefits of saving and as a result undertake to save more. The theory would apply to Canada to the extent that the availability of RRSP's shifted the tastes of Canadians to make saving more, and consumption less, attractive. This might have been accomplished by the advertising campaigns mounted by many banks for consumers' RRSP accounts.[9] The second point which suggests that RRSP saving may have been more important than would appear at first blush is that the increase in *inflation-adjusted* RRSP savings is greater than the increase in the inflation-adjusted Canadian savings rate. In this sense RRSPs appear very important.[10]

IRA and Keogh saving in the United States has been less important than RRSP saving in Canada. Venti and Wise (1985) in the only thorough econometric evaluation of the IRA program conclude that most IRA contributions represent new savings. Summers (1986) reaches a similar conclusion on the basis of other more qualitative evidence on the frequency with which individu-

---

[9] In a recent research trip to Ottawa, one of the authors observed promotional posters, signs, and literature for RRSP saving schemes in prominent positions in virtually every downtown bank. One particularly manipulative, but probably effective, poster featured an impoverished, homeless old woman with a caption which suggested that hers was the fate awaiting anyone unwise enough not to take advantage of the bank's RRSP program.

[10] It should be noted that the comparison of inflation-adjusted RRSP saving with inflation-adjusted saving in other financial assets could be misleading, in that during the period under study RRSP assets were much smaller in relation to RRSP saving (accumulated assets were small because the RRSP program was relatively new) than other financial assets in relation to other financial saving. Small assets lead to a small inflation-erosion adjustment to saving, so the fact that the increase in inflation-adjusted RRSP saving rate is high in comparison with the increase in inflation-adjusted total saving is not necessarily so striking as it may seem.

als make contributions at the last possible moment and the reported wealth holdings of IRA contributors. Many other authorities, pointing to the decline in the personal savings rate that has taken place in recent years, believe that IRAs have had little effect. It should be noted however that the inflation-adjusted private savings rate in the U.S. has actually increased since the expansion of IRAs in 1981 (fig. 1d).

A final form of sheltered saving which was available in both countries was employer-sponsored pension saving. In both countries pension saving out-stripped all other categories of financial saving, and in both countries the real value of pension wealth virtually doubled between 1973 and 1983. In the U.S., where pension saving was the only form of sheltered saving widely available before 1982, pension wealth was also the only form of financial wealth to grow rapidly. However, because the experiences in pension saving were broadly similar in the two countries, because definition and data differences make direct comparison difficult, and because decisions about contributions to employer-sponsored pension programs are only indirectly under the control of individuals, we chose to concentrate most of our attention on RRSP and IRA/Keogh saving differences rather than on pensions.

4.2. Fiscal policy

Macroeconomic theory leads us to believe that the fiscal stance of the government may have an impact on the personal saving rate. In its most extreme form, the Ricardian Equivalence Proposition of Barro (1974) states that the level of government borrowing should not affect a consumer's long-run consumption plans so long as it is not associated with changes in government spending patterns, since he realizes that current government borrowing must be paid for with higher taxes in the future. This proposition holds that government borrowing will not affect the interest rate and that changes in the government borrowing rate will be offset one for one by changes in the private saving rate.

Comparing fig. 1a with fig. 3, we see that in Canada the initial surge in private saving in the early 1970s was followed, in the early 1980s, by massive government budget deficits. Given the volatility of each of the subcomponents of national saving in Canada (figs. 1a–1c and 3) the behavior of the Canadian national saving rate depicted in fig. 4 has been remarkably stable during the post-77 period. It is very striking that over the entire 1957–1985 period U.S. and Canadian overall national saving rates have moved in parallel despite quite different movements in the individual components of national savings.

U.S. data, however, does not conform with Ricardian equivalence in any period covered by our data (see the paper by Poterba and Summers in this issue). Rather than rising as in Canada, the private saving rate in the U.S. declined somewhat as the government deficit mushroomed to unprecedented proportions in the early 1980s. In addition, in the early and middle 1960s
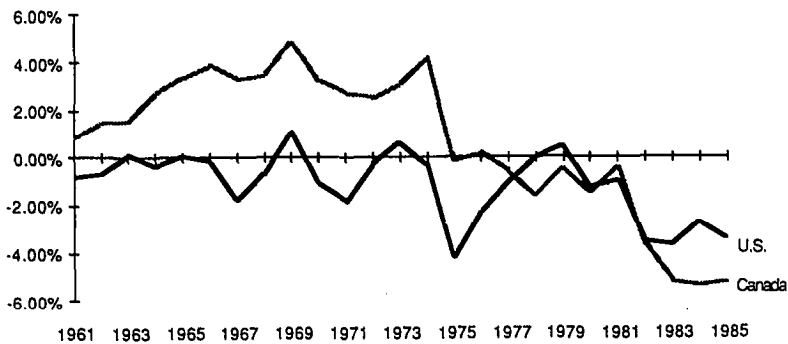
Fig. 3. Government saving rate as a fraction of GNP.
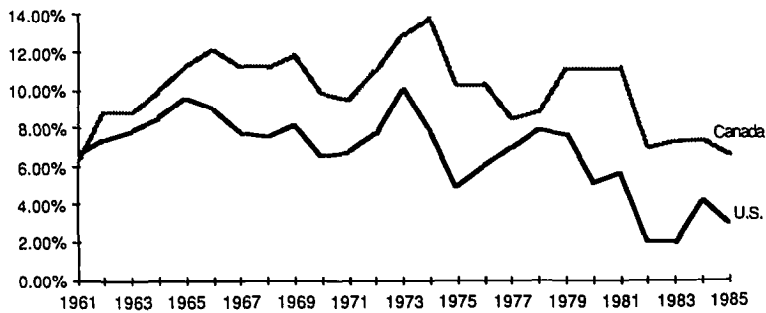
Fig. 4. National saving rates of the U.S. and Canada as a percentage of GNP.

when the government was running a substantial structural surplus there is little sign of an abnormally low personal saving rate.

