New Evidence on Taxes and Portfolio Choice

Sule Alan
Kadir Atalay
Thomas F. Crossley
Sung-Hee Jeon

Institute for Fiscal Studies

E·S·R·C
ECONOMIC
& SOCIAL
RESEARCH
COUNCIL

New Evidence on Taxes and Portfolio Choice

Sule Alan
University of Cambridge, CFAP and SEDAP

Kadir Atalay
McMaster University and SEDAP

Thomas F. Crossley
University of Cambridge, IFS and SEDAP

Sung-Hee Jeon
The University of Melbourne and SEDAP

February 2009**

Abstract: Identifying the effect of differential taxation on portfolio allocation requires exogenous variation in marginal tax rates. Marginal tax rates vary with income, but income surely affects portfolio choice directly. In systems of individual taxation – like Canada's – couples with the same household income can face different effective tax rates on capital income when labor income is distributed differently within households. Using this source of variation we find statistically significant but economically modest responses to taxation. In a "placebo" test, using data from the U.S. (which has joint taxation), we find no effect of the intra-household distribution of labor income on portfolios.

JEL classifications: G11, H24, H31
Keywords: Household Portfolio Choice, Taxes,

Executive Summary

1. Theoretical models predict that households' portfolio allocation decisions are based not only on the risk-return relationship of assets but also on their tax characteristics. Given risk and return characteristics, households should minimize tax burden by tilting their portfolios toward less heavily taxed assets. Moreover, less taxed households face a smaller incentive to invest in tax-favoured assets.

2. Identifying the effect of differential taxation on portfolio allocation requires exogenous variation in marginal tax rates. Marginal tax rates vary with income, but income and wealth surely affect portfolio choice directly.

3. In systems of individual taxation – like Canada's – couples with the same household income can face different effective tax rates on capital income when labor income is distributed differently within households. Because income taxes are progressive, a household with one member with high labour earning and one member with low labour earnings typically also has one member with a high marginal tax rate and one member with a low marginal tax rate. This household may be able to arrange its affairs to obtain the lower marginal tax rate on capital income.

4. We first use evidence from a tax reform to show that Canadian couples do in fact arrange their capital income to take advantage of the lower marginal tax rates of secondary earners.

5. Using this source of variation we find statistically significant but economically modest responses to taxation. Holding household income and wealth constant, households with a higher first-dollar marginal tax rate on capital income hold a larger share of their portfolio in tax-favoured assets. They are also more to hold tax-favoured assets at all.

6. In a "placebo" test, using data from the U.S. (which has joint taxation), we find no effect of the intra-household distribution of labor income on portfolios. This finding supports our interpretation of the Canadian data as revealing a true tax effect.

I. Introduction

The effect of taxation on household portfolio choice has long been an important question facing researchers and policy makers. Theoretical models predict that under a differential taxation system, households' portfolio allocation decisions are based not only on the risk-return relationship of assets but also on their tax characteristics. Given risk and return characteristics, households should minimize tax burden by tilting their portfolios toward less heavily taxed assets. Moreover, less taxed households face a smaller incentive to invest in tax favored assets. For these theoretical predictions to be a useful guide to tax policy, empirical evidence is required that confirms the qualitative predictions of theory, and which provides quantitative estimates of the magnitudes of relevant effects.

The literature on tax avoidance (Slemrod and Yitzhaki, 2002) suggests that tax elastities may be much larger for aspects of financial arrangements (for example, the timing of income) than for real variables (such as labor supply or savings levels.) Portfolio choice may be in the former category. Nevertheless, there have been relatively few empirical studies of the effect of taxation on portfolio allocation. The existing literature is well surveyed by Poterba (2001). The key challenge in this literature is to find a substantial and plausibly exogenous source of variation in tax rates. The contribution of this paper is to derive new estimates of tax effects on portfolio allocation using a novel source of variation in tax rates.

Cross-sectional differences in the marginal tax rates (MTRs) generate variation across households in the relative after-tax returns of different assets classes. Examples of this kind of study includes Feldstein (1976), Hubard (1985) and King and Leape (1998). All these studies find strong effect of taxes on asset allocation. A problem with this approach however, is that

household MTRs are highly correlated with income, and so it is difficult to disentangle a pure tax effect from income or wealth effects on portfolio allocation.

Another strategy, pursued first by Scholz (1994), then Samwick (2000) and Poterba and Samwick (2003) is to study changes in portfolio allocation around tax reforms (using a 'diff-in-diff' approach.) The great advantage of this approach is that the tax reform generates variation in MTRs *within* income groups. Moreover, if a suitable control group can be identified, it is possible to control for general time effects, under a 'common trends' assumption. However, the common trends assumption may also be a weakness of this approach. It may be difficult to identify, with any confidence, control groups that were unaffected by the tax reform, but experience time effects that are similar to the time effects experienced by those that were affected by the reform. Moreover, the investigator faces a difficult tradeoff in deciding the interval over which the data should be 'differenced'. A strategy that compares periods just before and after the reform risks missing delayed adjustments to changes in taxation (households may not rebalance portfolios instantaneously, because of transaction costs or other sources of inertia.) On the other hand, a strategy of comparing data from long before a tax reform with data well after the tax reform rests more heavily on the common trends assumption and so suffers from a greater risk of confounding a tax effect with other time effects.

