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Did Tax Flattening Affect RRSP Contributions?

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Abstract: In 1988, marginal personal income tax rates changed in Canada, for some individuals by reasonably substantial amounts. This note examines a large sample of tax-filer data and finds little convincing evidence of any effect on contributions to Registered Retirement Saving Plans (RRSPs).

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I Introduction

In 1988, marginal personal income tax rates changed in Canada, for some individuals by reasonably substantial amounts, although not by as much on average nor in as consistently a downward direction as in the United States tax reform of 1986. Auerbach and Slemrod (1997) summarize the studies of the U.S. reform as suggesting that there was little effect on savings. In this note, the focus is on the effect of the change of tax rates in Canada on one form of saving, that is contributions to Registered Retirement Savings Plans (RRSPs)¹. In a large sample of tax-filer data, there seems to be little convincing evidence of an effect. Because the rate of return on RRSPs increases directly with current tax rates both absolutely and relatively to other assets, this provides one piece of evidence suggesting that RRSP contribution behaviour is not linked closely to changes in rate of return.

Section II of this note explains the basic modeling approach while Section III very briefly describes the data. Section IV discusses the results, consisting of some comparisons of means and some regression results. Section V concludes.

II The Approach

The approach has two strands. First, roughly following the framework of Feldstein (1995) who examines the overall changes in income following U.S. tax flattening in 1986², the average contribution behaviour is compared for those whose marginal tax rates increased, stayed the same and fell in 1988. Second, a regression equation for RRSP contributions is developed with right hand side variables including the marginal tax rate but also other variables, and a number of possible specifications are explored in a sensitivity analysis.

The analysis is arranged around the year 1988 because in that year the federal government reduced the number of tax brackets from ten to three, changing the marginal rates for a number of individuals as shown in Table 1. All provinces but Quebec calculate basic provincial income tax as a percentage of federal tax.³ While the overall direction of change is not clear from the table and some provinces

¹The RRSP is a feature of the Canadian personal income tax system that essentially allows an individual taxpayer to save a proportion of income annually (up to certain cash limits) free of current income tax. Assets within such a plan compound on a tax-free basis. Withdrawals are taxable (and become compulsory at age 69).

²See also Sillamaa (1998a) for an examination of changes in overall income before and after the 1988 Canadian tax changes and Sillamaa (1998b) for an examination of changes in labour supply.

³In addition there are both federal and provincial surcharges on those with high taxable income and these too are largely based on federal income tax.

Table 1: Canadian federal tax brackets in 1987 and 1988			
1987 taxable income limit (\$)	1987 tax rate (%)	1988 taxable income limit (\$)	1988 tax rate (%)
1320	6		17
2639	16		17
5279	17		17
7918	18		17
13197	19		17
18476	20		17
23755	23		17
-	23	27500	26
36952	25	-	26
-	25	55000	26
63347	30	above	29
above	34	-	29

increased tax rates at this time, in the sample of taxfilers from all provinces except Quebec (the sample will be described in detail later), the average change in marginal tax rates is a reduction of 4 percentage points.⁴

In the descriptive analysis, the focus is on the largest province, Ontario, but Nova Scotia and New Brunswick are also included.⁵ Table 2 shows how the basic rates of these three provinces changed

⁴ For some individuals the marginal tax rate changes were fairly large. For example a Nova Scotian with taxable income of \$24,000 in 1987 and the same real income in 1988 would have had a fall in the combined federal/provincial marginal tax rate from about 36% to just under 27%. If the initial income had been above \$63,347, the marginal tax rate would have fallen from 53% to just over 45%. These changes were large enough for Sillamaa (1998a, 1998b) to identify what appear to be labour supply responses.

⁵The motivation for some province-by-province descriptive analysis is to maximize homogeneity for comparisons (given different provincial tax regulations etc.). While the choice of provinces is somewhat arbitrary, of the three provinces that did not change their basic rates over the 1986 to 1989 period (the others are Newfoundland and Saskatchewan), Nova Scotia had the

Table 2: Provincial Basic Personal Income Tax Rates, 1986 to 1989 (as a % of basic federal tax)				
Province	1986	1987	1988	1989
Nova Scotia	56.5	56.5	56.5	56.5
New Brunswick	58.0	58.0	60.0	60.0
Ontario	50.0	50.0	51.0	52.0

over this period.

