Tax Incentives to Promote Personal Saving: Recent Canadian Experience

Gregory V. Jump*

I. Introduction

Recent years have seen a renewal of interest by economists in the behavior of personal saving. There appear to be a number of reasons for this. First, rates of personal saving in the United States, Canada, and other developed countries have generally exceeded their respective historical norms since the mid-1970s, and there has been considerable interest in why this has occurred. The most widely accepted explanation at present is that conventional saving measures are distorted by variations in the (expected) rate of price inflation. This explanation, which is presented by Jump (1980), J.B. Shoven and J.I. Bulow (1976), and others, essentially views the recent rise in personal saving rates as a measurement error attributable to higher price inflation rather than being the result of any behavioral change on the part of consumers. We shall refer to this as the "inflation-distortion" effect and examine it more closely in a later section of the paper.

A second reason for the recent interest in personal saving—at least in North America—is that rates of personal saving in the United States and Canada, which had been of similar magnitudes throughout most of the postwar period, suddenly began to diverge in about 1975. (See Figure 1.) The personal saving rate in Canada has been significantly higher than that in the United States every year since then—giving rise to the question of why this has occurred. Since the two economies have had similar inflation experiences over this period, the answer does not appear to lie with the inflation-distortion effect.[1] Some other factors must be involved. At present no widely accepted explanation has been put forward, but there has been considerable speculation that differences in the personal tax systems between the two countries might be involved. The Canadian and U.S. personal tax systems are similar in many respects, but in the mid-1970s the Canadian Government instituted a number of measures aimed at giving favored tax treatment to savers. That these measures were introduced at the same time the Canadian saving rate began to exceed its U.S. counterpart provides reason to suspect that they may offer an explanation for the differential saving behavior.

A final reason for the renewed interest in personal saving has to do with the generally sluggish growth in investment spending that has been

*Associate Professor of Economics at the University of Toronto

[1]It is worth noting that an inflation-corrected time series for the personal saving rate in Canada does not show an increase in the 1975–81 period, whereas an inflation-corrected series for the United States shows a pronounced decline after 1975

Figure 1

Rates of Personal Saving
United States vs. Canada

(National Accounts Basis)

observed in most developed economies over much of the past decade. As anyone who has read a *Principles* text knows, investment must always be equal to saving; hence one cure for a problem of underinvestment might be for the government to provide incentives for increased personal saving. This prescription has been especially strongly endorsed by advocates of "supply-side" economics in the United States. However, the interest in using saving stimuli to provide increased incentives to invest has by no means been limited to supply-siders. The observation that recent rates of personal saving in the United States, while somewhat higher than the postwar average, have been low relative to saving rates in other countries, has prompted a number of economists to come out in favor of having the government use tax policy to stimulate personal saving. In view of the close similarities between the Canadian and U.S. economies, Canadian experience with tax-based saving incentives is of particular interest to those who take this position.

The objectives of this paper are (1) to examine whether tax policies which promote higher rates of personal saving are indeed an effective means of stimulating a permanent increase in investment, and (2) to analyze recent Canadian experience in this regard. We take as given the premise that higher rates of investment are desirable but question whether saving incentives provide the most effective means of accomplishing this goal. The basic message to come out of the paper is that the conventional savings concept is an artificial construct and does not provide a reliable guide to investment behavior. Policies which result in permanently increased personal saving may not lead to greater capital formation. Conversely, policies which result in permanently increased investment activity may have ambiguous effects on personal saving.

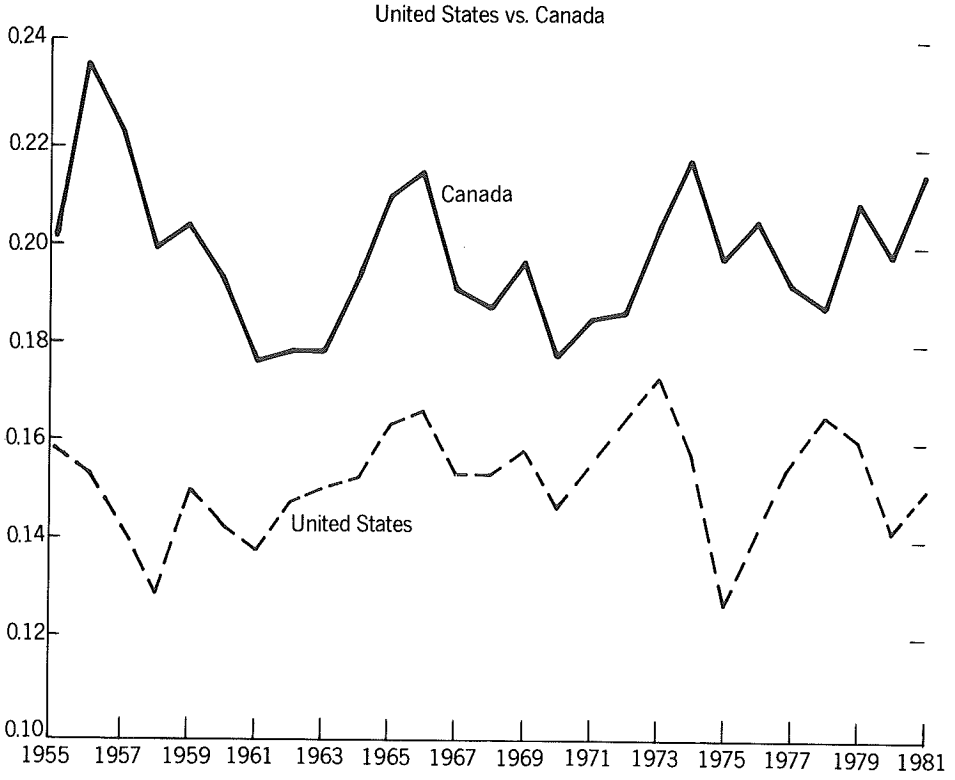
The finding that personal saving and investment do not always respond to stimuli in parallel fashion will come as no surprise to many readers. After all, Robert Barro (1974) demonstrated that a bond-financed temporary reduction in lumpsum taxes will prompt consumers to save more without altering current consumption spending or investment in physical capital. Barro's was a temporary effect, attributable to the fact that his consumers (correctly) anticipated an increase in future taxes sufficient to retire the newly issued government bonds. Consumers "saved" their tax reduction in the current period in order to be able to pay those higher future taxes. Our results will differ from Barro's in the sense that we are able to cite permanent tax reductions that lead to permanent increases in personal saving with no effects on consumption or investment, i.e., the effects are not transitory but persist indefinitely.

Tax policies that have these kinds of permanent effects are more than idle curiosity pieces. The policies instituted by the Canadian Government in the mid-1970s appear to be of this sort. Analysis of the Canadian policies suggests that they may well have contributed to an increase in personal saving but it is doubtful that they have provided increased incentives for capital investment. Those U.S. economists who are envious of recent Canadian saving performance would do well to refocus their attention on investment performance. (See Figure 2.)

Figure 2

Ratio of Real Investment to Real GNP

United States vs. Canada



The outline of the remainder of the paper is as follows. In Section II a general equilibrium model of a closed economy is developed and its steady-state properties are investigated. The model is then used to analyze the effects on equilibrium values of saving and investment of three kinds of permanent tax changes: (1) a reduction in lumpsum taxes, (2) a reduction in income taxes, (3) the introduction of a tax credit for personal saving. These particular policies are chosen because they mirror the essential features of the saving incentives introduced into the Canadian tax system.

Details of the Canadian tax incentives are presented in Section III. After a brief digression on open economy considerations, these tax measures are analyzed using the tools developed in the preceding section. Some empirical estimates of their impacts on measured Canadian saving rates during the mid and late 1970s are derived.

Some concluding observations are offered in Section IV.

II. A General Equilibrium Analysis of Selected Tax-based Saving Incentives

The purpose of this section is to develop a model capable of analyzing the types of tax measures cited in the Introduction. The choice of model is dictated by our ultimate interest in saving and investment decisions. Since these are by nature intertemporal decisions, some sort of optimizing growth model is called for. An unfortunate feature of optimizing models is that they invariably have very complex dynamic response paths. We will evade this complication by restricting the analysis to a static comparison of steady-state equilibria.

Specific features we wish the model to embody are:

(1) Some mechanism whereby tax changes affect the consumption investment decision.

(2) Some form of saving in addition to personal saving; otherwise there can be no discrepancy between personal saving and investment

Feature (1) can be satisfied by simply introducing an income tax which will serve to "distort" the consumption-investment choice faced by economic agents. Feature (2) is most easily satisfied by allowing government saving to exist at nonzero levels. This in turn requires that the government have some means of financing negative values of saving (i.e., deficits). The simplest assumption to make in this regard is to assume the government finances any deficits by printing money. We reject the temptation to include government bond issues as an additional form of deficit finance. The addition of government debt would only complicate the model without adding anything useful.