It is well known that the last few decades witnessed significant trends in household portfolio allocation. Prior to 1980s most households' financial wealth was held in simple forms (mostly in liquid and safe assets) in most industrialized countries. This observation has changed considerably since 1990s; now a large proportion of households in these countries hold significantly more sophisticated portfolios. Financial liberalization, declining information costs, attraction of employer-sponsored retirement accounts (such as 401Ks in the U.S) and

introduction of tax advantaged investment tools (such as registered education saving accounts in Canada) are among the explanations offered for this trend.[1] The large size of time effects in portfolio allocations makes the common trends assumption particularly worrying.

In light of all this, it would be useful to have additional estimates of tax effects on portfolio allocation, based on alterative sources of variation in tax rates. The strategy proposed in this paper is to exploit variation in MTRs across households with the same *total* earnings, which arise in progressive income tax systems with individual taxation. In jurisdictions with individual taxation, such as Canada, two households with the same total earnings, but divided differently between the principal and secondary earner, may face a different MTR on the first dollar of household capital income. In particular, households in which most of the labor income is earned by one individual will face a lower MTR on the first dollar of capital income than a household with fairly equal income shares. This is because the former household can attribute capital income to the household member with lower labor earnings. This advantage does not exist in systems of joint taxation, as in the United States. Thus in Canada (and other countries with individual taxation) it is possible to study the effect of MTR on portfolio allocation while holding constant household income and wealth. We use the 1999 Canadian Survey of Financial Security to implement this empirical strategy.

Of course, there are a number of important challenges to the validity of this strategy. We address these empirically. First, this strategy rests on the assumption that in systems with individual taxation, households shift financial assets to the secondary earner (or lower-earning spouse) in order to minimize the taxation of capital income. Stephens and Ward-Batts (2004)

---

[1] See Bertaut (1998) and Guiso, Haliassos and Japelli (2002) for exhaustive surveys of household portfolio facts and trends.

report evidence in support of this proposition from a study of the 1990 change from joint to individual taxation in the U.K. Below we provide further evidence supporting this assumption, by studying the distribution of capital income within households before and after the Canadian tax reform of 1988. For many households, that tax reform had the effect of making the Canadian tax system less joint.

Second, households in which labor earnings are fairly equally contributed may differ in important ways (in addition to effective MTR) from households that have similar total labor income and wealth, but greater inequality in labor income shares. For example, households with two labor incomes of fifty thousand dollars annually may have different preferences (including risk tolerance) than a household with a single labor income of one hundred thousand dollars per year. Alternatively, intra-household decision making may proceed quite differently in these two (for example, bargaining power may be more evenly distributed in the first household than in the second.) To address these concerns, we implement a 'placebo test'. In particular, we study the relationship between labor income shares and portfolio allocation (holding wealth and total income constant) in two U.S. data sets: the 1998 Survey of Consumer of Finances (SCF) and the 1999 wealth module of the Panel Study of Income Dynamics (PSID). Because the U.S. has joint taxation, the first dollar MTR on capital income is unaffected by the distribution of labor income within the household. Thus a correlation between labor income shares and portfolio allocation in these data would suggest important heterogeneity in preferences or household bargaining, while the absence of such a correlation would support our empirical strategy for identifying tax effects.[2]

---

[2] Indeed, one can think of our empirical strategy as a natural experiment or difference - in – difference approach, but where the contrast is across household types (rather than before and

Veall (2001) employs Canadian micro data to estimate the effect of taxes on households'

contributions to tax-favored retirement savings accounts (Registered Retirement Savings Plans, -

RRSPs). Milligan (2002) studies the effect of taxes on RRSP participation, again with Canadian

micro data. Note that RRSP contributions and participation reflect decisions both about the level

of saving and about portfolio allocation. Neither author exploits the identification strategy that

we propose but rather they employ a more traditional approach based on temporal and provincial

variation in tax rates (following the work on U.S. tax reforms cited above.) Veall examines the

Canadian tax reform of 1988. He finds a *negative* relationship (though not statistically different

from zero in all specifications) between RRSP contributions and marginal tax rates –

contradicting the prediction that less taxed households face a smaller incentive to invest in tax-

favored assets. In contrast, Milligan, who looks at participation (rather than contributions

conditional on participation) and uses a combination of temporal and cross-province variation in

tax rates, finds that that a 10 percentage-point increase in the marginal tax rate increases the

participation probability by eight percent. Milligan notes that a potential explanation for Veall's

finding is that tax changes in the period he studied may be overwhelmed by general trends in

---

after a tax reform), and where the control groups are drawn from a otherwise-similar jurisdiction

with a different tax system (rather than from individuals in the same jurisdiction who were less

affected by the reform.) The strategy rests on the proposition that the U.S. and Canada are

sufficiently similar in preferences, technology and institutions to allow the identification of

policy effects. This is an idea with a substantial pedigree (see for example, Card and Freeman,

1993.) The contrast between Canada's system of individual taxation and the U.S. system of joint

taxation has recently been exploited by Schuetze (2006) to study income splitting among the

self-employed.