Assume that the perceived real after-tax rate of return on RRSPs is

$$(1) R^{RRSP} = (1+r)^n(1-t_w)/((1-t_c)(1+\pi)^n)$$

where n is the number of time periods until withdrawal, t_w is the expected rate of income tax upon withdrawal (RRSP withdrawals are taxable), r is the expected interest rate (assumed constant and equal across types of securities), t_c is the current rate of income tax and π is the expected rate of inflation (assumed constant). While the formula contains many simplifying assumptions, it illustrates two reasons why an increase (decrease) in the marginal income tax rate will make RRSPs relatively more (less) attractive. First, if the perceived marginal rate of tax upon withdrawal is not a function of the current marginal tax rate, the rate of return to RRSP contributions *relative to current consumption* will increase if the current income tax rate increases, because income that is directed into RRSP contributions is “deductible” for purposes of current income tax. Second, even if t_w is a function of t_c (for example if $t_w = t_c$), but t_c is (or is related to) the tax rate in effect between contribution and withdrawal, the return to RRSP contributions *relative to other financial assets* (for example, the returns to bonds and stocks, modeled in expressions (4) and (5) below) is an increasing function of t_c , because of the tax-free compounding RRSPs provide.⁶

III The Data

The Small Area Administrative Data Division of Statistics Canada maintains panel data based upon personal income tax returns. The panel begins in 1982 and is updated annually. Tax returns are linked

least extensive stock savings plan. New Brunswick and Ontario changed their basic rates but had no stock savings plan or similar measure. See Canadian Tax Foundation (1989).

⁶Moreover because of compounding, even in the $t_w = t_c$ case where t_c is also the tax rate during the interim, small differences in current tax rates can make large differences: for example at $r = .09$ a tax change of 4 percentage points can make a difference of 20% in the overall return over 20 years and of 50% over 30 years. These differences will be greater if $dt_w/dt_c < 1$.

by family. Each year's sample is representative of those who filed a tax return that year and either have a Canadian social insurance number (SIN) or do not have a SIN but are listed on the tax return of a spouse who does have a SIN. Once selected, these taxfilers are included in the database every subsequent year they file a tax return. About 20 million or 70% of Canadians file a tax return and of these approximately 2 million are included in this sample, although the samples here are smaller because they are restricted by various selection rules.⁷

IV Empirical Analysis

Table 3 describes the real RRSP contributions of a number of selected groups. Note that the empirical analysis in this table and elsewhere in this paper only includes individuals who were always aged 18 to 65 from 1986 to 1989 (unless otherwise specified), who would have paid taxes on the margin in 1986 (\$1305 was the taxable income threshold in 1986), who contributed to RRSPs in 1986 (to eliminate from the comparisons any effects related to the information and other costs associated with a first contribution to an RRSP) but whose 1986 contributions were 20% less than the RRSP limit, so that contributions were unconstrained by RRSP limits and might be more visibly responsive to changes in marginal tax rates. Throughout the 1986 to 1989 period, RRSP limits were the lesser of 20% of earned income (which includes income as an employee, self-employment income and rental income) or \$3500 less employee Registered Pension Plan (RPP) contributions, if any.

The main message from the table is that there is no evidence of a change in real RRSP contributions that can be traced to a tax change, either between 1987 and 1988 or over the longer period 1986 to 1989. As noted, the predominant tax change between 1987 and 1988 was a decrease in tax rates and hence a lessening in the incentive to contribute to RRSPs yet there was no reduction in RRSP contributions. (Similar results were found when the province by province analysis was restricted to those with some self-employment income or those with RPP contributions and for Ontario, where numbers were sufficient to allow a reliable analysis at a higher level of detail, when the sample was limited in turn to men aged 30 to 55 with wives employed outside the home, to other men, to married women aged 30 to 55 and to other women.) From the average RRSP contributions for individuals whose marginal tax rates stayed constant, rose or fell between 1987 and 1988, it can be seen that while in Ontario those with higher marginal tax rates did contribute slightly more to RRSPs, there was no fall in contributions by those whose marginal rates fell. In both New Brunswick and Nova Scotia, those whose marginal tax rates fell had a bigger increase in RRSP contributions than those whose marginal rates rose.