The decision to include money in the model necessitates some assumption as to why economic agents are willing to hold it. The simplest assumption is a pure transactions motive, and that is what will be adopted here. If we couple this with a tax system that is neutral with regard to inflation, the transactions motive yields a model in which money is both neutral and superneutral. It seems best to deal with such a system in as much as neutrality issues are not directly germane to the objectives of this paper. Some com-

ments on neutrality issues as they affect investment policy will, however, be offered in the final section.

Structure of the Model

A model that possesses the features described above may be described in brief fashion. This economy is assumed to consist of N identical individuals who act as price takers but possess perfect foresight regarding future wages and prices. Each individual is finite-lived and leaves exactly one heir at the time of his death so that the population remains static. Each individual supplies one (perfectly inelastic) unit of labor at all times during his life. Individuals have bequest motives and value consumption by their heirs in the same way they value their own consumption during their lifetimes.[2]

The representative consumer faces the following optimization problem at date 0:

$$\max. \qquad U_0 = \int_0^\infty e^{-\rho t} u(c_t) dt, \tag{1}$$

subject to

$$c_t + \dot{k}_t + \dot{m}_t = (1 - \tau)[r_t k_t W_t] - T_t - \pi_t m_t \tag{2}$$

$$\int_0^\infty e^{-\int_0^\infty (1-\tau) r_s ds} [c_t - (1 - \tau) W_t] dt \leqq k_t + m_t \tag{3}$$

$$m_t = \beta W_t. \tag{4}$$

The variables are defined as follows:

u = an instantaneous utility function; $u' > 0, u'' < 0$

c_t = real consumption at date t

k_t = individual holdings of capital goods at date t

r_t = the before-tax real rate of interest at date t, equal to the rate of return on capital

m_t = holdings of real money balances at date t

π_t = the rate of price inflation at date t

W_t = the real wage rate at date t

T_t = lumpsum taxes at date t

τ = the personal income tax rate

[2]This particular form of the bequest motive is more restrictive than necessary but greatly simplifies the ensuing analysis.

ρ = the rate of time preference

β = the ratio of real balances to real labor income, assumed constant

Note that the transactions demand for money is assumed to be based on labor, as opposed to total, income. Because labor is perfectly inelastically supplied, this guarantees the neutrality and superneutrality of money in the model.[3]

First-order conditions for utility maximization are given by

$$\dot{c}_t = -\frac{u_t'}{u_t''}[(1-\tau)r_t - \rho]. \tag{5}$$

Economic agents will plan rising/falling consumption streams whenever the after-tax return to capital is greater/less than the pure rate of time preference.

Output in this economy is generated by the constant-returns-to-scale production function

$$Y_t = F(N,K_t);\ F_1>0, F_2>0, F_{11}<0, F_{22}<, F_{21}>0, \tag{6}$$

where K_t $(= Nk_t)$ denotes the aggregate capital stock.

Capital depreciates at the rate δ so that

$$\dot{K}_t = I_t - \delta K_t. \tag{7}$$

Factors are assumed to be paid the value of their marginal products; hence

$$F_{N_t} = W_t \text{ and } F_{K_t} = r_t + \delta.$$

Note that the tax function embodied in equation (2) implies that tax depreciation and economic depreciation are identical; i.e., owners of capital are taxed on the return $F_{K_t} - \delta$.

The economy is assumed to be closed; hence the output market clears when

$$Y_t = C_t + I_t + G, \tag{8}$$

where $C_t = Nc_t$ and the level of government expenditures, G, is assumed constant at all points in time.

The government is bound by the budget constraint

$$G - \tau(r_tK_t + W_tN_t) - NT_t - \pi_t\left(\frac{M_{S_t}}{P_t}\right) = \left(\frac{\dot{M}S}{P_t}\right) \tag{9}$$

where M_{S_t} is the nominal money supply and P_t denotes the price level.

[3]If the usual assumption, $m_t = \beta[r_tk_t + W_t]$, were to be made, money would not turn out to be superneutral. The reason is that under this assumption money and capital must be held jointly in the individual's portfolio. The acquisition of one more unit of k_t requires the individual to acquire βr_tk_t more units of real balances. The rate of return to this joint acquisition varies inversely with the rate of price inflation; hence the capital investment decision is not independent of the rate at which money is being created.

Money market equilibrium requires

$$Nm_t = \frac{M_{S_t}}{P_t}. \tag{10}$$

Equations (5), (7) and (9) are the equations of motion of this system and describe its dynamic behavior. The workings of the economy can be completely understood without direct reference to personal or government saving, but saving behavior does underly the consumption-investment relationships modeled here.[4]

The conventional measure of aggregate personal saving is given in real terms by

$$S_{p_t} = (1 - \tau)[r_t K_t + W_t N] - NT_t - C_t \tag{11}$$

Note that S_{p_t} will exceed the gross purchase of real assets by the personal sector by the amount, $N\pi_t m_t$. This is due to the fact that the conventional definition of income, $[(1 - \tau)(r_t K_t + W_t N) - NT_t]$, excludes the inflation tax, $(-N\pi_t m_t)$, which is levied on holders of real money balances in this economy. This "tax" represents a legitimate reduction in the purchasing power of the personal sector whenever $\pi_t > 0$. Its omission from measured income gives rise to an inflation-distortion effect in personal saving of precisely the sort noted in the Introduction.[5]

The exact converse of this inflation-distortion appears in the conventional measure of government saving, expressed here in real terms.

$$S_G = {}^{\tau}(r_t K_t + W_t N) + NT_t - G \tag{12}$$

Measured government saving falls short of net asset accumulation by the government sector by the amount of the inflation tax,

$$\pi_t\left(\frac{M_{S_t}}{P_t}\right).$$

Conventional accounting techniques fail to recognize this as a legitimate source of revenue to the government sector.

Other things being equal, an increase in π_t will cause the value of S_{P_t} to rise and the value of S_{G_t} to decline by an equivalent amount. In other words, the allocation of measured saving between the personal and government sectors will vary with the rate of price inflation. The inflation-distortion effects at work here must always cancel when S_{P_t} and S_{G_t} are aggregated. That is,

[4]It is interesting that J.R. Hicks [1939, pp. 172–80] warned that saving concepts were not likely to be useful tools of analysis more than 40 years ago.

[5]In the real world an additional inflation-distortion effect arises from the accounting treatment of interest income and expenses. Conventional measures of income overstate the flow purchasing power of interest recipients by an amount equal to the product of π and the real value of debts assets, i.e., by the amount of the inflation tax levied on creditors. The converse applies to debtors.

$$S_{P_t} + S_{G_t} \equiv I_t, \tag{13}$$

irrespective of the rate of price inflation.

Steady-State Equilibrium

The economy modeled here will ultimately reach a steady-state equilibrium whenever the government maintains the tax rate, τ, constant and allows the nominal money supply to expand at some constant rate, μ. The values of all real variables will be stationary in steady-state equilibrium and the steady-state inflation rate, π^*, will be equal to μ. (Asterisks will be used to denote steady-state values.) Equilibrium is characterized by the following equality:

$$r^* = \frac{\rho}{1-\tau}. \tag{15}$$

Since $r^* + \delta$ is equal to F_K^*, and the marginal product of capital is a function only of N and K, it follows that equilibrium values for Y and K must be independent of the rate of price inflation. In fact, Y^* and K^* depend only upon N, the parameters ρ and δ, and the tax rate, τ, with

$$\frac{dK^*}{d\tau} < 0 \text{ and } \frac{dY^*}{d\tau} < 0.$$

Equilibrium investment is equal to replacement investment, δK^*. Equilibrium consumption is

$$C^* = Y^* - \delta K^* - G,$$

and this is also independent of the rate of price inflation.

Money is superneutral in this economy in the sense that variations in the rate of monetary expansion, μ, have no effects on the level or composition of equilibrium real output. Another way of expressing this is to say that the inflation tax borne by holders of real money balances is nondistorting. The only distorting tax in this economy is the income tax, which affects the consumption-saving decision of economic agents. A change in the personal tax rate is the only policy action that can alter the values of Y^* and K^*. The equilibrium value, C^*, will be altered by a change in τ and also by a change in G.

The stationary character of steady-state equilibrium means that net asset accumulation will be equal to zero for each sector of the economy. For the government sector this implies

$$S_G^* = -\pi^*\left(\frac{M_S}{P}\right)^*.$$

For the personal sector it implies

$$S_P^* = \delta K^* + \pi^* \left(\frac{M_S}{P}\right)^*.$$

The allocation of measured saving between the government and personal sectors is a function of π even in steady-state equilibrium. The higher the value of π^* the lower will be S_G^* and the greater will be S_P^*.

Analysis of Tax Policies

The simplest policy to analyze is a reduction in lumpsum taxes. What, if any, effects this will have will depend upon how it is financed. A permanent reduction in lumpsum taxes financed by printing money at a faster rate simply substitutes one form of nondistorting tax for another. This policy action can have no real effects on the economy. It will, however, cause π^* to rise and the measured value of government saving to fall, i.e., the measured value of the government's deficit will increase. It will cause the measured value of personal saving to rise by an equivalent amount.