4.3. Personal assets, capital gains, and saving

To this point we have concentrated our analysis on the measures of saving specified in the National Income Accounts of the U.S. and Canada, but these definitions may not be ideal measures of personal saving as economists should define it. This is primarily because measured income does not include capital gains and losses on existing assets. Saving may alternatively be defined not as the fraction of the current income stream unspent but rather as the change in net wealth from period to period.[11] Information on this measure of savings may be found in the National Balance Sheets (NBS) of the U.S. and Canada, which attempt to measure the levels of wealth and debt in all sectors of the

---

[11] It is not obvious that capital gains should be included in national savings. Treating them as savings would require regarding them as investment and part of GNP if national accounts consistency were to be maintained.

Table 4

Average annual capital gains expressed as a fraction of GNP.[a]

	United States				
Year	Net worth	Tangible assets	Financial assets	Equity in non-corporated enterprises	Liabilities
1962–65	12.38%	3.81%	10.96%	1.49%	3.89%
1966–70	6.46%	4.73%	2.70%	0.31%	1.27%
1971–75	4.99%	4.96%	−1.24%	2.58%	1.32%
1976–80	12.65%	6.08%	4.59%	4.16%	2.18%
1981–85	5.22%	0.05%	9.06%	−1.39%	2.49%

	Canada			
Year	Net worth	Tangible assets	Financial assets	Liabilities
1962–65	15.50%	9.04%	11.18%	4.73%
1966–70	11.10%	7.74%	6.52%	3.16%
1971–75	15.24%	11.85%	7.13%	3.74%
1976–80	12.51%	7.08%	8.08%	2.65%
1981–85	2.87%	−1.05%	3.13%	−0.79%

[a]Sources: National Balance Sheets of the U.S. and Canada, Economic Report of the President, and The Bank of Canada Review.

economy. These data reveal wealth saving patterns which have diverged significantly from national accounts saving patterns in several ways. In fact, the rate of growth in the real value of personal wealth in Canada over the 1976–1985 period averaged only 2.7% annually – *below* the average rate of 4.6% during the period 1966–1975. Over the same period in the U.S. net wealth saving, at 2.3%, was actually above its average rate of growth in the previous decade, 1.75% (table 4).[12] The purpose of this section is to assess the extent to which these differing trends in wealth saving can be attributed to the differing tax and market incentives facing consumers in the two countries, and to discuss the relationships between wealth saving and NIA basis saving.

Perhaps the area where the institutional systems in Canada and the U.S. have differed most is in the relative incentives they provide to consumer borrowing. The most important difference has been in the tax deductibility of consumer interest provided by the U.S., but not the Canadian, tax code. Regulatory and other public agencies have also worked to reduce mortgage interest rates in the U.S.[13] Consequently real after-tax interest rates on

[12]It is important to recall here that no effort has been made by U.S. and Canadian statistical agencies to ensure that their measures of levels of wealth and wealth saving are compatible, so within-country comparisons, either historical comparisons or cross-sectional statistics, are likely to be more reliable than intercountry comparisons.

[13]See the Treasury Department publication in the References section. Also see Carroll (1986) for data on the level of Canadian government participation in the mortgage market.
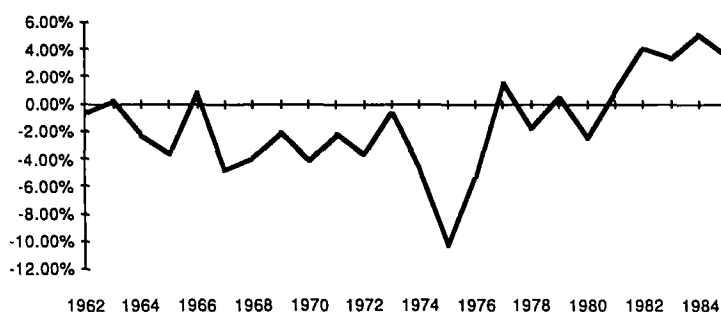
Fig. 5. Differential in growth in nominal liabilities as a percentage of personal disposable income
(U.S. growth minus Canadian growth).

consumer borrowing in the U.S. have historically been lower than in Canada, although the difference in after-tax mortgage interest rates remained relatively constant in the 2.5-3% range until about 1976 (table 2).

In the late 1970s, however, institutional rigidities in the U.S. prevented the nominal interest rate from rising fully as inflation accelerated, and this fact combined with tax deductibility (which becomes more valuable as inflation increases) to produce strongly negative real after-tax interest rates. In Canada, on the other hand, the nominal rate rose rapidly as inflation accelerated, and there was no inflation-induced tax deductibility boon. These forces widened the gap between the two real after-tax rates to fully 8% by 1981 (see table 2 for all these data).

Blinder (1982) has suggested that the encouragement given to borrowing by the U.S. tax code may have been one of the principal reasons for low U.S. and high Canadian saving rates since the mid-1970s. It is certainly true that following the extraordinary reduction in the relative cost of borrowing (roughly post-1976) U.S. household liabilities (especially mortgage liabilities) grew much faster in comparison with Canadian liabilities than they had done previously (fig. 5). To illustrate, in the period 1970–1976 the annual increase in household liabilities averaged 10.6% of disposable income in Canada and only 6.1% in the U.S.; in the period 1977–1985 the debt formation figure fell by 3.8% of disposable income in Canada to 6.8%, and rose by 2.3% in the U.S. to 8.4% (table A.2).[14]

An increase in liabilities is usually used to finance the purchase of tangible assets, particularly housing and real estate, so we should expect movements in the tangible wealth component of personal wealth to offset the changes in liabilities; in fact, the National Income Accounts assume that any increase