⁷The data are not published but were made available under contract with Statistics Canada in its Ottawa office, under controlled onsite access to maintain confidentiality. There are also confidentiality-based reporting restrictions involving rounding and minimum size of comparison group.

Table 3: Real RRSP Average Contributions in 1986 Dollars, Various Selected Groups, 1986-1989

(All individuals had 1986 taxable income exceeding \$1305, were taxfilers in all four years, unless otherwise specified between ages 18-65 and made a positive RRSP contribution in 1986 at least 20% below contribution limit)

Description of Group	Number in Group	Average Contributions			
		1986	1987	1988	1989
Ontario	53820	1700	1900	1900	1800
New Brunswick	2540	1400	1400	1500	1500
Nova Scotia	3320	1300	1400	1500	1500
Ontario, marginal rates same between 1987 and 1988	1260	1000	900	1000	900
Ontario, marginal rates fell between 1987 and 1988	26540	1700	2000	2000	1800
Ontario, marginal rates rose between 1987 and 1988	26020	1700	1800	1900	1800
New Brunswick, marginal rates fell between 1987 and 1988	1330	1300	1300	1400	1300
New Brunswick, marginal rates rose between 1987 and 1988	1210	1400	1500	1600	1800
Nova Scotia, marginal rates same between 1987 and 1988	130	900	800	700	700
Nova Scotia, marginal rates fell between 1987 and 1988	1670	1300	1300	1500	1500
Nova Scotia, marginal rates rose between 1987 and 1988	1520	1400	1400	1400	1500

Notes to table: Unless otherwise specified all individuals were adults aged 18-65 in both 1986 and 1989. Marginal tax rates are treated as the same if they changed by less than .2%. For New Brunswick, the number with unchanged marginal tax rates using this criterion was sufficiently small that Statistics Canada suppressed the result to maintain confidentiality.

We now turn to a brief regression analysis of the potential effect of marginal tax rate changes on

RRSPs. The following basic regression equation was estimated using data for all provinces except Quebec:

$$(2) \Delta RRSP = -629 + 0.018\Delta I - 1474\Delta Tax + 23Age + 157Self - 103 RPP - 382 Low - 116Male$$

$$(14.1) (49.3) \quad (7.7) \quad (25.5) \quad (5.8) \quad (-4.8) \quad (14.2) \quad (5.1)$$

$$N = 100740 \quad R^2 = .033$$

where the magnitudes of t-statistics are in brackets, $\Delta RRSP$ is the change in an individual's real RRSP contributions between 1986 and 1989 (where "real" means CPI adjusted, 1986=100), ΔI the change in the individual's real received income over that period, ΔTax is the change in the individual's marginal tax rate, Age is age in 1986, $Self$ is a dummy variable for some self-employment in either 1986 or 1989, RPP is a dummy for some RPP contributions in either 1986 or 1989, Low is a dummy variable for 1989 income less than \$27,804 and $Male$ is a dummy variable for gender. Clearly from the value of R^2 there is tremendous heterogeneity but nonetheless every coefficient is significantly different from zero at the 5 per cent level. The income coefficient indicates that a one dollar increase in real income is associated with an increase in real RRSP contributions of just under two cents. The coefficients for the last five variables indicate that RRSP contributions grew more for individuals who are older, have some self-employment income, are not members of Registered Pension Plans, are not low income and for women (who have higher expected lifespan than men and are less likely to have as many earning years). All these coefficients are remarkably consistent both in sign and in rough magnitude across all the regressions run. But the key result is that the ΔTax coefficient has the wrong sign. In the equation, higher marginal tax rates are associated with lower not higher RRSP contributions.