Note that these saving effects are equilibrium, or permanent, effects. They represent the analogue in this model to Barro's temporary personal saving increase in response to a debt-financed temporary reduction in lumpsum taxes. The mechanism which gives rise to these effects is, however, different here than in Barro's analysis. Barro's consumers save more because they *anticipate* an increase in *future* nondistorting taxes equivalent in magnitude to the current reduction in nondistorting lumpsum taxes. In our analysis nondistorting lumpsum taxes are reduced and nondistorting inflation taxes are raised by an offsetting amount at the *same point in time.* Consumers permanently "save" more only because the conventional concept of saving inappropriately ignores inflation taxes. Our results arise from a measurement problem rather than from any behavioral action on the part of economic agents.

It is worth pointing out here that a deficit-financed reduction in lumpsum taxes will produce the same changes in S_P^* and S_G^* if the financing taxes the form of debt issue rather than money creation. Holders of nominally denominated government debt also bear an inflation tax in the form of a reduction in the real value of debt principal as a result of price inflation. This form of inflation tax is also ignored in conventional measures of income and saving and leads to an inflation distortion. The government budget constraint requires that any deficit-financed lumpsum tax reduction be offset by an equivalent increase in inflation taxes. It makes no difference whether this tax is borne by debt holders or by money holders; the measured saving implications are the same.

Let us now consider a permanent reduction in the personal income tax rate. This will lead to the same increase in the equilibrium values of Y, K and C, irrespective of how it is financed. However different financing alternatives will have differing implications for measured saving variables.

Suppose that the reduction in τ is financed by an offsetting change in lumpsum taxes. In this case the equilibrium value of π^* is unchanged, but the equilibrium value of the real money supply will rise due to an expansion of real labor income. S_G^* will fall in this case by the amount

$$-\pi^* d\left(\frac{M_S}{P}\right)^*.$$

S_P^* will rise by the amount

$$dI^* + \pi^* d\left(\frac{M_S}{P}\right)^*.$$

The increase in personal saving will exceed the increase in equilibrium investment.

If a reduction in τ is deficit-financed, the effects on equilibrium saving are ambiguous. The reason for this is that it is impossible to determine from the model whether the level of income taxes collected at the new equilibrium (low τ, high Y^*) are greater or less than the level of income taxes collected at the old equilibrium (high τ, low Y^*). To be able to determine this would require very explicit numerical information about the production function. Lacking this information, the results remain ambiguous.

Intuition suggests that a reduction in τ is likely to lead to lower income tax collections at the new equilibrium. If this turns out to be the case, deficit finance will mean an increase in the rate of monetary expansion is necessary in order to raise inflation tax receipts by enough to compensate for the income tax loss. The rate of inflation will rise and S_P^* will increase by more than it does under lumpsum tax finance. Correspondingly, S_G^* will fall by a greater amount under deficit financing.

On the other hand, income taxes might be higher at the new equilibrium after the reduction in τ. (This is Professor Laffer's case.) If so, deficit finance will require a reduction in the rates of monetary expansion and inflation. The inflation tax will decline in the new equilibrium and S_G^* will increase. The movement in S_P^* is ambiguous in this case because of the offsetting effects of higher I^* and lower inflation taxes. Regardless of which way this turns out, it is clear that movements in personal saving do not provide a very reliable indication of the response in equilibrium investment.

A Tax Credit for Personal Saving

Finally, consider the effects of the introduction of a permanent tax credit for personal saving. Suppose this takes the form that for every \$1 of measured income not spent on consumption, an individual's taxable income is reduced by γ dollars. This policy action reduces the effective personal income tax rate from τ to $(1 - \gamma)\tau$ and imposes what amounts to a consumption tax at the effective rate $\gamma\tau$.

The savings tax credit alters the intertemporal substitution possibilities faced by the representative individual. He can now substitute one unit of current consumption for a continuing flow of future consumption equal

to $(1 + \gamma\tau)(1 - \tau)r_t$. This alters the first-order conditions for utility maximization to

$$c_t = \frac{-u'}{u''}[(1 + \gamma\tau)(1 - \tau)r_t - \rho]. \tag{16}$$

Steady-state equilibrium is now realized when

$$r^* = \frac{\rho}{(1 + \gamma\tau)(1 - \tau)}$$

and $\mu = \pi^* =$ any constant value.

As long as the value of τ remains unaltered, any savings tax credit with $\gamma > 0$ will lower the equilibrium real interest rate and lead to increases in the values of Y^*, K^* and C^*. Thus this type of policy action will have expansionary effects on real economic activity. Whether it will actually lead to an increase in personal saving is a different matter which once again depends upon how this tax action is financed.

If the tax credit is financed by an offsetting change in lumpsum taxes, it will lead to a decline in S_G^* and an increase in S_P^* that exceeds the rise in I^*. These results are identical with those associated with a reduction in τ financed by an offsetting change in lumpsum taxes. They occur for the same reasons which need not be repeated.

If the tax credit is financed by altering the rate of money creation, the saving effects are once again ambiguous—for precisely the same reasons they were ambiguous in the case of a deficit-financed reduction in τ. The earlier conclusion that personal saving responses do not provide a reliable indication of the effects of tax policies on investment is appropriate once again.

III. Recent Canadian Experience with Tax-Based Saving Incentives

In the mid-1970s the Government of Canada introduced several major alterations to the personal tax treatment of investment income. Most significant in this regard were:

1. An investment income exclusion (IIE) applicable to interest, dividends, and capital gains from *Canadian sources.* Beginning with the 1975 taxation year, Canadian taxpayers were permitted to exclude up to a maximum of $1,000 worth of Canadian-source investment income from taxable income. The $1,000 annual limitation has remained in effect.
2. A liberalization of the tax treatment of income allocated to retirement savings in the form of Registered Retirement Savings Plans (RRSPs).

Since the early 1960s Canadian taxpayers have been permitted to establish individual retirement savings plans. When the plan is "registered" with a recognized financial intermediary (e.g., a bank or a broker), it becomes an RRSP and is eligible for special tax treatment.[6] RRSP funds are invested in Canadian assets (non-Canadian assets are ineligible). Earnings on these funds are not subject to tax. In addition, holders of RRSPs are permitted to make gross new contributions to the plan, up to some annual maximum, that are tax deductible.

Individuals are eligible to maintain RRSPs up to age 65. At age 65, the plan terminates and its holder has two options: (a) he can either declare the entire amount of funds in the RRSP as taxable income for that year, or (b) use th "funds to purchase an income-averaging annuity (sold by life insurance companies). If option (b) is exercised, the individual is subject to tax on the annuity payments as they are received. Most individuals choose option (b) because this minimizes tax liabilities under the progressive Canadian tax system.

An individual need not wait till age 65 to terminate an RRSP. He can do so at any time but must declare the entire amount as taxable income in the year of liquidation. Because the Canadian tax system is progressive, RRSPs are often used as a means of income averaging. An individual can establish an RRSP in a year of high income and liquidate it in a year of low income, thereby reducing his lifetime tax liabilities. This motive for investing in RRSPs is discussed by Michael Daly [1981] and will be ignored in the remainder of our analysis. For all intents and purposes we will assume that individuals hold RRSPs until retirement. Any individual who does this and faces the same marginal tax rate at all points in time will realize an after-tax nominal rate of return on RRSP contributions that is equal to the before-tax nominal rate of interest.[7]

RRSPs offer taxable investors an attractive alternative to the purchase of unsheltered assets. The one thing that prevents Canadians from investing even more heavily in RRSPs than they already do is the limit placed on annual contributions into these plans. Prior to 1974 the limit was set at the lesser of $2,500 or 20 percent of the earned income for a taxpayer with no employment-based retirement plan. For other taxpayers, the *sum* of RRSP

[6]Technically RRSPs refer to registered plans held by individuals who are not also enrolled in employment-based retirement plans. Registered plans held by individuals who do also have employment-based pension plans are termed Registered Pension Plans (RPPs). The designation RRSP used in the text is intended to cover both cases.

[7]To see that this is the case, consider an individual who faces a marginal tax rate of τ and invests $1 in an RRSP L years prior to age 65. The individual is entitled to an immediate tax rebate of τ dollars. If RRSP funds earn the before-tax nominal rate of interest, i, he will have accumulated a total of $(1 + i)^L$ dollars at age 65. These funds can be used to purchase an income-averaging annuity at the date of retirement. Suppose this annuity is a consol with a before-tax rate of return equal to i. Then the after-tax rate of return earned by the individual is the value of the discount rate, R, which satisfies the following:

$$\$1 = \tau + \frac{(1 - \tau)\, i\, (1 + i)^L}{R(1 + R)^L}$$

The value $R = i$ does this.

contributions and individual contributions to an employment-based retirement plan was limited to the lesser of $1,500 or 20 percent of earned income.

These limitations were sharply modified beginning with the 1974 taxation year. While the 20 percent of earned income restriction was retained, the dollar maximums were raised to $5,500 and $3,500 for taxpayers without and with employment-based plans, respectively. This represented a significant relaxation of the annual limitations. The $5,500 and $3,500 maximums are still in effect at the present time, though the cumulated inflation that has occured since 1974 has acted to substantially reduce their respective real values.