[14] Recall again that intercountry comparisons are somewhat more dubious than within-country historical comparisons because of uncertainties about measurement differences in the U.S. and Canada; thus it is not clear how significant it is that the Canadian rate of debt formation was generally somewhat higher than the U.S. rate.
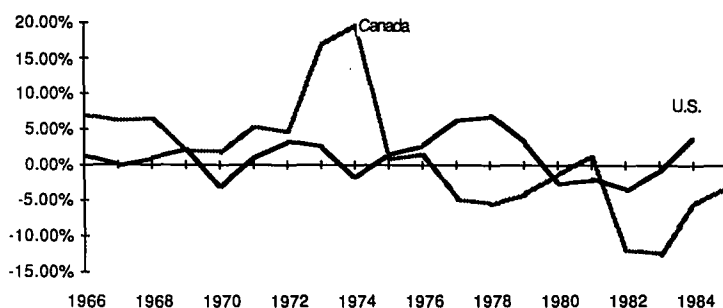
Fig. 6. Housing price inflation minus CPI inflation (i.e., the increase in the real price of housing or the real return on an investment in housing).

in liabilities is used to purchase an equal value of other assets and therefore does not change net personal wealth at all. There do indeed appear to be clear links between liabilities and other assets. The late-1970s growth in U.S. liabilities which accompanied that period's record-low after-tax interest rates was contemporaneous with a surge in U.S. housing/real estate wealth and housing construction, while an acceleration of the rate of new debt formation in Canada during the early 1970s (also a record-low real interest rate period) was also accompanied by a construction boom and a rapid accumulation of tangible assets (table A.2).

There are also links more subtle than that implied by the NIA one-for-one liabilities-for-wealth tradeoff assumption. Probably the most important has to do with the fact that housing and real estate are inelastically supplied in the short run, so that any rapid increase in demand should produce a rapid run-up in prices, which would then decline slowly back to equilibrium. Fig. 6 presents a comparison of the annual increase in the real market price of housing in the U.S. and Canada (see table 5 for the data and for a description of sources). Two extraordinary facts emerge from the chart. The first is that the early part of the 1970s witnessed an extremely rapid increase in prices of housing in Canada, coinciding closely with the above-mentioned acceleration in liabilities. The corresponding revaluation of housing wealth produced a surge in net wealth saving in Canada; according to the NBS the *real* value of personal holdings of housing and land increased by 65% between 1970 and 1976, and new construction, although high, can only account for a small portion of this. After 1975, however, Canadian housing price increases generally failed even to keep up with inflation, causing a downward revaluation of assets. In the U.S., on the other hand, housing prices in the early 1970s barely outpaced inflation, and tangible wealth growth was slow, but in the middle and later 1970s (when the tax incentives to liabilities were so strong and borrowing accelerated) they grew rapidly, as did tangible wealth. Prices (and tangible wealth) fell in both countries during the recession of the early 1980s, but the effect in Canada was much more severe, possibly because the Canadians were not eligible for the

Table 5

Statistics on housing prices and construction.

Year	Housing price deflators		Percent increase in housing prices (nominal increase) [Defl./Defl.{last} − 1]		Real increase in housing prices [Nom. incr. − Infl.]		Housing starts[d]		Real value of new housing	
	U.S.[a]	Can.[b]	U.S.[c]	Can.[c]	U.S.	Can.	U.S.	Can.	U.S.[e]	Can.[f]
1965	44.4	—	—	8.00%	—	6.73%	125.8	13.9	29.6	—
1966	46.2	—	4.05%	9.00%	1.19%	7.00%	99.7	11.2	26.5	37.2
1967	47.5	—	2.81%	9.50%	−0.07%	6.19%	120.2	13.7	25.6	38.4
1968	50.0	—	5.26%	10.00%	1.06%	6.56%	128.8	16.4	29.3	39.4
1969	53.8	—	7.60%	6.00%	2.23%	1.87%	125.0	17.5	30.2	38.2
1970	55.3	—	2.79%	5.50%	−3.13%	1.65%	122.4	15.9	27.4	41.9
1971	58.3	—	5.42%	9.00%	1.12%	5.39%	173.7	19.5	35.7	44.9
1972	62.1	—	6.52%	7.00%	3.22%	4.65%	198.2	20.8	43.3	47.5
1973	67.5	—	8.70%	21.00%	2.47%	17.00%	171.5	22.4	44.9	49.6
1974	73.8	—	9.33%	27.00%	−1.64%	19.69%	112.7	18.5	34.1	48.7
1975	81.7	—	10.70%	12.00%	1.56%	0.71%	97.1	19.3	28.8	47.1
1976	88.7	100.0	8.57%	12.00%	2.80%	1.45%	129.0	22.8	35.5	48.6
1977	100.0	103.3	12.74%	3.30%	6.29%	−4.86%	166.8	20.5	44.6	49.1
1978	114.5	106.0	14.50%	2.61%	6.84%	−5.47%	169.7	19.0	47.8	49.9
1979	130.8	109.9	14.24%	3.68%	2.98%	−3.92%	146.7	16.4	45.6	50.3
1980	145.2	118.6	11.01%	7.92%	−2.51%	−1.34%	109.4	13.2	35.4	47.9
1981	157.4	132.9	8.40%	12.06%	−1.97%	1.36%	91.7	14.8	31.8	47.0
1982	161.5	132.7	2.60%	−0.15%	−3.53%	−11.88%	89.3	10.5	25.9	44.8
1983	165.5	130.5	2.48%	−1.66%	−0.74%	−12.54%	143.0	13.6	37.8	46.7
1984	171.9	131.1	3.87%	0.42%	3.87%	−5.38%	—	—	—	—
1985	—	132.6	—	1.16%	—	−3.04%	—	—	—	—

[a] From Statistical Abstract of the U.S., 1986 and earlier years.
[b] From Statistics Canada; deflator for purchase price of equivalent house and land combinations. (Data on housing price alone is not substantially different.)
[c] Data before 1977 are taken from a chart in Personal Savings in Canada.
[d] Data from OECD Publication Main Economic Indicators.
[e] Data are deflated from nominal figures in OECD MEI, Work Put in Place, Residential Sector.
[f] Data are deflated from nominal data in OECD MEI, Cost of New Residential Construction.

generous tax incentives which allowed U.S. consumers to maintain relatively high mortgage borrowing during this period.