One possible criticism of equation (2) is that part of the marginal tax rate change faced by an individual comes from changes in income not fully captured by the ΔI income term. In (3) there is an attempt to control for this by using the variable $\Delta ETax$. This variable is the marginal tax rate an individual taxpayer would have experienced in 1987 if the (new) 1988 tax schedule had been in effect in 1987 (with the 1988 tax brackets adjusted downward using the CPI to reflect the 1987 price level) less the actual marginal tax rate in 1987. Hence $\Delta ETax$ is a measure of the policy change effect on marginal tax rates. The resulting estimates are:

$$(3) \Delta RRSP = -746 + 0.017\Delta I - 393\Delta ETax + 24Age + 156Self - 112 RPP - 259 Low - 81Male$$

$$(17.0) (48.7) \quad (1.8) \quad (26.4) \quad (5.78) \quad (-5.3) \quad (11.7) \quad (3.6)$$

$$N = 100740 \quad R^2 = .033$$

It can be seen that the coefficient of this "exogenous" tax change variable is still negative and hence not the theoretically-expected sign. This wrong-sign result was also robust to changing the specification in a variety of other ways including defining ΔTax only over the 1986 to 1988 period and adding the square of age and the square of ΔI to the regression.

Other types of sensitivity analysis were run as well. First, the change in marginal tax rate variable was replaced with the change in the tax rate variable defined in (1). A drawback is that this requires the specification of expected rates of interest and inflation (9% and 5% respectively were chosen)⁸ as well as setting n to be $69 - \text{Age}$ ⁹, but this approach does allow the estimation of a model both with $t_w = 0$ ¹⁰ and alternatively with $t_w = t_c$. To summarize these results, in both cases the rate of return coefficient has a negative sign (again inconsistent with theoretical expectation) although in the $t_w = t_c$ case the coefficient estimate is not significantly different from zero at the 5 per cent level.

Second, in another set of extensions, the possibility of substitute assets was considered. The theoretical basis for this is not clear because for most individuals the after-tax returns are higher in RRSPs and hence it would normally be expected that all financial assets would be saved for retirement within RRSPs (recall the sample individuals are all below the maximum contribution limit). In the few cases where the perceived return to saving is higher outside of RRSPs, it would be expected all saving would be entirely outside of RRSPs. There might not be significant substitution based on marginal changes in the after-tax rate of return.¹¹ Nonetheless, to try to allow for these effects explicitly but simply, the variable from (1) is incorporated directly in the regression as well as the rates of return on two stylized assets, both held until retirement. “Bonds” are assumed to have a perceived after-tax real rate of return of:

$$(4) R^l = (1+r(1-t_c))^n / (1+\pi)^n$$

making the strong assumption that the rate of income tax does not change over the holding period

⁸The rate of return on long-term Canadian government bonds (CANSIM series) over the four years 1986 to 1989 was 9.54%, 9.95%, 10.23% and 9.92% while the CPI all-items inflation measure (CANSIM series) was 4.4%, 4.9%, 5.0% and 4.8% for the same years.

⁹While the RRSP program is described as a method of saving for retirement, contributions are liquid and individuals can withdraw RRSP funds without special penalty. (A withdrawal is taxed as income but the withholding of income tax at source upon withdrawal is for most individuals at a lower rate than the eventual income tax due. Hence the RRSP program provides an element of income averaging to the income tax system, allowing a taxpayer to contribute when marginal tax rates are high and withdraw when marginal tax rates are low.) Even at ages younger than retirement, withdrawals were about 20% of contributions for 1991-95 (Statistics Canada, 1997). Nonetheless for this particular test of specification sensitivity, the RRSP decision is thought of as involving saving for retirement and hence n is plausibly $69 - \text{Age}$.

¹⁰Examining (1) it should be apparent that the choice of any constant value for t_w between 0 and 1 would only affect the scale of the coefficient of the ΔR^{RRSP} variable.

¹¹The usual gains from diversification are largely absent as most assets held by Canadians can be held inside RRSPs. One exception is the 20% content rule regarding foreign assets, although the investment portfolios of Canadians, like those of other nations’ residents, exhibit little international diversification (French and Poterba, 1991) .