Some Open Economy Considerations

The introduction of the $1,000 IIE reduces the effective marginal tax rate on investment income to zero for any taxpayer who earns less than $1,000 per year from investment in assets. For individuals who earn more income than this, the $1,000 IIE represents a lumpsum tax reduction. The effects of this tax measure can be analyzed with the closed economy model developed in the preceding section, provided we can show that the model is appropriate for a small, open economy like Canada. The same applies to the effects of the increase in annual RRSP contribution limits. This policy action represents the sort of savings tax credit analyzed in Section II for taxpayers who are not constrained by the annual limits. For taxpayers who are constrained, the increase in contribution limits represents a lumpsum tax reduction.

It will be argued here that the closed economy model can be applied to the Canadian situation because both the $1,000 IIE and the special tax treatment accorded to RRSPs are applicable only when taxpayers invest in domestic Canadian assets. Income from foreign assets is not given favorable tax treatment under these provisions. The effect is to segment the Canadian and the rest of the world capital markets and make it possible for Canadian assets to yield lower before-tax rates of return than their international counterparts.

Suppose that prior to the introduction of these tax measures, Canadian and the rest of the world assets were perfect substitutes. Since Canada is a small economy, Canadian investors would have faced a before-tax rate of return, $\bar{r}$, determined in the rest of the world. Any change in Canadian tax laws which applies equally to investment income from all sources would have no effect on $\bar{r}$, though it could alter the consumption-saving patterns of Canadians. An across-the-board reduction in income taxes offset by an increase in lumpsum taxes, for example, would stimulate Canadians to reduce current consumption and accumulate assets at a more rapid rate. With $\bar{r}$ fixed in world capital markets, Canadians would have no incentive to increase domestic capital formation but would, instead, purchase foreign assets. The corresponding rise in Canadian personal saving would be exactly offset by a reduction in foreign saving, i.e., by a capital outflow.

If, as was actually the case, Canadian tax authorities reduce only the rate of taxation applicable to income from domestic assets, individuals will have an incentive to divest themselves of foreign assets and purchase Canadian assets. If the tax rate that is reduced is a distorting tax, Canadians will also have an incentive to reduce current consumption and accumulate assets at a faster rate. Since it is domestic assets that are being accumulated, the real rate of interest in Canada will be driven below the rest of the world rate, $\bar{r}$, and domestic capital formation will rise. The differential treatment of distorting taxes acts to segregate the Canadian and the rest of the world capital markets and allows the Canadian economy to come to the same steady-state equilibrium position achievable by a closed economy.[8] The closed economy model developed in Section II does, therefore, provide an appropriate mechanism for analyzing the effects of recent Canadian tax policies.

Investment and Saving Effects

The task before us now is to determine whether the $1,000 IIE acts principally as a reduction in marginal tax rates or as a lumpsum tax reduction to existing asset holders and to do the same for the change in RRSP contribution limits. It obviously makes a great deal of difference as regards the effects of these policies on Canadian investment incentives. If these are principally distorting tax reductions, they should provide considerable stimulus to Canadian business investment. If, on the other hand, they are principally lump sum in nature, they provide little or no investment stimulus.

Existing evidence on the distribution of investment income in Canada leads us to believe that the $1,000 IIE acts principally as a lumpsum reduction in taxes. Canadian income tax statistics for the 1979 tax year (the latest available) reveal that some two-thirds of total investment income in the form of interest, dividends, and taxable capital gains was earned in that year by taxpayers reporting gross incomes in excess of $20,000.[9] The average amount of investment income reported by taxpayers with gross incomes exceeding this amount was $3,624—well in excess of the $1,000 limit on the IIE. Moreover, the average level of investment income reported by taxpayers with 1979 incomes below $20,000 was $689. These figures do not deny that some less wealthy taxpayers would have an incentive to save and invest due to the IIE, but suggest that the bulk of Canadian investment activity is carried on by individuals for whom the $1,000 limit is a binding constraint.

[8]More correctly, the open economy will achieve the same steady-state equilibrium under these circumstances only if the equilibrium real rate of interest is $r^* \leq \bar{r}$. When $r^* > \bar{r}$, equilibrium will not be attained and the open economy will stay at a position where its domestic real rate of interest remains equal to $\bar{r}$. However, this is not a realistic possibility, for $r < r^*$ implies that domestic consumers will plan consumption streams that continually decrease over time. This sort of behavior is a possibility we rule out as implausible

[9]Source: Revenue Canada, *Taxation Statistics* (1981 Edition). The average amount of investment income exceeded $1,000 for all income classes in excess of $20,000 in 1979.

An even stronger case can be made that the 1974 increase in RRSP contribution limits represented primarily a lumpsum transfer to Canadian taxpayers. The basis for this claim is that RRSPs have offered a perfect arbitrage opportunity to taxpayers with investment income in excess of $1,000 per year. Interest paid on funds borrowed to finance RRSP contributions have been tax deductible against unsheltered investment income. (Beginning with the 1982 tax year this will no longer be the case.) Thus a taxpayer who has such income—either from foreign sources or from domestic sources in excess of $1,000—has been able to borrow at an after-tax cost of $(1 - \tau)\, i$ and earn an after-tax rate of return on a RRSP of i. He has had a strong incentive to undertake this arbitrage activity but will be constrained by the annual RRSP contribution limit. The number of taxpayers in this favorable position has been at least as large as the number bound by the $1,000 IIE limitation. It follows, therefore, that if the $1,000 IIE limitation is a binding constraint on the bulk of Canadian investors, the RRSP limitations must be too.

This does not deny that changing RRSP limits in 1974 served to lower the effective marginal tax rates faced by many lower income Canadians. It simply suggests that the amount of saving and investment funds controlled by these individuals is small relative to the total.[10]

What all of this means is that the 1974–75 tax incentives for saving introduced in Canada are best viewed as lumpsum tax reductions to upper and middle income taxpayers. We have already analyzed the implications of lumpsum tax reductions and found that they have no effect on the equilibrium value of investment—provided such nondistorting tax reductions are financed by offsetting increases in other nondistorting taxes.

It is, of course, not clear how the Canadian Government financed these tax changes inasmuch as numerous other policy actions were being taken at the same time. We must consider the possibility that the IIE and RRSP actions have caused the Canadian Government to set the overall level of personal and corporate income tax rates higher than would have otherwise prevailed. If this has occurred, then the equilibrium levels of output and investment are likely to be lower than would otherwise be the case. In other words, the IIE and RRSP policy might actually have generated perverse effects on Canadian investment activity. It is difficult to say more.

There is even more ambiguity regarding the effects of these policies on measured saving flows. The responses of personal and government saving to a tax change are difficult to assess even when the offsetting financing policy is known. When it is unknown, the situation is indeterminant. This is

[10]It is worth mentioning that neither interest paid on consumer debt nor the mortgage interest of owner-occupants is tax deductible under Canadian tax laws. This feature of the tax system serves to reduce the appeal of RRSPs and the IIE even to individuals not constrained by the annual limitations imposed by these tax policies. Any individual with outstanding consumer or mortgage debt can earn a marginal after-tax rate of return equal to the before-tax rate of interest, i, by simply repaying part of his debts. The opportunity to invest in RRSPs or tax-sheltered Canadian assets would not offer any reduction in effective tax rates to individuals in this position.

unfortunate because of the considerable interest in the question of whether the recent divergence between Canadian and U.S. rates of personal saving can be attributed to Canadian tax policies. While we cannot provide a definite answer to that question, it is possible to compute a rough estimate of the maximum increment to Canadian personal saving that might be attributable to these policies. Such an estimate might at least give some insight as to whether the tax hypothesis is a credible explanation of the observed discrepancy in saving rates.

The maximum response of personal saving to a lumpsum tax reduction occurs under deficit financing. It was shown earlier that the equilibrium value of S_p will increase by the full amount of the tax reduction under these circumstances—a response due entirely to the inflation-distortion effect. We need only estimate the annual tax revenue costs of the $1,000 IIE and the higher RRSP contribution limits in order to derive an upper-bound estimate of the impacts of these policies on personal saving in Canada.

Using detailed taxation data for 1979, it is a relatively simple matter to estimate the tax revenue loss associated with the $1,000 IIE. Data are available on the amount of the IIE by income class. An estimate of the revenue loss can be computed by multiplying the amount of IIE claimed by the marginal tax rate appropriate to each income class and aggregating the results. The resulting value for the 1978 taxation year is $0.90 billion.[11]

It is much more difficult to come up with an estimate of the tax revenue loss associated with the fact that RRSP contribution limits were higher in 1974 and after than they had been prior to 1974. It is the incremental tax reduction associated with the 1974 increase in limits that is relevant here.[12] Available taxation data report only the total amounts of gross RRSP contributions (by income class) on an annual basis. It is not possible to determine by how much these values exceed the annual contributions that would have occurred under the pre-1974 limitations from these data. In addition, taxation statistics do not report the tax-exempt accrued RRSP earnings from past contributions that also represent revenue losses to governments. That is, the tax loss associated with RRSPs in any year is the tax foregone on the sum of gross new contributions and accrued earnings from past contributions. To come up with an estimate of this loss some very crude assumptions must be made.