RRSP behavior. This is one example of the kind of concern with the traditional identification strategy which we outlined above. In contrast, our proposed identification strategy does not employ temporal variation. To the best of our knowledge, our strategy has not been previously employed (neither in Canada nor other jurisdictions.)

To preview our main results, we find that Canadian households do shift capital income within the household to take advantage of the system of individual taxation; and that in Canada, holding wealth and total income constant, households with more equal income shares (and hence a higher MTR) tilt their portfolios towards less taxed assets. Moreover we find no evidence of the latter effect in the SCF or PSID, suggesting that the effect we observe in the Canadian data is a true tax response, and not attributable to heterogeneity in preferences or intra-household bargaining. We find that a ten percentage point increase in marginal tax rates increases the mean portfolio share of taxed-favored assets by 2 percentage points, a modest, but statistically significant effect.

The Section 2 presents some evidence that Canadian couples allocate financial assets among partners in order to minimize tax liabilities. We then turn to the effect of marginal tax rates on portfolio choice. Section 3 elaborates on our data and methods, and results are presented in Section 4. Section 5 concludes.

II. The Allocation of Investment Income Within Households

Variation in the distribution of labor income within households with the same total income generates variation in the effective MTR on capital income if households allocate capital income across household members in order to minimize their tax liability. Typically this would mean having the partner with lower labor income hold financial assets which generate taxable

income. Stephens and Ward-Batts (2004) report evidence that U.K. households follow such a strategy. Their study is based on the switch from joint to individual taxation in the U.K. in 1990. Under joint taxation, the MTR on capital income did not depend on the allocation of capital income among partners, so the shift to individual taxation created an opportunity for couples to avoid taxation by attributing capital income to the lower earning partner (usually the wife.) Stephens and Ward-Batts report a significant increase in the share and incidence of capital income claimed by wives. They also note an increase in the incidence of couples in which all capital income is attributed to the wife. They therefore conclude that couples responded to the switch from joint to individual taxation by reallocating asset ownership to the partner with lower labor income.

While the Canadian and post-1990 UK tax systems have individual taxation in common, they differ in ways that may be important for our study. In the U.K., couples can choose the division of household assets between spouses. In Canada, this is less straightforward. In particular, transfers of ownership between couples could attract taxation. Nevertheless, there are likely ways in which Canadian couples can arrange the attribution of capital income so as to minimize tax liability. We now present some evidence that this is case.

The Canadian income tax system is generally based on individual taxation, but particular features of the tax code have at times created incentives similar to those provided by a system of joint taxation. The Canadian tax reform of 1988 is particularly interesting because it reduced the "jointness" of the tax system facing couples in Canada. It eliminated a connection between a secondary earners' effective marginal tax rate (on labor or capital income) and her (or his) spouse's marginal income tax rate. A spousal exemption (tax deduction) was replaced with a non-refundable tax credit. Under both a deduction and a credit, the amount that can be claimed

by the primary earner is in each case reduced as the secondary earner's income rises. However, because a deduction reduces taxable income, its value depends on the marginal tax rate of the primary earner who claims the deduction and is therefore much higher for high-income (and hence high marginal tax rate) husbands. In contrast, the value of tax credit does not depend on primary earner's marginal tax rate. Thus the effect of the reform was to significantly reduce the "first dollar" marginal tax rate of women married to high-income husbands, while leaving the "first dollar" marginal tax rate of women married to lower income husbands essentially unchanged.

Crossley and Jeon (2007) exploit this change in a difference-in-difference framework to study the effects of taxes on the labor supply of married women. They use data from the Canadian Survey of Consumer Finances (SCF) for the years from 1986 to 1991[3] and focus on low education women (because these women are most likely to be secondary earners.) Crossley and Jeon report that low education women married to higher income husbands significantly increased their labor force participation (particularly part-time participation) as a result of the Canadian federal tax reform in 1988.[4]

We have used the methods and data of Crossley and Jeon (2007) to study the effect of the 1988 tax reform on the capital income reported by low education married women and their husbands.[5] The idea is that for some of these women (those married to high earning husbands) there was a significant decrease in their 'first dollar' effective marginal tax rate, whether that

---

[3] The Canadian SCF is quite similar to the US March supplement to the CPS.

[4] The estimated effect on participation rates is sizeable: 9 to 10 percentage points.

[5] An interested reader can find further details on the tax reform, data and methods in Crossley and Jeon (2007).

dollar was labor income or capital income. Crossley and Jeon have shown that some households responded by the wife entering the labor force; here we ask whether some of these households responded by reallocating asset ownership to take advantage of the possibilities for tax saving that the reform introduced.