The final difference in the wealth saving experiences of the U.S. and Canada is that during the recession of the early 1980s Canadians experienced considerably larger real capital losses across the board, partly because the Canadian recession was more severe than that in the U.S. and partly because inflation persisted somewhat longer in Canada. Under the hypothesis that individuals increase saving to compensate for capital losses and decrease saving in response to capital gains [an implication of the life cycle and permanent income hypothesis views of saving determination – see Friend and Lieberman (1975) for a statement and empirical tests], there should be a negative relationship between the level of personal wealth and the private saving rate. It is true that the sustained increase in Canadian NIA saving coincided with the slowdown in the growth in Canadian wealth, and that Canadian saving was highest in the early 1980s when losses were greatest. By contrast, in the U.S. where wealth revaluation experiences were most favorable after 1976, the national accounts basis saving rate did not grow.

5. Econometric analysis

One problem with the preceding analysis is that, while examining individual questions in detail, it fails to provide a framework for assessing the overall importance of the different factors in influencing the saving rate. We address this issue now by considering three measures of such differences in the context of the regressions reported in section 3. We have added four independent variables to the regressions: the level of sheltered saving as a fraction of disposable income, the weighted average real after-tax rate of return on financial assets, the overall government deficit/surplus, and the ratio of personal wealth to GNP. (Results are reported in table 6.)

5.1. Sheltered savings

In essentially all of our regression specifications the coefficient for the level of sheltered savings was significantly positive, with coefficients between -1 and -2 and corrected t-statistics which were significant at the 5% level. A literal interpretation of this result would be that an increase in sheltered savings was associated with a 150% increase in private savings, a result which is difficult to explain except on the basis of the Cagan–Katona recognition effect hypothesis. From a mechanical standpoint, the reason for this result is that the period of high sheltered saving in Canada was also the period of higher total private saving, and the increase in total saving was even larger than that in sheltered saving. It should be noted that when similar regressions were run for the countries individually, the sheltered saving coefficient in the U.S. was not significant, while that in Canada was highly significant.

Table 6

The private saving rate as a function of macroeconomic and institutional factors (dependent variable for all regressions is differential between U.S. and Canadian private saving rates); period is 1961–1985; corrected t-statistics are in parentheses.

Eq.	Constant	Inflation difference	Unemployment rate difference	GNP gap difference	Government saving difference	Sheltered saving difference	Wealth over GNP	Real adjusted short-term interest rate	$\bar{R}^2$	ρ
1	0.028 (2.375)	0.218 (0.945)	0.244 (0.477)		-0.882 -(2.325)				0.627	0.616
2	0.037 (3.156)	0.127 (0.582)		-0.179 -(0.690)	-1.083 -(3.483)				0.642	0.663
3	0.002 (0.151)	0.188 (1.025)	0.517 (1.272)		-0.432 -(1.477)	-1.432 -(2.888)			0.792	0.470
4	-0.001 -(0.083)	0.192 (1.019)		0.223 (1.025)	-0.483 -(1.810)	-1.704 -(2.852)			0.783	0.496
5	0.014 (1.257)	0.933 (2.366)	0.540 (1.102)		-0.568 -(1.741)			-0.874 -(2.168)	0.705	0.478
6	0.027 (2.309)	0.676 (1.654)		-0.083 -(0.334)	-0.895 -(3.194)			-0.663 -(1.574)	0.679	0.508

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
7	0.078 (4.127)	0.054 (0.258)	0.014 (0.035)		-0.729 -(2.851)		0.086 -(2.967)		0.747	0.322
8	0.079 (4.699)	0.034 -(0.163)		-0.067 -(0.038)	-0.779 -(3.588)		-0.083 -(2.914)		0.750	0.363
9	0.028 (1.085)	0.130 (0.688)	0.361 (0.850)		-0.477 -(1.672)	-1.092 -(1.944)	-0.034 -(1.163)		0.794	0.418
10	0.030 (1.168)	0.127 (0.664)		0.170 (0.812)	-0.492 -(1.949)	-1.242 -(1.930)	-0.042 -(1.438)		0.793	0.399
11	0.060 (3.165)	0.598 (1.785)	0.267 (0.682)		-0.527 -(2.116)		-0.071 -(2.681)	-0.632 -(1.919)	0.783	0.272
12	0.068 (4.074)	0.494 (1.435)		0.004 (0.025)	-0.644 -(2.967)		-0.077 -(2.897)	-0.548 -(1.606)	0.776	0.326
13	-0.013 -(1.819)	0.262 (1.338)	0.988 (3.439)			-1.795 -(3.713)			0.759	0.508
14	-0.024 -(2.647)	0.291 (1.416)		0.495 (2.766)		-2.481 (4.785)			0.738	0.522
15	0.001 (0.030)	0.233 (1.148)	0.927 (2.994)			-1.622 -(2.912)	-0.020 -(0.639)		0.752	0.495
16	0.005 (0.199)	0.233 (1.104)		0.451 (2.540)		-2.060 -(3.491)	-0.039 -(1.232)		0.743	0.456

An alternative variable variable intended to capture the effect of sheltered savings programs is the weighted average interest rate, which attempts to measure the average rate of return on all personal saving by combining the rate on sheltered and unsheltered assets using appropriate weights corresponding to the relative sizes of the two types of saving. This variable was usually estimated with coefficients between 0.6 and 0.9, indicating that a 1% increase in the weighted interest rate would elicit an increase in saving of 0.6 to 0.9% of GNP.