In 1979 a total of $5.67 billion in RRSP contributions were claimed as deductions by Canadian taxpayers. The 1974 changes acted to approximately double annual contribution limits; hence something in the neighborhood of $2.84 billion, or one-half of the total, probably represents the incremental effect of the 1974 changes on the level of new contributions in 1979. To this figure must be added some estimate of the accrued earnings

[11]$0.64 billion of this represented a loss in federal tax revenues and the remaining $0.26 billion was a loss in provincial taxes.

[12]The reason for this is that RRSPs existed prior to 1974 with no apparent effect on the Canadian-U.S. personal saving rate differential. We seek to determine whether the 1974 changes in RRSP contribution limits have been a factor causing the Canadian saving rate to rise relative to the U.S. rate.

on past contributions. Assuming a 9 percent annual rate of return and that annual contributions were $2.84 billion higher as a result of the 1974 changes in every year over the 1974–79 interval, the total incremental tax-exempt income in 1979 is estimated to have been approximately $4.26 billion. Assuming an effective marginal tax rate of 33 percent, the tax revenue losses associated with this amount are estimated to have been $1.42 billion.

Under the assumption that Canadian governments used (nondistorting) deficit finance to offset their tax losses from the $1,000 IIE and the 1974 changes in RRSP contribution limits, personal saving in Canada was higher by $2.32 billion in 1979 than might otherwise have been the case. Total personal saving was $17.81 billion in that year and the measured personal saving rate (on a National Accounts basis) was 10.3 percent. Thus Canadian tax incentives may have contributed as much as 1.3 percentage points to the 1979 personal saving rate. The effect on measured saving rates for the 1975–78 and 1980–81 intervals is likely to be of approximately the same magnitude.

The average discrepancy between measured rates of personal saving in Canada and the United States from 1975 to 1981 was 4.4 percentage points in Canada's favor. Canadian tax incentives can explain at best only one-fourth of this discrepancy under the most heroic of assumptions. It appears, therefore, that some factors other than Canadian tax incentives have been responsible for the apparent divergence in Canadian and U.S. personal saving behavior.

IV. Concluding Observations

One conclusion to be drawn from this study is that saving behavior is difficult to analyze in the aggregate. The main reason for this is that existing measures of saving do not fully correspond with the concepts of saving that economists have in mind. The analysis here has focused on only one measurement problem—the inflation-distortion effect. If that were the only difficulty, it could easily be solved by redefining saving on an inflation-adjusted basis, i.e., by correcting existing measures for inflation taxes. However in the real world there are many other measurement problems, e.g., what to do with consumer durable goods purchases and business saving by corporations? The list of alterations that could be made to measured savings concepts is long and the number of opinions regarding which of these are appropriate is diverse. Existing measures may well come as close to satisfying the majority of economists as any single set of alternatives. The point to be stressed is that saving is not a particularly useful focus of analysis.

Fortunately, for most problems an analysis of saving behavior is not necessary. The problem analyzed in this paper provides an illustration of this. If the objective of government policy is to promote increased capital formation, it is not necessary to find policy tools that will accomplish this result by first enticing economic agents to save more. It is, instead, much more straightforward to think in terms of policy tools that will directly act

to increase the after-tax rate of return on capital. Reductions in the rates of tax applied to incomes from capital investments will do this and promote higher investment, provided such tax reductions are not financed by increases in other distorting taxes that fall upon investment incomes.

In the model derived in the paper, deficit finance via inflation taxes provides a nondistorting means of finance. Inflation taxes are nondistorting here only because the model was structured to ensure the superneutrality of money. It is worth mentioning that this is probably not the case in the real world. A number of economists (e.g., M. Feldstein and L. Summers [1976]) have argued that the real tax burden borne by investors rises with the rate of price inflation. If so, this helps to explain the sluggish performance of investment over the past several years. Governments interested in stimulating capital formation would do well to consider some form of inflation indexing for income from capital sources. Whether such actions would also lead to higher personal saving is both ambiguous and not particularly relevant.

Recent Canadian experience with tax incentives provides a useful example of how focus on saving behavior can be misleading. The tax incentives enacted by the Government of Canada in 1974 and 1975 were essentially aimed at promoting capital investment by increasing personal incentives to save. Our analysis suggests that these actions were by and large lumpsum transfers to middle and higher income taxpayers. The policies not only provide little incentive for increased investment but may actually have perverse effects insofar as they have been financed by increases in distortionary taxes. Furthermore, their effects on personal saving are ambiguous.

The tax incentives may actually have caused a decline in measured personal saving in Canada. At most, they may have added something in the neighborhood of 1.3 percentage points to the measured personal saving rate over the 1975–81 interval. This increment falls well short of explaining the average 4.4 percentage point relative increase in Canadian versus U.S. rates of personal saving that has arisen over this time period. Canadian tax policies regarding personal saving do not appear to be capable of explaining this discrepancy.

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Discussion

Alan S. Blinder*

Gregory Jump's analysis of the U.S.-Canadian personal savings differential is a nice amalgam of theory, facts, and institutional details. In many ways the paper is a model for economic writing.

He begins with an empirically important question (Why have Canadian households outsaved their U.S. counterparts by a wide margin in recent years?), formulates an interesting and tenable hypothesis (that Canadians are responding to tax incentives favorable to saving), and then builds an economic model to address the issue. The model manages to be simple and coherent without being trivial and, in applying his model to the real world, Jump pays careful attention to several relevant facts and institutions. The paper neatly follows a unified thread from start to finish. I enjoyed reading it and profited from doing so.

Nonetheless, I must confess that careful study of the paper led me to conclude that the facts are a bit obscure, that the theory is not very enlightening, and that certain institutional details may be the proverbial Prince of Denmark that are left out of this particular *Hamlet*.

1. Major Themes

Though I will have some critical things to say later, I wish to begin by stressing my broad agreement with the major themes that Jump develops in examining the hypothesis that tax incentives account for the large difference in saving rates between two countries that seem so similar. As I see it, these themes are:

(1) that conventional personal saving rates are distorted upward by inflation because they fail to account for the automatic dissaving that occurs when inflation erodes the real value of money fixed assets.

Jump concentrates on money itself but realizes that corporate and government bonds are far more significant in practice. Even a casual look at this point suggests that it is of great empirical importance. In 1979, a year of high inflation, U.S. households saved 5.25 percent of their disposable income—a total of $86.2 billion.[1] But the disposable income figure included $207 billion of interest income, most of which really represented a return of principal on previous loans. And the saving figure excluded almost $44 billion in interest paid to businesses, most of which would more properly be

*Gordon S. Rentschler Memorial Professor of Economics at Princeton University.

[1]The U.S. data have recently been revised, showing considerably more saving than previously estimated. Specifically, the personal saving rate in 1979 is now put at 5.9 percent. I used the older data because I needed some of the details that I do not yet have in the newer data.

accounted for as return of principal, and hence saving. If we eliminate both interest received and interest earned, on the grounds that the real interest rate was roughly zero, then the revised saving rate jumps from 5.25 percent to 9.1 percent. The inflation distortion is no mere detail.

However, as Jump correctly points out, it is unlikely that this inflation distortion accounts for much of the discrepancy between Canadian and U.S. saving rates because the inflation rates in the two countries have been so similar.

(2) that there is a big difference between household saving and domestic investment.

Jump focuses on government saving and, in particular, on the fact that the household dissaving caused by inflation automatically becomes government saving. But Auerbach's paper for this conference reminds us of the (high, but not perfect) substitutability between business and personal saving and Fieleke's paper reminds us that capital inflows from abroad can also be used to finance domestic investment.

It is significant to note that the OECD study which motivated this conference found that household saving accounts for a much smaller fraction of total national saving in Canada than in the United States.[2] Given this fact, and the high substitutability among household, business, and government saving, we should not make too much of the fact that the personal saving rate is higher in Canada.

(3) that tax incentives used to spur saving (or, for that matter, investment) imply a loss of revenue that must be financed by an increase in other taxes (now, or in the future), including the inflation tax.

In reality, these other taxes will almost certainly be distorting, but Jump concentrates on the nondistorting case to simplify his analysis.

(4) that not all saving (or investment) incentives have marginal effects. Some are more or less lumpsum payments to savers (or investors), and Jump argues that many of the Canadian tax incentives have been of this sort.

These are all terribly important points which need to be made again and again because so many people now argue that we should use tax incentives for saving as a way to spur investment. Together, they lead Jump to be highly skeptical that Canadian tax incentives have made his country's personal saving rate much higher than our own. His skepticism rests on sound grounds and is amply justified.

Having showered all this praise on Jump, let me enter some objections. I will start with the facts, where I merely wish to raise some questions and request clarification. Then I will argue that Jump's theoretical model is ill-suited to dealing with the issue at hand. Finally, I will nominate an institutional difference between the two countries that Jump barely mentions—the tax deductibility of interest expenses—as a candidate to explain the discrepancy in saving rates.