Table 1 suggests that this is indeed the case. Relative to a control group that was unaffected by the tax reform, wives that experienced a significant decrease in their effective marginal tax rate were 8.5% points more likely to report capital income after the reform. The estimated effect on dollars of capital income reported by these married women is $209 which implies that the treated group essentially doubled their reported capital income. These results echo the findings of Stephens and Ward-Batts (2004). On this basis, we conclude that (like their U.K. counterparts) Canadian couples reallocate asset ownership to minimize tax liabilities. This means that the effective marginal tax rate on capital income is often the marginal tax rate of the partner with lower labor income, and so within couples with the *same* household labor income, marginal tax rates on capital income will vary depending how much of that labor income is earned by each partner. The rest of our analysis employs this source of variation to study the effects of taxation on portfolio choice.

III. Portfolio Choice: Data and Methods

 a) Data

Our main estimates are based on master files from the Canadian Survey of Financial Security, SFS. This survey involved personal interviews in May and June of 1999. The sample includes a supplement of 2,000 households selected from geographical areas with a larger concentration of high income households. Sample weights provided by the survey are used to make the data representative of the Canadian population as a whole.

The SFS (1999) individual files contain information on labor income of all members in a household separately. The portfolio allocation information is recorded at the household level and it is available through the family files. We first merge the SFS individual files with the family files. We then categorize the assets reported in the SFS by their tax characteristics (details below). We define individual income, as the sum of wages and salaries, self employment income (business and farms), pensions and taxable government transfers.[6]

For the placebo tests we use two major American data sets; the Survey of Consumer Finance, SCF (1998) and the Panel study of Income Dynamics, PSID (1999). The SCF is a triennial survey that collects information from approximately 4500 respondents concerning household wealth and its allocation. The survey is considered to be the best source of information on household finances in the United States. The main shortcoming of the SCF for our purposes is that detailed income information is not available at the individual level. Thus we must construct within household incomes shares from data on wages and salaries only. (In contrast, in the Canadian SFS, we construct incomes shares that reflect all of the income sources listed in the previous paragraph.) To ensure that this difference is not driving the results, we repeat our placebo tests on the PSID (which has complete income information at the individual level.)

The PSID is a long running panel survey (since 1968) with detailed individual income information. Wealth supplements were added to the main survey every 5 years beginning in 1983. The portfolio allocation information in these supplements is not as detailed as in the SCF.

---

[6] Government transfers include Old Age Security, Canada/Quebec Pension Plan Benefits, disability and death benefits, child benefit and employment insurance benefits. We do not include investment income, because it is clearly endogenous to the shares.

Nevertheless, the aggregate asset categories we need for comparison to the Canada data can be constructed. In the PSID we define income (at both the individual and household level) as the sum of wages and salaries (including overtime payments, bonuses and commissions), child support, and government transfers.

Tax characteristics of different savings instruments depend not only on the type of assets held but also where those assets are held. For example, dividend payments are taxed at the household's marginal tax rate on labor income if stocks are held directly or in mutual funds, but they are not taxed until withdrawn if the stocks are held in a tax-deferred account.

We classify interest bearing assets as heavily taxed assets as the income generated by these assets are taxed at the household's marginal tax rate on labor income. We classify stocks and mutual funds as moderately taxed assets as capital gains are not taxed until realization and generally, households' marginal capital gain tax rates are lower than ordinary income marginal tax rates. One problem we face is that dividend payments are treated similarly to interest earnings and taxed at the household's marginal tax rate on labor income. By classifying stocks as moderately taxed we are assuming that capital gains are the most important part of the returns generated by stocks and dividend payments are relatively less important for tax considerations. Other assets that we classify as moderately taxed include tax-free bonds and tax-free bond funds as capital gains on these assets are taxed even though the interest income they generate is tax-exempt. Our final category includes assets that are tax-favored (deferred) such as RRSPs (registered retirement accounts) and educational saving accounts in Canada and IRA and Keogh accounts in the US. Interest income, dividend payments, capital gains in these accounts are not taxed until withdrawn. Table 2 summarizes the definitions of asset categories we constructed for the SFS, the SCF and the PSID.

Table 3 presents mean portfolio shares of all three assets categories in total financial wealth and mean income share of minor income earner (in total household income) across the three data sets. While the distribution of income shares of the minor income earner is very similar in both countries (with a mean of about 22% and a standard deviation of 18%), portfolio holdings are quite different in the U.S. and Canada. In particular, tax-favored investment accounts were much more important in Canada than in the United States at the time these data were collected (the use of tax-favored retirement accounts has continued to grow in the U.S.). The difference is almost entirely offset by the holdings of heavily taxed assets which were much more important in the US. In terms of moderately taxed assets (stocks and mutual funds), the data from the two countries are very similar.[7]

Our working sample includes married (or common-law) couples with or without children. We eliminate households who report negative total income for the survey year. We define the household head as the major income earner of the family (in cases where both spouses earn the same amount, we treat the older one as the head). Households whose heads are older than 65 or younger than 25 are excluded. Finally, households whose heads are full time students during the survey year are eliminated. The final estimation sample size is 6010 households in the SFS. From the sample, for some estimates, we exclude households that are Quebec residents and households with self employment income (because we cannot calculate marginal tax rates for