The budget deficit variable received coefficients ranging between -0.9 and -1.1, with high t-statistics (table 6). Again interpreting literally, this would mean that an increase in government dissaving is associated with a roughly matching increase in private saving – the result predicted by Ricardian equivalence. Once again, however, caution should be exercised in interpreting this result, since it is due entirely to the fact that the period of highest saving in Canada, roughly post-1976, was also the period of the escalating Canadian government deficit. Individual country regressions show that essentially the whole significance of the coefficients on government deficit differentials is due to the trends in Canada after 1976, while the U.S. results are insignificant for all periods.

The final variable included in the regressions was the level of personal wealth as a fraction of disposable income, which was intended to test whether movements in national accounts basis saving might reasonably be interpreted as resulting from efforts by consumers to maintain their level of real wealth in the face of fluctuations in asset value due to reevaluations of their asset portfolios. The coefficient was of the correct sign (negative) and was very strongly significant in all of the specifications of the model, and (unlike most of the other significant variables) was even significant in most specifications which did not include data after 1977. This suggests that both independent movements in asset values and the housing market booms, which we attributed partially to low after-tax rates of interest, may have affected saving.

6. Conclusion

This paper has identified three important factors contributing to the large divergence between the private savings rate in the U.S. and Canada. They are the greater tax incentives for financial savings in Canada, the greater tax disincentives for borrowing to purchase tangible assets in Canada, and the larger budget deficits recently experienced in Canada. At this point it is difficult to gauge their relative importance since the empirical results are driven largely by the experience of the late 1970s and the 1980s. But the Canadian experience does serve to call into question the widely accepted presumption that there is little that public policy can do to affect private saving rates.

Appendix

Table A.1a

U.S. saving data by sector as a fraction of GNP.

Year	Corporate saving			Personal saving			Total private saving		Government		National saving (private plus government)
	Corporate saving	Inflation impact on financial assets[a]	Inflation-adjusted saving	Unadjusted personal saving	Inflation impact on value of financial assets[a]	Inflation-adjusted saving	Total corporate and personal saving	Inflation-adjusted private saving	Net saving	Inflation-adjusted saving[b]	
1954	2.63%	-0.06%	2.69%	4.40%	0.33%	4.07%	7.03%	6.77%	-1.91%	-1.64%	5.13%
1955	3.65%	0.05%	3.60%	3.94%	-0.23%	4.17%	7.59%	7.77%	0.76%	0.58%	8.35%
1956	2.97%	-0.22%	3.19%	4.97%	0.91%	4.06%	7.94%	7.25%	1.21%	1.90%	9.15%
1957	2.73%	-0.57%	3.30%	5.03%	2.23%	2.80%	7.76%	6.10%	0.20%	1.86%	7.96%
1958	2.21%	-0.43%	2.64%	5.32%	1.75%	3.57%	7.53%	6.22%	-2.76%	-1.45%	4.77%
1959	3.15%	-0.13%	3.27%	4.40%	0.50%	3.90%	7.54%	7.18%	-0.32%	0.04%	7.22%
1960	2.70%	-0.28%	2.97%	4.04%	0.98%	3.05%	6.73%	6.03%	0.60%	1.31%	7.34%
1961	2.71%	-0.18%	2.89%	4.75%	0.63%	4.12%	7.45%	7.01%	-0.82%	-0.38%	6.63%
1962	3.52%	-0.20%	3.73%	4.58%	0.68%	3.90%	8.11%	7.63%	-0.67%	-0.20%	7.43%
1963	3.67%	-0.23%	3.90%	4.12%	0.73%	3.40%	7.79%	7.30%	0.12%	0.61%	7.91%
1964	3.97%	-0.25%	4.22%	4.94%	0.78%	4.16%	8.91%	8.38%	-0.36%	0.17%	8.55%
1965	4.53%	-0.35%	4.88%	4.96%	1.00%	3.97%	9.49%	8.84%	0.07%	0.72%	9.56%
1966	4.43%	-0.61%	5.04%	4.76%	1.63%	3.13%	9.19%	8.17%	-0.17%	0.85%	9.02%
1967	3.90%	-0.64%	4.54%	5.64%	1.69%	3.95%	9.54%	8.49%	-1.78%	-0.72%	7.77%
1968	3.37%	-0.95%	4.32%	4.87%	2.43%	2.43%	8.23%	6.76%	-0.69%	0.79%	7.55%
1969	2.67%	-1.25%	3.92%	4.47%	3.04%	1.43%	7.14%	5.34%	1.05%	2.85%	8.19%

Table A.1a (continued)