[2]See Diagram 1 on page 8 in "International Differences and Trend Changes in Saving Ratios," OECD, Working Party No. 1, Paris, October 1981.

2. The Basic Facts

As Jump sees the data, "rates of personal saving in the United States and Canada, which had been virtually identical throughout most of the postwar period, suddenly began to diverge in about 1975." Thereafter, the Canadian saving rate went much higher than the U.S. rate. Thus Jump's view of the "stylized fact" is as shown in Figure 1.

Frankly, I just do not see this "fact" when I look at the data. When I look at his Figure 1, I see a "stylized fact" more like Figure 2; that is, a U.S. personal saving rate that is pretty much trendless over the period (though low in the last few years)[3], and a Canadian personal saving rate with a strong upward trend throughout the period. The two lines cross in about 1973.

Beauty may be in the eye of the beholder, but this difference in perspectives is fundamental. It completely changes what you look for by way of explanation. Jump looks for something that started abruptly about 1974, finds the increase in saving incentives, but argues that this hypothesis does not stand up to close scrutiny. Figure 2 would suggest a search for a factor that was present from the outset, but that grew ever more important throughout the period.

One final point should be made about "the facts." Diagram 4 (p. 95) of the OECD report offers a picture of Canadian and U.S. household saving rates that looks quite different from Jump's Figure 1. You can examine it for yourself, but when I look at the OECD diagram I see the "stylized fact" indicated in Figure 3. Both saving rates are trending up throughout the 1960s. The Canadian saving rate continues its upward march until 1975 and then flattens out, whereas the U.S. saving rate stops rising around 1972 and then falls. If these are the "facts" to be explained, then Jump may be looking on the wrong side of the border.

In any case, Jump ought to explain the differences between his "facts" and those of the OECD, and also take account of the recent upward revisions in the U.S. personal saving rates. Before we can appraise the explanation, we really must know which is the true stylized fact.

3. The Theoretical Model

As previously noted, Jump looks to tax incentives to explain the Canadian-U.S. saving differential. He takes the standard intertemporal optimization model of consumer behavior[4] and embeds it in a simple general equilibrium model in which investment is the sum of personal and government saving. There is no uncertainty and no business saving, and particular assumptions are made in order to render money not just neutral, but superneutral. (For example, the tax system is fully indexed, the demand for money is not interest sensitive, labor is supplied inelastically, and wages are

[3]The apparent decline in the U.S. saving rate in recent years was nearly obliterated by the data revisions mentioned in footnote 1.

[4]See, for example, Menachem E. Yaari, "On the Consumer's Lifetime Allocation Process," *International Economic Review,* September 1964, pp. 304–317.

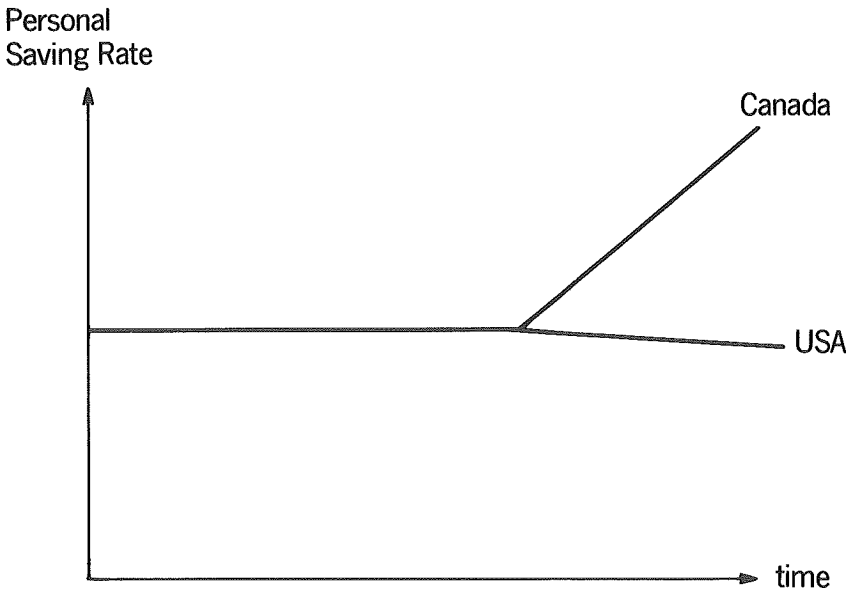

Figure 1

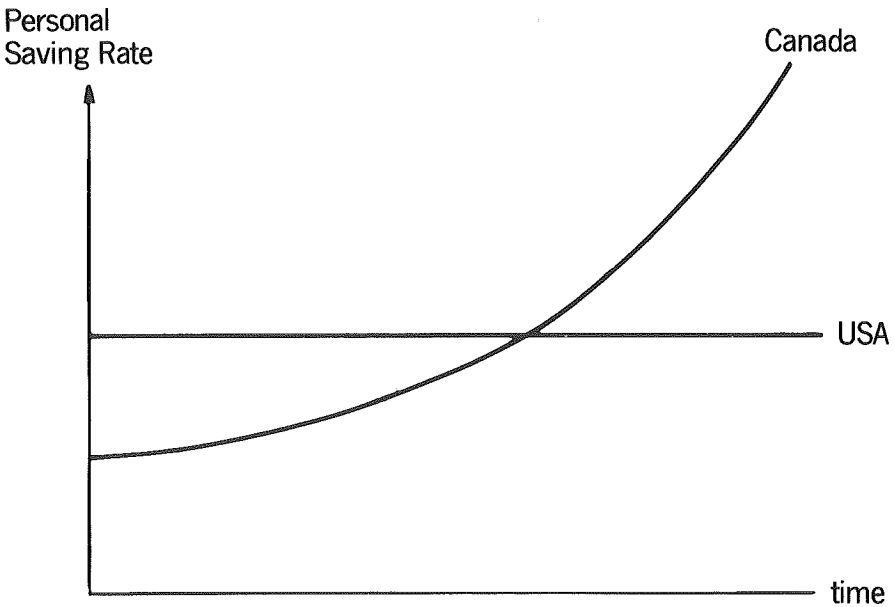

Figure 2

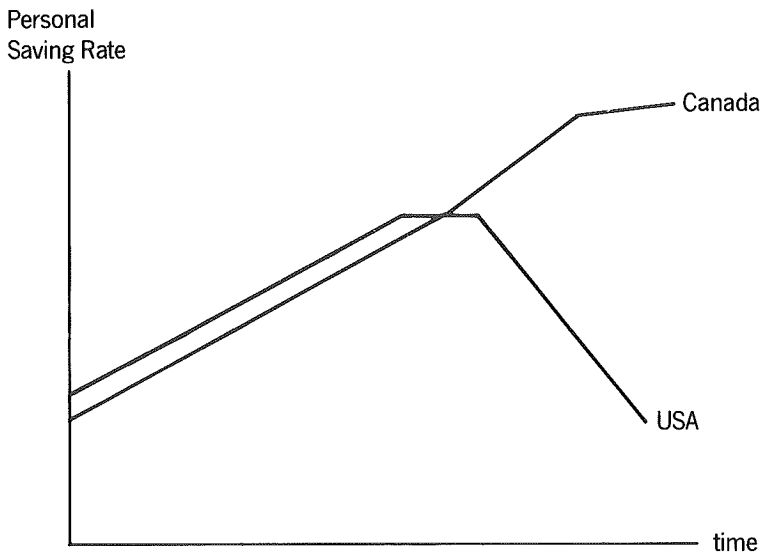

Figure 3

perfectly flexible.) Though the model can handle more general situations, Jump concentrates on the steady state.

If the model is meant to be a vehicle for making the four points which I enumerated at the outset, then I have only a few quarrels with Jump's modeling strategy.

The Model As Model

The first is that his equation (15) is not necessary for steady-state equilibrium. While I am not sure how much things would change if the condition were dropped, the fact that equation (15) is the lynchpin for almost everything Jump does with the model is worrisome.

The equality of the real after-tax return on saving and the subjective rate of time discounting is necessary to make a *single individual's* consumption constant over his life cycle. But in an economy composed of people of different ages, *aggregate* consumption will be constant as long as the age distribution of the population is constant—*regardless* of the shape of the life cycle consumption profile of a single individual. Thus $r\ (1-t) = \rho$ should not be considered as a requirement for a steady state.

This distinction illustrates, by the way, how different the steady-state and nonsteady-state properties of a model can be. A rise in the rate of interest, holding the present value of lifetime wealth constant, "tilts" each individual's consumption profile toward less consumption today and more tomorrow. In the short run, this will raise aggregate saving. But in the long

run it will not raise saving because the shape of the individual lifetime consumption profile is irrelevant in the aggregate.

A second problem is the treatment of the tax incentives offered by the Canadian authorities—which consist of tax exemption for saving (or investment income) up to a certain point, and no tax preference thereafter—as being equivalent to a lumpsum subsidy for big savers (or investors).