---

[7] There are a small number of households that report no holdings of financial assets. We follow Poterba and Samwick (2002) and assume that these households have under-reported holdings of chequeing/saving accounts. We therefore assume that these households are censored at 1 for heavily taxed asset group and 0 for other 2 groups. We get very similar results if we simply delete these households.

these households). This leaves a working sample of 3710. Identical sample restrictions are applied to the SCF and PSID data, resulting in samples of 1837 and 2097 couples.

b) *Methods*

We begin our analysis with cross sectional 'reduced form' regressions of portfolio shares $\left(s_h^k\right)$ on household characteristics including household income and wealth (X_h), and the share of household labor income earned by the lower earning partner $\left(ES_h\right)$:

$$s_h^k = X_h \beta^k + \alpha^k ES_h + e_h^k \quad \textbf{(1)}$$

Note that *k* indexes asset classes and *h* indexes households; e_h^k is a regression disturbance. The variable ES_h is our source of variation in marginal tax rates. We do this on samples that include and exclude the province of Quebec, and include and exclude households with significant self-employment income. Household wealth and income variables are entered as quartile dummies. Additional control variables (also included in X_h) are basic demographic attributes of household head, such as age, gender, education and occupation. We also include a dummy variable for home ownership and a dummy variable indicating that the household has a child. A statistical issue arises from the fact that portfolio shares are bounded between 0 and 1. In particular, a significant number of households have shares of heavily taxed assets equal to one (and hence 0 shares for other asset classes.) To address this, we employ two-limit Tobit estimation (with upper and lower limits at 1 and 0).

This empirical strategy requires that ES_h is correlated with marginal tax rates, and that ES_h can be otherwise excluded from the portfolio share equation. To determine whether

ES_h provides significant variation marginal tax rates, we estimate 'first stage' OLS regressions of the form:

$$mtr_h = X_h \theta + \gamma ES_h + \varepsilon_h^k \quad \textbf{(2)}$$

where mtr_h the marginal tax rate the household faces on its first dollar of capital income. This variable is calculated using the tax simulation program described in Crossley and Jeon (2007). That program is not capable of generating marginal tax rates for households from the province of Quebec (which has a somewhat different tax system from the rest of Canada) or for households with significant self-employment income. Thus we can only perform this regression on the sample that excludes Quebec residents and self-employed households.

To determine whether ES_h is a plausibly exogenous source of variation in marginal tax rates (that is, whether ES_h can be otherwise excluded from the portfolio share equation), we conduct a 'placebo' test. In particular, we re-estimate the portfolio share equations (1) on similar samples drawn from the 1998 Survey of Consumer of Finances (SCF) and the 1999 wealth module of the Panel Study of Income Dynamics (PSID). Because the U.S. has joint taxation, the first dollar MTR on capital income is unaffected by the distribution of labor income within the household. Thus if the effect ES_h on portfolio allocations operates only through its effect on taxes, it should have no effect in the U.S. Alternatively, a correlation between labor income shares and portfolio allocation in these data would suggest important heterogeneity in preferences or household bargaining.

Finally, reduced form equations like (1) are insufficient for policy analysis that requires magnitudes. Thus we estimate equations that directly capture the relationship between the tax rates on capital income that households face and their portfolio allocations:

$$s_h^k = X_h \pi^k + \phi^k mtr_h + u_h^k \ \textbf{(3)}$$

The effect of marginal tax rates on portfolio allocations is captured by the ϕ^k parameters, all

notation is as above, and u_h^k is regression disturbance. We estimate these Tobit equations with an

endogenous regressor by full maximum likelihood Tobit, using ES_h as the instrument for the

marginal tax rate. For completeness and comparison, we also report Tobit estimates in which we

treat the marginal tax rate as exogenous. Again because of the limitations of the tax calculator at

our disposal we can only estimate these equations on the sample that excludes residents of

Quebec and households with significant self-employment income.

In a set of (exhaustive) share equation, a theoretical restriction is that the marginal effects

of any one explanatory variable should sum to zero across the equations. With exhaustive shares

and a common set of explanatory variables, linear regression automatically imposes this

restriction. However, this is not the case with Tobit estimation. Imposing the "adding-up"

restriction on a system of Tobit equations is very cumbersome (see Poterba and Samwick, 2002,

and Rosen and Wu, 2004). We therefore follow Rosen and Wu (2004) and first perform

unconstrained estimation and then calculate marginal effects and check that the adding up

constraint is satisfied. In our data the marginal effects come very close to summing to zero (and

are not statistically different from zero), so we simply report the unconstrained estimates. We

now turn to our results.