Year	Corporate saving			Personal saving			Total private saving		Government		National saving (private plus government)
	Corporate saving	Inflation impact on financial assets[a]	Inflation-adjusted saving	Unadjusted personal saving	Inflation impact on value of financial assets[a]	Inflation-adjusted saving	Total corporate and personal saving	Inflation-adjusted private saving	Net saving	Inflation-adjusted saving[b]	
1970	1.80%	-1.44%	3.25%	5.81%	3.49%	2.32%	7.62%	5.57%	-1.07%	0.98%	6.55%
1971	2.45%	-1.00%	3.45%	6.15%	2.50%	3.66%	8.60%	7.11%	-1.81%	-0.32%	6.79%
1972	2.90%	-0.73%	3.63%	5.18%	1.88%	3.29%	8.08%	6.93%	-0.29%	0.86%	7.79%
1973	2.79%	-1.40%	4.19%	6.71%	3.51%	3.20%	9.50%	7.39%	0.60%	2.70%	10.09%
1974	1.41%	-2.50%	3.91%	6.74%	6.45%	0.30%	8.15%	4.21%	-0.30%	3.64%	7.85%
1975	2.39%	-1.93%	4.33%	6.75%	5.68%	1.08%	9.15%	5.40%	-4.19%	-0.44%	4.96%
1976	2.70%	-1.17%	3.87%	5.58%	3.54%	2.04%	8.28%	5.91%	-2.24%	0.13%	6.04%
1977	3.25%	-1.32%	4.57%	4.73%	3.84%	0.89%	7.98%	5.46%	-1.00%	1.52%	6.98%
1978	3.07%	-1.56%	4.63%	4.90%	4.21%	0.69%	7.97%	5.32%	-0.02%	2.63%	7.95%
1979	2.47%	-2.36%	4.83%	4.71%	6.11%	-1.41%	7.18%	3.42%	0.46%	4.22%	7.64%
1980	1.38%	-2.94%	4.32%	5.01%	7.68%	-2.67%	6.39%	1.66%	-1.26%	3.47%	5.13%
1981	1.42%	-2.37%	3.79%	5.22%	5.96%	-0.74%	6.64%	3.05%	-0.97%	2.61%	5.66%
1982	0.63%	-1.46%	2.09%	4.86%	3.96%	0.90%	5.49%	2.99%	-3.50%	-1.00%	1.99%
1983	1.86%	-0.70%	2.56%	3.74%	2.11%	1.63%	5.60%	4.20%	-3.68%	-2.28%	1.92%
1984	2.41%	-1.05%	3.46%	4.47%	2.90%	1.57%	6.88%	5.03%	-2.69%	-0.84%	4.19%
1985	2.69%	-0.96%	3.65%	3.59%	2.56%	1.03%	6.28%	4.67%	-3.42%	-1.80%	2.87%

[a] Rate of inflation times holdings of money-denominated assets.
[b] National saving rate minus inflation-adjusted private saving rate.

Table A.1b

Canadian saving data by sector as a fraction of GNP.

	Corporate saving			Personal saving			Total private saving		Government		National saving (private plus government)
Year	Corporate saving	Inflation impact on financial assets[a]	Inflation-adjusted saving	Unadjusted personal saving	Inflation impact on value of financial assets[a]	Inflation-adjusted saving	Total corporate and personal saving	Inflation-adjusted private saving	Net saving	Inflation-adjusted saving[b]	
1954	4.54%	—	—	3.10%	—	—	7.65%	—	1.16%	—	8.80%
1955	4.69%	—	—	2.79%	—	—	7.48%	—	2.06%	—	9.54%
1956	4.51%	—	—	3.28%	—	—	7.79%	—	3.26%	—	11.05%
1957	2.21%	—	—	3.12%	—	—	5.33%	—	2.69%	—	8.02%
1958	4.24%	—	—	3.67%	—	—	7.91%	—	-1.61%	—	6.30%
1959	3.66%	—	—	2.29%	—	—	5.95%	—	1.45%	—	7.40%
1960	3.53%	—	—	2.26%	—	—	5.79%	—	0.98%	—	6.77%
1961	3.52%	-0.14%	3.66%	1.88%	0.47%	1.41%	5.40%	5.07%	0.08%	1.13%	6.20%
1962	3.53%	-0.31%	3.85%	3.84%	0.91%	2.92%	7.37%	6.77%	1.44%	2.04%	8.81%
1963	3.63%	-0.36%	3.98%	3.68%	1.06%	2.62%	7.30%	6.60%	1.57%	2.27%	8.87%
1964	4.51%	-0.30%	4.80%	2.75%	0.82%	1.93%	7.26%	6.73%	2.77%	3.30%	10.03%
1965	4.30%	-0.46%	4.76%	3.61%	1.22%	2.39%	7.92%	7.15%	3.38%	4.14%	11.29%
1966	3.96%	-0.86%	4.81%	4.31%	2.02%	2.29%	8.26%	7.10%	3.89%	5.05%	12.15%
1967	3.86%	-0.90%	4.76%	4.12%	2.12%	2.00%	7.98%	6.76%	3.32%	4.54%	11.30%
1968	4.11%	-1.10%	5.21%	3.64%	2.41%	1.22%	7.75%	6.44%	3.48%	4.79%	11.23%
1969	3.61%	-1.01%	4.63%	3.42%	2.16%	1.26%	7.03%	5.89%	4.84%	5.98%	11.87%
1970	3.32%	-0.93%	4.24%	3.35%	1.99%	1.36%	6.67%	5.60%	3.19%	4.26%	9.86%

Table A.1b (continued)