In fact, a tax incentive of this sort sets up a multi-armed budget constraint with one or more "kinks," such as the one shown in Figure 4. For people who locate on arm *KD*, the tax incentive does have only income effects, and hence is nondistorting. But some big savers will reach a corner solution at the kink, point *K*, and hence will have their behavior heavily distorted. Thus there are really three groups to be considered: one that experiences the usual type of distortion (a change in the slope of its budget line; see segment *KE*), another that experiences a more extreme type of distortion (those attracted to point *K*), and a third—the group on which Jump focuses—for whom the tax incentive is a lumpsum transfer (see segment *KD*). I am not sure why we should presume that the last group is of predominant importance.

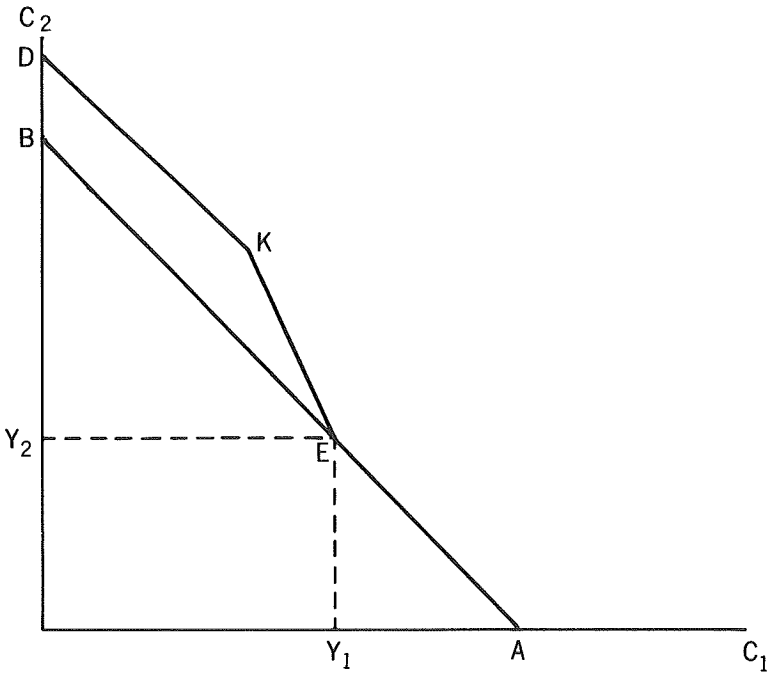

Figure 4

The Model and Reality

But, as I interpret Jump's paper, the model is meant to be more than just a bulletin board on which to hang a few good points. It is designed to study the savings differential between the United States and Canada since 1973. For this task, however, I find almost every aspect of the model objectionable.

Have the two economies been travelling along neoclassical steady-state growth paths? Did full employment prevail in both economies during the 1970s? Is the Canadian economy closed to capital flows? Is the inflation tax nondistorting? Does either country have a tax system which taxes only real interest income and allows deductions only for real interest expenses and true economic depreciation? The answer in every case is no.

It seems most unlikely that the U.S.-Canadian saving differential is a steady-state phenomenon. Neither economy was moving along a full-employment growth path during these years. Neither country's citizens could borrow or lend freely in a perfect capital market. Money was probably neither neutral nor superneutral in either country, and the inflation tax was certainly distorting. Neither country had an indexed tax system in the relevant sense, and both had relatively open capital markets (though Jump's point about the discriminatory nature of Canadian tax incentives is valid and important). The Canadian tax law allowed interest deductions neither for interest paid to finance purchases of consumer durables nor for home mortgages; the U.S. tax law allowed both. And the Canadian tax law was not the only one to have a variety of tax incentives for saving during this period. The U.S. tax law included tax breaks for pensions, IRAs, Keogh accounts, and other provisions.

Now, I know all about abstracting from details and the virtues of "as if" reasoning. But it really seems to me that some of these phenomena may be the essence of the problem. I am skeptical that a model which sweeps them all under the rug can teach us much about the U.S.-Canadian saving discrepancy. And nothing in Jump's paper removes this skepticism.

I also plead innocent to the charge of picking theoretical nits. At the end of the paper, Jump uses the model to put an upper bound on the amount of additional saving that might have been induced by the Canadian tax incentives. His calculation makes use of several of the aforementioned assumptions in an essential way, including the ideas that the Canadian economy is on a steady-state growth path, that the extra personal saving is exactly matched by higher revenues from the inflation tax, and that the inflation tax is nondistorting. Furthermore, this calculation could be relevant to the Canadian-U.S. saving differential only if the Canadian inflation rate had been higher than the U.S. inflation rate—which was not the case to any significant extent.

4. Institutional Differences

I save my most speculative comments for last. Comparisons between Canada and the United States come about as close to a controlled experi-

ment 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 differences we observe to legal-institutional differences. This is the spirit of Jump's inquiry, and I endorse it.

However, what I would have thought was the chief institutional difference between the two countries—the tax deductibility of interest expenses—is barely mentioned by Jump. Let me cite a few numbers to illustrate the potential importance of this issue.

With a 10 percent mortgage interest rate and an 8 percent inflation rate—numbers that are pretty typical for the 1970s, a Canadian pays a 2 percent net real rate of interest if he buys a house. An American pays −1 percent if he is in the 30 percent tax bracket, and −3 percent if he is in the 50 percent bracket. Even down in the 20 percent tax bracket the net after-tax rat e of interest is zero. And this ignores the fact that investments in housing are leveraged to the hilt. Furthermore, the tax distortion in favor of borrowing gets more and more important as the inflation rate rises. And inflation rates were rising for most of the period Jump studies.

The point, of course, is that the U.S. tax law encourages people to save in the form of houses and consumer durables, items that are not counted as saving in the national income accounts. I'll offer myself as a case in point. I bought my first house in Princeton in 1973 and sold it in 1977. At first I made monthly mortgage payments that were enormous relative to my income. Was I being a big spender? Hardly. I was being a big saver, for the (untaxed, and quite anticipated) capital gain that came at the end was far more enormous. A naive calculation suggests that I actually made negative expenditures on rent during those four years. Of course, that was not the case. What happened was that I did most of my saving in the form of housing. So did millions of other Americans.

About two-thirds of American dwellings are now owner-occupied. In 1979, the Commerce Department included about $115 billion in imputed rent on these dwellings in the GNP. This amounted to 6.9 percent of disposable income—far more than total personal saving as conventionally defined. Even if we count only half of this as saving—which is probably too conservative—the personal saving rate would have been 8.8 percent instead of 5.2 percent.

Now, I do not pretend that these remarks offer a definitive solution to the Canadian-U.S. saving discrepancy. The empiricism is in the best armchair tradition, and I would need to know more about the situation in Canada. But both the enormous magnitude and the particular time pattern of the tax distortion point the finger of suspicion at the tax deductibility of interest. It merits more discussion than Jump gives it.

Discussion

David F. Bradford*

I would like to start my discussion by reviewing what Gregory Jump has done in his paper examining the recent Canadian experience with tax incentives to promote personal saving. I shall then address three points, one very briefly, and two at somewhat greater length. The three points:

(i) I am skeptical of the modeling by which deficit financing is connected with inflation. However, I shall argue this is not a very important point as far as the interesting aspect of Jump's analysis is concerned.

(ii) The question of the incentive effects of Canadian tax measures merits a closer look, on which I make a small beginning.

(iii) Inflation tends to magnify certain differences between the tax structures of the two countries in ways that may explain differences in saving rates.

On the face of it, Jump was assigned a difficult task. The starting point is the surprising divergence since 1976 between U.S. and Canadian rates of household saving. These had been rather similar (and low, by OECD standards) until then. But since 1976 (reading from Jump's Figure 1), the Canadian ratio of personal saving to income has drifted up, from about 10 percent to about 12 percent, while the U.S. rate has slogged along near 6 percent. The question apparently posed to Jump: What role in the difference between U.S. and Canadian experience has been played by the tax law changes introduced by the Canadian government in the mid-1970s with the objective of encouraging savings? In brief summary, these changes consisted of allowing taxpayers to exclude from taxable income up to $1000 of (Canadian source) interest, dividends, and capital gains, and substantially liberalized limits on deductible contributions to registered retirement savings plans (holding Canadian assets).

It is, incidentally, significant and probably unfortunate that Jump did not take on the following question: What role did differences in the tax systems of the two countries play in their records? I have in mind here two points. First is the artificiality of distinguishing savings- and investment-encouraging devices. It is curious how often one encounters in this context the apparent view that it matters (in equilibrium) whether it is the buyers or the sellers that are taxed. (I am not suggesting Jump suffers from any confusion on this point.) I shall have nothing more to say about the possible bearing of changes in investment incentives on the matter under study as I do not know the facts about the Canadian rules. However, I shall say a bit

*Professor of Economics and Public Affairs at the Woodrow Wilson School, Princeton University.

more about a second aspect of differences in the two systems when I come to discuss the *implicit* changes in the laws brought about by inflation.

The thought that a connection might exist between savings incentive policies and differences in the saving performances of the United States and Canada is plausible in view of the great similarity between the two economies in other respects, and their close links. The OECD staff paper distributed to conference participants (Table 21, p. 97) presents data supporting the view that the two economies have indeed followed similar paths over the last 25 years. I would note in particular the close agreement in the inflation rates.