IV. Portfolio Choice: Results

a) Reduced form estimates

The left-hand column of Table 4 presents estimates of equation 1, for all three asset

categories in the (Canadian) Survey of Financial Security. Coefficients on the income share (α^k)

are reported; full results are presented in an available Appendix (Tables A1-A2). These estimates indicate that households in which the income share of the minor earner is higher (that is, closer to 0.5) hold larger portfolio shares in tax-favored assets and smaller portfolio shares in heavily taxed assets. As such households will face higher effective marginal tax rates, this result accords with the prediction that higher taxed households will face greater incentives to invest in tax-favored assets.

As noted in Section 3, some of our subsequent estimates can only preformed on a restricted sample that excludes the self-employed and residents of Quebec (this is the case whenever we use the Marginal Tax Rate variable). The right-hand column of Table 4 indicates that our basic results holds (although slightly weaker) for this restricted sample. In particular, in the restricted sample, just as in the full sample, households with more equal income shares hold a larger portfolio share in tax-favored assets.

In addition, the full results reported in an available Appendix (Tables A1-A2) indicate that: 1) higher levels of net wealth and income are associated with higher shares of tax-favored assets and lower shares of heavily taxed assets; 2) Higher education is associated with lower shares of heavily taxed assets and higher shares of the other asset categories (particularly moderately taxed assets – which includes stocks); and 3) having children and owning a house are positively associated with higher shares of tax-favored assets.

b) First stage estimates and placebo test

Our interpretation of the results in Table 4 rests on two assumptions: that income share of the minor earner is a significant determinant of marginal tax rates (instrument relevance) and that (conditional on other controls) the income share of the minor earner does not affect portfolio shares except through the marginal tax rate (instrument validity). We examine the first of these

assumptions in Table 5. Table 5 reports the coefficient on a regression of marginal tax rates on the income share of the minor earner and our other control variables (Equation (2) in the previous Section). These estimates confirm that, controlling for household income, wealth and demographic characteristics, the income share of the minor earner is a very significant determinant of the effective marginal tax rate on capital income faced by the household.

Table 6 takes up the question of instrument validity, via a placebo test. Here we re-estimate Equation (1), for each asset category, on U.S. data drawn from the PSID and SCF. Again, because the U.S. has joint-taxation, the effective household marginal tax rate on capital income should be independent of the within household distribution of labor income (holding total household income and wealth constant). Table 6 shows that that the coefficient on the income share of the minor earner is never statistically different from zero in these estimates. This result is robust to the exclusion of the self-employed from these samples (full results available from the authors.) This finding strengthens our confidence in the assumption that, in Canada, the income share of the minor earner affects portfolio choice through the effective household marginal tax rate, and not through some other channel (and thus the income share is a valid instrument for the marginal tax rate.)

c) IV estimates

Finally, Table 7 presents estimates of Equation (3), which relates portfolio shares directly to the effective household marginal tax rate on the first dollar of capital income. The estimates in the right-hand column treat the marginal tax rate as endogenous and use the income share of the minor earner as an instrumental variable. For completeness we report, in the left-hand column, estimates that treat the marginal tax rate as exogenous. Because these estimates obviously require

the marginal tax rate variable, they were obtained from the sample which excludes Quebec and the self-employed.

The preferred estimates in the right-hand column indicate that higher marginal tax rates are associated with larger portfolio shares for tax-favored assets. This result is strongly statistically significant and in accord with the prediction that households facing high marginal tax rates have greater incentives to hold wealth in tax-favored assets. Interestingly, we do not find this result when we fail to instrument for the marginal tax rate and instead treat it as exogenous (in the left-hand column.)

Because these estimates are from Tobit models the coefficient on the marginal tax rate is not a marginal effect (ie., the coefficient is not the derivative of the expected portfolio share with respect to the marginal tax rate). However, we have calculated the marginal effect of the marginal tax rate at the mean of the data and these are also reported at Table 7. We find that a ten percentage point increase in marginal tax rates increases the mean portfolio share of taxed-favored assets by 2 percentage points (or, since the mean share of tax-favored assets is about 0.5, about 4 percent.) This is a modest effect.

d) Further checks

There is a further concern with our empirical strategy, which is as follows. Individual contributions to RRSPs are subject to an annual limit. In 1999, the cap was the smaller of 13,500 dollars or 18% of earned income. This implies that for households with household earned income in excess of 75,000 dollars, the total (household) RRSP contribution limit is larger when labour income is more equally distributed within the household. For example, a single earner household with earned income of 100,000 dollars had a contribution limited of 13,500 while a household with two earned incomes of 50,000 had a contribution limit of 18,000. In practice, the

contribution limit is rarely binding. Nevertheless, to check whether this feature of the RRSP

system may be driving our results, we re-estimated our reduced forms (eqn. (1)), focusing only

the extensive margin. In particular we estimated Probit models for participation in different asset

classes to examine the effect of the distribution of labour income within the household, while

holding household income and wealth constant. While contribution limits might affect the share

of wealth held in RRSPs, they should not affect the decision to participate in RRSPs. The results

of this exercise are summarized in Table 8. The results indicate that households in which the

lower earning spouse earns a greater share of labor income, are more likely to participate in tax-

favored saving accounts. Thus we conclude that are basic results are not being driven by

contribution limits.