Year	Corporate saving			Personal saving			Total private saving		Government		National saving (private plus government)
	Corporate saving	Inflation impact on financial assets[a]	Inflation-adjusted saving	Unadjusted personal saving	Inflation impact on value of financial assets[a]	Inflation-adjusted saving	Total corporate and personal saving	Inflation-adjusted private saving	Net saving	Inflation-adjusted saving[b]	
1971	3.12%	-0.66%	3.78%	3.72%	1.32%	2.40%	6.84%	6.18%	2.66%	3.31%	9.49%
1972	3.60%	-1.17%	4.76%	4.91%	2.17%	2.73%	8.50%	7.50%	2.51%	3.52%	11.02%
1973	3.93%	-2.28%	6.21%	5.85%	3.92%	1.93%	9.78%	8.14%	3.10%	4.74%	12.88%
1974	3.25%	-3.64%	6.89%	6.38%	5.94%	0.44%	9.63%	7.33%	4.15%	6.45%	13.78%
1975	3.07%	-3.33%	6.40%	7.34%	5.49%	1.85%	10.41%	8.24%	-0.13%	2.04%	10.28%
1976	4.14%	-2.56%	6.70%	6.04%	4.04%	2.00%	10.18%	8.70%	0.16%	1.64%	10.34%
1977	3.17%	-2.71%	5.88%	5.97%	4.38%	1.58%	9.14%	7.47%	-0.63%	1.04%	8.51%
1978	3.17%	-2.41%	5.58%	7.27%	4.06%	3.21%	10.44%	8.79%	-1.59%	0.06%	8.85%
1979	4.04%	-2.86%	6.90%	7.55%	5.12%	2.43%	11.59%	9.33%	-0.47%	1.80%	11.13%
1980	4.33%	-3.29%	7.62%	8.24%	6.05%	2.19%	12.57%	9.81%	-1.46%	1.29%	11.10%
1981	1.81%	-4.41%	6.22%	9.77%	7.19%	2.59%	11.59%	8.81%	-0.43%	2.35%	11.16%
1982	-0.25%	-3.76%	3.52%	10.89%	7.08%	3.81%	10.64%	7.33%	-3.67%	-0.35%	6.98%
1983	3.34%	-1.84%	5.17%	9.22%	3.77%	5.45%	12.56%	10.62%	-5.20%	-3.27%	7.35%
1984	3.71%	-1.13%	4.84%	9.09%	2.67%	6.42%	12.81%	11.27%	-5.35%	-3.82%	7.45%
1985	3.50%	-1.13%	4.62%	8.36%	2.86%	5.50%	11.86%	10.13%	-5.19%	-3.46%	6.67%

[a] Rate of inflation times holdings of money-denominated assets.
[b] National saving rate minus inflation-adjusted private saving rate.

Table A.2a

U.S. real value of wealth, standardized to 1976 = 100.[a]

Year	Net worth	Non-financial assets				Financial assets					Equity non-corporate enterprises	Liabilities		
		Total	Housing & land	Consumer durables	Other	Total	Currency & deposits	Pensions	Stocks	Other		Total	Mortgages	Other
1961	67.4	22.4	14.4	7.0	1.1	39.5	14.5	3.7	17.7	3.7	14.1	8.7	5.6	3.1
1962	66.3	23.1	14.9	7.1	1.2	38.2	15.3	3.8	15.3	3.8	14.4	9.4	6.1	3.3
1963	70.2	23.7	15.1	7.4	1.2	42.3	16.3	4.3	17.8	3.9	14.6	10.3	6.6	3.7
1964	74.1	24.8	15.9	7.6	1.3	45.5	17.4	4.7	19.3	4.0	14.9	11.2	7.2	4.0
1965	78.3	25.7	16.4	7.9	1.4	49.2	18.5	5.2	21.3	4.2	15.4	12.0	7.6	4.4
1966	78.5	27.6	17.6	8.4	1.6	47.6	19.2	5.4	18.8	4.3	15.8	12.5	7.9	4.6
1967	85.0	28.6	17.9	9.0	1.6	53.5	20.3	5.9	22.9	4.5	15.9	13.0	8.1	4.8
1968	91.4	30.5	19.2	9.6	1.8	58.2	21.2	6.3	26.1	4.5	16.2	13.6	8.4	5.2
1969	87.8	31.7	19.9	9.9	1.9	53.7	21.4	6.3	21.6	4.5	16.2	13.8	8.5	5.3
1970	86.4	31.9	19.7	10.2	2.0	52.5	21.7	6.5	19.9	4.4	15.8	13.7	8.4	5.2
1971	91.4	33.4	21.0	10.3	2.1	56.2	22.7	7.2	21.8	4.5	16.2	14.4	8.8	5.6
1972	97.7	35.7	22.7	10.8	2.2	60.2	24.4	8.3	23.0	4.6	17.3	15.6	9.5	6.1
1973	95.7	38.4	24.8	11.2	2.3	54.5	25.4	7.7	16.8	4.5	19.3	16.4	10.0	6.4
1974	90.2	39.7	25.5	11.7	2.5	47.0	25.0	7.0	10.7	4.3	19.5	15.9	9.8	6.1
1975	93.4	39.4	25.3	11.7	2.4	50.0	25.1	8.0	12.7	4.2	19.7	15.6	9.7	5.9
1976	100.0	41.9	27.4	12.1	2.4	53.6	26.4	8.7	14.3	4.2	21.1	16.6	10.3	6.3
1977	103.5	45.7	30.5	12.7	2.5	53.4	27.6	9.0	12.6	4.2	22.5	18.1	11.3	6.8
1978	109.6	50.0	33.9	13.3	2.7	54.3	28.4	9.6	12.0	4.3	24.9	19.6	12.3	7.3
1979	113.2	51.2	35.1	13.5	2.6	55.8	28.5	10.2	13.0	4.1	26.5	20.3	12.8	7.5
1980	115.2	49.8	34.2	13.1	2.5	57.8	27.6	11.0	15.3	3.9	27.0	19.4	12.5	6.8
1981	113.5	49.6	34.3	12.8	2.5	55.8	28.0	11.0	13.2	3.7	27.1	19.0	12.3	6.7
1982	111.4	45.7	30.8	12.5	2.4	58.8	28.8	12.3	14.0	3.7	25.8	18.9	12.1	6.8
1983	119.0	49.0	33.7	12.8	2.5	64.1	30.8	14.0	15.5	3.8	26.4	20.4	12.9	7.5
1984	120.9	49.9	34.2	13.2	2.5	67.4	33.9	14.6	15.2	3.7	25.6	22.0	13.7	8.3
1985	125.5	50.2	34.0	13.7	2.5	75.1	36.4	16.8	18.1	3.8	24.4	24.2	14.7	9.5

Source: National balance sheets of the U.S.