While there is thus some cause to suspect institutional differences lie behind differences in recently observed saving rates, the number of observations is small. What are the chances that a few years' experience in a rapidly changing world would throw out convincing evidence about the efficacy of a couple of tax incentives for saving? Judging from the contentious record of efforts to detect in time series the responsiveness of saving to the interest rate, we have to regard the chances as not very good. It is therefore understandable that Jump eschewed an econometric attack on his subject. Like any good economist in this situation, he asked what theory can tell us, and looked to the quantitative information for rough estimates of magnitudes.

Although I have reservations about the particular model employed by Jump, I have no quarrel with the essential conclusions of his theoretical analysis. That is, for a tax measure to encourage saving, it must lower the cost of future consumption in terms of present consumption. In other words, it must *raise the rate of return received by savers.* To elaborate slightly, assuming the government budget must somehow balance, as a first approximation the income effects of feasible tax changes must net to zero. If the marginal propensity to consume doesn't vary systematically in the population of taxpayers (not, in my view, necessarily a good assumption), the distributional consequences of feasible tax changes do not affect household saving, correctly measured. This is the critical point provided by theory. If the tax law changes don't raise the rate of return received by savers at the margin, they won't influence savings.

Did the tax law changes in the mid-'70s change the rate of return to savers? Jump correctly refines the question: Compared to what? If the saving incentives reduce tax revenue, it has to be made up somewhere. So the question is incomplete until we specify the offsetting change. Having argued theoretically that an inflation tax, attributable to increased issue of money, is of a lump-sum character, Jump chooses to evaluate the hypothetical alternative of no savings incentives and slower money growth. The no-real-effect argument is complete if one accepts that the tax law changes were themselves also of a lump-sum character. In this case the package of offsetting budgetary effects has no effect on saving, correctly measured.

However, because money issue does raise the rate of inflation, it does bring about a mismeasurement of saving, of a kind Jump has previously brought to our attention. That is, neglect of household dissaving through lost real balances, and of government saving through the offsetting change

in its monetary liabilities, leads to an overstatement of household saving and an understatement of government saving. It is this mismeasurement, and not any real savings effect, to which Jump attaches an upper-bound in the latter part of his paper.

I come then to my first, and minor point. Even recognizing that it is only an issue of measurement, I would take exception to Jump's reliance on a direct connection between deficit finance and inflation in making his estimates. His identification of bond finance and money creation is only valid in a steady-state model. In a model which permits bond finance today to be offset by either money expansion or tax finance in the future, deficit spending is not necessarily inflationary. I therefore question Jump's assumption that deficit finance translated immediately into price level changes.

We are presumably not really interested in the contribution policy made to an apparent but not real difference. Correcting U.S. and Canadian household saving rates for inflation involves about the same adjustment in both, and leaves the puzzle. The interesting question remains the explanation of the differences in correctly measured household saving rates.

Were the saving policy changes, indeed, of a lump-sum character? First, a look at Jump's empirical evidence. Concerning the $1000 tax-free investment income (presumably *net* income is involved—could one borrow from a foreign bank and avoid the netting of interest?), Jump points out that in 1979, two-thirds of total (not just Canadian source) investment income (net?) accrued to taxpayers reporting gross incomes in excess of $20,000. This implies one-third was received by taxpayers with gross incomes below $20,000, a group with average investment income of $689. Presumably this group includes many elderly taxpayers with investment income in excess of $1000. But presumably also the group of taxpayers with gross income above $20,000 includes many young families in the early accumulation phase of life. From these figures, one could imagine that something like one-fourth of investment income was received by taxpayers still exempt at the margin by virtue of the $1000 provision. This is not a wholly negligible magnitude.

It is also perhaps risky to identify saving with the receipt of investment income. Because under Canadian tax law neither interest on consumer borrowing nor home mortgage interest is deductible, there is a tremendous incentive for households to direct saving first to the reduction of these liabilities, or at least there is a strong incentive for them thereby to avoid exceeding the $1000 exempt investment income limit. Thus, simply looking at the evidence in connection with the $1000 investment income, it is quite possible that a very substantial proportion of savers confronts the full before-tax rate of interest at the margin. This proportion is the critical empirical magnitude.

As far as the registered retirement savings plan limits are concerned, Jump presents no evidence at all. Rather he relies upon the argument that households can borrow against contributions to these plans, and therefore have every incentive to maintain contributions at the limit allowed by law (and to restrict withdrawals to the minimum required by law in the retirement phase). If it is possible to borrow costlessly against these plans, at a

rate of interest that equals that received within the plan, it is certainly true that a priori reasoning implies that nearly everyone would borrow to the hilt. However, to the extent that for many individuals the associated interest is not deductible, or to the extent that existing mortgages and the like imply that they already have in effect tax-exempt saving margins, there are many savers who will be indifferent at the margin to even such a costless arbitrage transaction.

It is, furthermore, most unlikely that the arbitrage is totally costless. At a minimum, one would assume that banks and other lenders would extract some spread between the rate of return charged to borrowers against pension savings, and that actually received in the savings plans. Finally, experience in the United States suggests that arguments based on a priori reasoning about what would be obviously sensible financial behavior may be contradicted by the facts. An interesting example is the suggestion by Merton Miller and Myron Scholes that the limitation on the deductibility of borrowing for portfolio investment purposes means that dividends are effectively free of tax. While optimal on a priori grounds the implied behavior is clearly not borne out by the facts in the United States. Wealth owners simply do not borrow to the extent transactions-cost-free theory suggests they ought to do.

If many savers do not borrow to take advantage of the registered retirement savings plan (and particularly now that the law has been changed in Canada) they will often be in a position to expand their contributions or to reduce the rate at which they draw down accumulations in their retirement phase. During such periods they, of course, face the before-tax rate of return on their savings decisions. Furthermore, even during periods in which the constraints on contributions or withdrawals are effectively binding on savers, there will typically be more or less lengthy periods in which they will, nonetheless, maintain larger accumulations under liberalized contribution limits. This may be seen by writing down the full household optimization problem subject to the savings plan limitations.

No doubt the most important question is whether a saver is confronting the before-tax rate of return interest at the margin. What is very striking is how much more likely it is to be the case in Canada than in the United States. The savings incentives we have been discussing here feature importantly: the $1000 investment income exemption and the relatively generous registered retirement savings plan limits. However, critically important as well is the absence of the deductibility of interest on mortgage or personal borrowing. I can well imagine that for a substantial majority of savers in Canada the before-tax rate of interest is the relevant factor at the margin.

This brings me, then, to the way in which the inflation rate, common to both countries, brought about effective changes in their legislation. If the question had been broadened to whether differences in the tax system help explain the differences in savings behavior, the different treatment of interest deductions would have been seen to be very important. Let us make the common assumption that during an anticipated inflation the interest rate

adjusts approximately one point per point in the inflation rate. While such an adjustment maintains the before-tax rate of interest constant in real terms, it introduces a spread in the real after-tax rates of return according to a tax bracket. The *wedge* between the return before and after tax on interest changes markedly during inflation, even with no change in tax rules. In particular, with the inflation at recent levels, high bracket taxpayers find their incentive to accumulate at interest drastically reduced and their incentive to borrow at interest vastly increased. This effect would lead them to reduce rates of savings as measured in the statistics examined here, while possibly to some degree offsetting these reductions through accumulation of untaxed forms of capital, including consumer durables.

This effect is often underrated in importance. Let's take a simple example. Suppose the rate of interest is 2 percent in the absence of inflation and 15 percent with 13 percent inflation. The following little table shows what happens to the real interest rate according to taxpayer marginal bracket:

Real After-Tax Interest Rate

Marginal Tax Bracket	No Inflation	Inflation at 13%
0	2	2
30	1.4	−2.5
50	1	−5.5

Put another way, here is what happens to the price of a real dollar of purchasing power 25 years hence:

Effective Price of a Dollar of Purchasing Power 25 Years Hence

Marginal Tax Bracket	No Inflation	Inflation at 13%
0	61¢	61¢
30	70¢	$1.87 (!)
50	78¢	$3.96 (!)

Even for taxpayers in modest tax brackets there is now an enormous incentive to borrow at interest and to dissave from interest-bearing forms of savings, the margin at which the average Joe in the United States probably makes his savings decision. In Canada, as inflation proceeded, the average Joe was kept confronting the real interest rate before tax. This didn't change much. In the United States, the relevant interest rate was the after-tax interest rate, and it was sharply cut by the effect of inflation. Indeed, a comparison of the tax rates at the margin would lead one to expect a drop in the rate of savings in the United States (measured in this discussion), and the maintenance of the rate of savings in Canada.

While I have the pulpit, let me close with a pious remark. There is a risk in focusing the concern of this conference on overall savings performance. Our concern is more properly with efficient resource allocation, and this has to do as much with the composition and distribution of investment and saving as with the overall aggregates. One of the more distressing aspects of measures that have been recently taken in this country to alter the aggregate is the undoubted distortion that they have introduced into the composition. Alan Auerbach will have much more to say on this aspect of the matter, which I think cannot be overemphasized.