V. Conclusion

Identifying the effect of taxation on household portfolio allocation requires plausibly

exogenous variation in marginal tax rates. In progressive tax systems, marginal tax rates vary

with income levels, but income, or wealth, almost surely affects portfolio choice directly. In

systems of individual taxation – like Canada's – couples with the same level of household

income (and wealth) can face different effective tax rates on capital income if labor income is

distributed differently within households. In this paper, we employ this source of variation to

estimate the effect of taxes on portfolio choices, while controlling for household income and

wealth. We find statistically significant but economically modest responses to differential

taxation. In a placebo test, using data from the U.S. (which has joint taxation), we find no effect

of the intra-household distribution of labor income on portfolio choice. The results of this test

support the validity of our empirical strategy.

References

Bertaurt, Carol C. 1998. "Stockholding Behavior of U.S. Households: Evidence from the 1983-1989 Survey of Consumer Finances." *Review of Economics and Statistics*, 80(2):263-275.

Card, D. and R. B. Freeman, ed. 1993. *Small Differences That Matter: Labor Markets and Income Maintenance in Canada and the United States*, Chicago: University of Chicago Press for the National Bureau of Economic Research.

Crossley, Thomas F. and Sung-Hee Jeon. 2007. "Joint Taxation and the Labor Supply of Married Women: Evidence from the Canadian Tax Reform of 1988." *Fiscal Studies*, 28(3):343-365.

Feldstein, Martin S. 1976. "Personal Taxation and Portfolio Composition: An Econometric Analysis." *Econometrica*, 44(4): 631-50.

Guiso, Luigi, Micheal Haliassos, and Tullio Japelli. 2002. *Household Portfolios*, Cambridge, MA: MIT Press.

Hubbard, Robert G. 1985. "Personal Taxation, Pension Wealth, and Portfolio Composition." *Review of Economic and Statistics*, 67(1):53-60.

King, Mervyn A. and Jonathan I. Leape. 1998. "Wealth and Portfolio Composition: Theory and Evidence." *Journal of Public Economics*, 69(2):155-193.

Milligan, Kevin. 2002. "Tax-Preferred Savings Accounts and Marginal Tax Rates: Evidence on RRSP Participation." *Canadian Journal of Economics*, 35(3):436-456.

Poterba, James. 2002. "Taxation, risk taking and household portfolio behavior." In *Handbook of Public Economics*, ed. Alan J. Auerbach and Martin S. Feldstein,Vol:3, 1109-1171. Amsterdam: Elsevier.

Poterba, James, and Andrew A. Samwick. 2003. "Taxation and household portfolio composition: US evidence from the 1980s and 1990s." *Journal of Public Economic*, 87(1): 5-38.

Rosen, Harvey, and Stephen Wu. 2004. "Portfolio choice and health status." *Journal of Financial Economics*, 72(3): 457-484.

Samwick , Andrew A. 2000. "Portfolio Responses to taxation: Evidence from the end of the rainbow" , In *Does Atlas Shrug? The Economic Consequences of Taxing the Rich,* ed. Joel Slemrod, 289-323. Cambridge, MA: Harvard University Press.

Scholz, John K.1994. "Tax Progressivity and Household Portfolios: Descriptive Evidence from the Surveys of Consumer Finances," In *Tax Progressivity and Income Inequality*, ed. Joel Slemrod, 219-267. Cambridge, UK: Cambridge University Press.

Schuetze, Herbert J. 2006. "Income Splitting Among the Self-Employed." *Canadian Journal of Economics*, 39(4):1195–1220.

Slemrod, Joel and Shlomo Yitzhaki. 2002. "Tax avoidance, evasion and administration", In *Handbook of Public Economics*, ed. Alan J. Auerbach and Martin S. Feldstein,Vol:3, 1423-1470. Amsterdam: Elsevier.

Stephens, Melvin Jr. and Jennifer Ward-Batts. 2004. "The impact of separate taxation on the intra-household allocation of assets: evidence from the UK." *Journal of Public Economics*, 88(9-10):1989– 2007.

Veall, Michael R. 2001. "Did tax flattening affect RRSP contributions?" *Canadian Journal of Economics,* 34(1):120-31.

Table 1: Effect of the 1998 Candian Tax Reform on Capital Income Reported by Low Education Women Married to Higher income men (Simple Diff-in-Diff estimates)

a) Incidence of Capital Income (%)

Group	Pre tax reform	Post tax reform	Difference	Difference in Difference
Control (married to low-income husband)	15.1	18.5	3.4	
Treatment (married to high-income husband)	19.8	31.7	11.9	8.5** *(2.9)*

b) Dollars of Capital Income

Group	Pre tax reform	Post tax reform	Difference	Difference in Difference
Control (married to low-income husband)	119	227	108	
Treatment (married to high-income husband)	202	519	317	209** *(84.4)*

Notes
1. Standard errors in parentheses.
2. ** statistically significant at the 5% level.