(even though it will change to t_w in the subsequent retirement year). “Equities” have an assumed real rate of rate of return in a portfolio designed for retirement of

$$(5) \quad R^E = ((1+r)^n - .75t_w((1+r)^n - 1)) / (1+\pi)^n$$

where the .75 is because only 75% of capital gains are taxable in Canada and it is assumed that tax deferral is maximized: that is, that investment is in “growth” stocks with no dividends and that there are no realizations until withdrawal. Note in each case it is still assumed that all securities earn r per year and the same assumptions on r , π and n are used as before.¹²

The results of these extensions were somewhat more varied than previous results and, on occasion but not usually, the “right” result was obtained in that an increase in rate of return of RRSPs appeared to be associated with an increase in RRSP contributions. However in all the variants run (combinations involving either $t_w = t_c$ or $t_w = 0$, with and without the square of age and the difference in income squared as variables, with different functional forms and different return variables as the “numeraire” and estimating using 1986 to 1988 changes rather than 1986 to 1989), in most cases the coefficients on both of the alternative asset variables were the “wrong” sign (indicating that purchases of these assets were not substitutes for RRSP contributions) and on all occasions at least one of the alternative asset variables had coefficients wrongly signed and significantly different from zero at the 5 per cent level. This is in contrast to relatively stable results regarding the coefficients of the dummy variables and the income variable. (For example when income was entered linearly, it consistently had a coefficient of either 0.017 or 0.018 just as in the regressions above.) So while this second set of sensitivity analyses adds a note of caution, the conclusion remains that there is no reliable evidence in the sample of an effect of real after-tax rates of return on RRSP contributions.

V Conclusions

While the tax rate flattening in Canada of 1988 included significant marginal tax rate changes for some taxpayers, no convincing evidence has been found that these changes affected RRSP

¹²These approximations are inevitably crude but note their role is simply to provide a somewhat richer specification than explored so far. Note the approach here is essentially cross-sectional so time series variation in the returns in different types of securities cannot be exploited, although even if this were possible, there would be a great difficulty in extrapolating from short-term returns to an appropriate estimate of the long-term return for securities held to retirement. The assumption that securities inside and outside RRSPs earn the same return seems reasonable as these can be the same securities. While some would argue that equity returns would be perceived to be higher than bond returns, over this four year period the Toronto Stock Exchange 300 Index increased just over 38% or just under 9% per year compounded. As a sensitivity check, the rate of returns used in defining all variables was increased to 11% for 1989, with no change in the basic pattern of results.

contributions. This provides some support for the view that, provided the RRSP rate of return is perceived to be better than that in other vehicles, the level of RRSP saving is not sensitive to changes to the rate of return either absolutely or relative to other assets. This finding for a particular component of saving is consistent with Auerbach and Slemrod (1997) who, in summarizing the U.S. studies for the period including the U.S. tax reform of 1986, found that “saving rates did not respond in a clear pattern to after-tax real rates of interest.”

There is an extensive empirical literature that has tried to determine whether tax-favoured saving such as in RRSPs is “new” or whether such plans have only served as repositories for assets that have already been accumulated or would be accumulated in any case. For U.S. plans such as Independent Retirement Accounts or 401(k) plans, Poterba, Venti and Wise (1996) have concluded that close to 100% of the saving is new, while Engen, Gale and Scholz (1996) have concluded that none is new. In Canada, Carroll and Summers (1987), Jump and Wilson (1986) and Venti and Wise (1995) suggested that the jump in aggregate saving in the early 1970s in Canada relative to the United States was evidence that the Canadian RRSP program was generating new saving but Burbidge, Fretz and Veall (1997, 1998) have argued against this interpretation. Some might argue that this note provides evidence against the proposition that RRSPs are largely new saving, because in standard optimizing models, RRSPs induce new saving by providing a higher rate of return and this note suggests that RRSP contributions may not be sensitive to changes in rate of return. However, suggesting that there would be no effect on saving if RRSP after-tax rates of return were lowered to that of other assets (in effect if RRSPs were abolished), would be extrapolating far outside a sample experience in which almost every individual always had far greater after-tax return saving in an RRSP than outside one. In any case propositions about overall saving behaviour need to be studied using measures of overall saving, not just RRSP saving. The results of this paper are consistent with the RRSP program having an effect on saving but suggest that, within limits, there is little evidence even in a very large sample that changes in tax rates (and by extension changes in rates of return available within the program) will much affect RRSP contribution behaviour. There may also be other channels by which the RRSP program may influence saving, for example the types of behaviour emphasized by Thaler (1990, 1994) who argues that roughly similar U.S. programs may affect saving largely through “framing” and other psychological channels.

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