Table A.2b

Canadian real value of wealth, standardized to 1976 = 100.[a]

Year	Net worth	Non-financial assets				Financial assets					Liabilities		
		Total	Housing & land	Consumer durables	Other	Total	Currency & deposits	Pensions	Stocks	Other	Total	Mortgages	Other
1961	44.5	25.6	14.9	5.6	5.1	25.7	6.5	1.7	6.9	10.6	6.8	3.8	3.0
1962	46.0	26.6	15.5	5.9	5.2	26.9	6.9	1.9	6.9	11.3	7.5	4.2	3.4
1963	48.9	28.3	16.5	6.2	5.6	28.9	7.4	2.1	7.6	11.9	8.2	4.5	3.7
1964	52.2	30.3	18.0	6.6	5.7	31.2	8.1	2.3	8.5	12.2	9.3	5.0	4.3
1965	56.7	32.7	19.6	7.0	6.0	34.5	9.1	2.5	10.3	13.0	10.5	5.5	5.0
1966	61.3	35.1	21.1	7.5	6.5	37.0	9.7	2.7	11.4	13.1	10.8	5.9	4.9
1967	64.4	37.3	22.4	8.2	6.7	38.9	10.9	2.9	11.4	13.6	11.9	6.5	5.3
1968	66.2	39.0	23.4	8.6	6.9	40.2	11.8	3.1	11.5	13.8	13.0	7.0	6.1
1969	68.9	41.0	24.5	9.2	7.3	41.6	12.5	3.4	11.7	14.1	13.7	7.4	6.3
1970	70.4	42.4	25.8	9.3	7.3	42.5	13.2	3.6	11.3	14.4	14.6	7.9	6.7
1971	75.2	45.7	28.4	9.8	7.4	45.3	14.6	3.9	11.3	15.5	15.8	8.7	7.1
1972	80.3	50.3	32.1	10.4	7.8	47.6	15.8	4.3	11.3	16.3	17.6	9.9	7.8
1973	88.3	56.1	36.6	11.2	8.3	50.5	18.1	4.5	11.5	16.4	18.3	10.9	7.5
1974	94.4	60.7	39.2	12.5	8.9	52.6	18.9	4.6	12.2	16.8	18.8	11.2	7.6
1975	96.1	62.4	40.8	13.0	8.5	54.5	20.2	4.9	12.0	17.4	20.8	11.7	9.1
1976	100.0	64.9	42.6	13.7	8.5	57.9	21.9	5.3	13.0	17.7	22.8	13.0	9.8
1977	104.7	67.0	43.8	14.4	8.8	61.2	23.3	5.8	13.4	18.7	23.5	13.8	9.7
1978	110.6	70.8	46.1	15.1	9.6	65.4	25.3	6.4	15.3	18.5	25.5	15.1	10.5
1979	117.2	74.7	48.4	16.1	10.3	68.8	26.9	7.1	16.0	18.8	26.3	15.9	10.4
1980	122.9	77.5	50.7	16.6	10.2	71.7	27.7	7.7	17.5	18.8	26.4	16.1	10.3
1981	125.3	77.3	50.9	16.4	10.0	73.2	27.4	8.2	17.2	20.4	25.2	15.6	9.6
1982	120.7	73.5	48.7	15.4	9.4	69.9	25.8	8.6	16.1	19.4	22.7	14.2	8.5
1983	121.9	73.4	48.9	15.2	9.3	71.4	25.8	9.5	15.7	20.4	23.0	14.7	8.3
1984	125.9	74.2	49.8	15.4	9.0	75.0	26.4	9.6	16.6	22.4	23.3	15.0	8.3
1985	130.0	75.5	50.8	15.8	8.8	79.4	27.5	10.5	17.5	23.8	24.8	15.6	9.2

[a] *Source*: National balance sheets of Canada.

References

Ashenfelter, O. and D. Card, 1986, Why have unemployment rates in Canada and the United States diverged?, Economica 53 (Supplement on Unemployment), S171.
Barro, R.J., 1974, Are government bonds net wealth?, Journal of Political Economy 82, 1095–1117.
Blinder, Alan, 1982, Discussion of 'Tax incentives to promote personal saving: recent Canadian experience' by Gregory V. Jump, in: Saving and government policy, Proceedings of a conference held at Melvin Village, NH, Oct. (Federal Reserve Bank of Boston, MA).
Carroll, Chris, 1986, The recent divergence of the personal saving rates in the U.S. and Canada: Explanations and implications, Senior honors thesis (Harvard University, Cambridge, MA).
Cagan, Phillip, 1965, The effect of pension plans on aggregate saving: Evidence from a sample survey, Occasional paper 95 (Columbia University Press for the National Bureau of Economic Research, New York).
Cawdery, Jack and Raymond Prefontaine, 1980, The recent behavior of the personal savings rate (Department of Finance, Canada).
Department of the Treasury, Deposit interest rate ceilings and housing credit: The report of the President's inter-agency task force on regulation Q.
Economic Council of Canada, 1979, Sixteenth annual review: Two cheers for the eighties (Supply and Services Canada, Ottawa).
Friend, Irwin and Charles Lieberman, 1975, Short-run asset effects on household saving and consumption: The cross-section evidence, American Economic Review 65, 624–633.
Jarrett, Janet M., 1981, Personal savings in Canada: An analysis of recent trends (The Conference Board of Canada, Ottawa).
Jump, Gregory V., 1980, Interest rates, inflation expectations, and spurious elements in measured real income and saving, American Economic Review 70, 990.
Katona, George, 1964, The mass consumption society (McGraw-Hill, New York).
Revenue Canada, Taxation statistics, Various years.
Summers, Lawrence, 1981, Capital taxation and accumulation in a life cycle growth model, American Economic Review 71, 533–544.
Summers, Lawrence, 1982, Tax policy, the rate of return, and savings, NBER working paper no. 995 (National Bureau of Economic Research, Cambridge, MA).
Summers, Lawrence, 1986, Individual retirement accounts: Facts and issues, Tax Notes, June.