TABLE 2: Asset Classification

	Heavily Taxed Assets	Moderately Taxed Assets	Tax-Favored
SFS (1999) Canadian	a) Bonds (Saving + Other) b) Term Deposits c) Guaranteed Income Certificates d) Mortgage Backed Security Funds e) Cheq. & Saving Accounts f)T-bills	a) Non-RRSP Stocks b) Mutual funds and other investment funds exclusive of RRSP c)Trust funds	a) Registered educational savings b) RRSPs c) Home ownership savings plan funds
PSID (1999)	a)Checking & Savings accounts b) Money market funds c)Certificates of deposit d)government savings bonds e)T-bills f)Bond funds, cash value in a life insurance policy, trusts	Directly held publicly and privately issued stocks and mutual funds	IRA and Keogh accounts
SCF (1998)	a) Cheq. & Saving Accounts b) Money market funds (excluding tax-free ones) c) CDs d) Savings bonds e) Mortgage-backed bonds f) Corporate Bonds g) Foreign Bonds h) Cash or call money accounts i)T-bills j)government bond funds and other bond funds	a) Stock mutual funds b)Stocks c)trusts d)Tax-free Money market funds e) Tax-free bonds f) Tax-Free Bond Funds	IRA and Keogh accounts

TABLE 3: Descriptive Statistics

AVERAGE PORTFOLIO & INCOME SHARES

	SFS(1999)		SCF(1998)	PSID(1999)
	Full	**Restricted***		
Income Share of Lower Earning Partner	.236 (.178)	.237 (.179)	.210 (.188)	.225 (.180)
Portfolio Shares				
Heavily Taxed	.389 [.412]	.388 [.411]	.632 [.632]	.671 [.683]
Moderately	.081 [.304]	.080 [.301]	.208 [.528]	.139 [.459]
Taxed-Favored	.530 [.697]	.531 [.705]	.161 [.429]	.190 [.515]

Notes

1. For Income Shares standard deviations are reported in round parentheses ()

2. For Portfolio Shares conditional Averages are reported in square parentheses []. Conditional average refers to only households who have positive amount of the asset group

3. For SFS and SCF survey weights are used in all calculations.

*Restricted Sample excludes the self-employees and Quebec residence from the full sample.

Table 4: Reduced Form Tobit Estimates (Summary)

$$s_h^k = X_h \beta^k + \alpha^k ES_h + e_h^k$$

Coefficients on the Income Share(α^k)

	SFS (1999)	
	Full Sample	Restricted Sample
Heavily Taxed	-0.053*	-0.048
	(.03)	(.039)
Moderately Taxed	-0.062	-0.088
	(.048)	(.067)
Tax-Favored	.092***	0.087**
	(.034)	(.044)

Notes

1. Standard Errors are in parentheses.
2. For complete results see Appendix Tables A1-A2.
3. Each tobit model allows for censoring both below and above (at portfolio shares of zero and one.)
4. *** significant at 1%, ** significant at 5%; ** significant at 10%

Table 5: First Stage Estimates (SFS)

$$mtr_h = X_h\theta + \gamma ES_h + \varepsilon_h^k$$

Coefficients on the Income Share(γ)

Income Share	0.346***
	(.01)
R-squared	*0.43*

Notes

1. Standard Errors are in parentheses.
2. For complete results see Appendix Table A3
3. *** significant at 1%

Table 6: Placebo Tests (Reduced Forms on SCF and PSID)

$$s_h^k = X_h \beta^k + \alpha^k ES_h + e_h^k$$

Coefficients on the Income Share(α^k)

	SCF(1998)	PSID (1999)
Heavily Taxed	.039	-.034
	(.024)	(.085)
Moderately Taxed	-.046	*
	(.030)	
Tax-Favored	.014	.035
	(.029)	(.10)

Notes
1. Standard Errors are in parentheses.
2. For complete results see Appendix Tables A4-A5.
3. Each Tobit model allows for censoring both below and above (at portfolio shares of zero and one.)
4. Results are qualitatively similar in the PSID and SCF when the self-employed are deleted from the sample (importantly, the income share remains insignificant). Full results are available from authors.
* Did not converge.

Table7: IV ESTIMATES

$s_h^k = X_h \pi^k + \phi^k mtr_h + u_h^k$				
Coefficients on the Marginal Tax Rate (ϕ^k)				
	SFS-Restricted Sample			
	TOBIT		**IVTOBIT**	
	Coef.	Marginal	Coef.	Marginal
Heavily Taxed	-0.029 (.057)	-.020	0.027 (.074)	.023
Moderately Taxed	-0.003 (.09)	-.0007	-0.222 (.178)	-.046
Tax-Favored	0.058 (.064)	.040	0.255** (.114)	.212

Notes
1. Standard Errors are in parentheses.
2. For complete results see Appendix Tables A6-A7.
3. Each Tobit model allows for censoring below and above (at portfolio shares of zero and one.)
4. *** significant at 1%, ** significant at 5%; ** significant at 10%

Table 8: Reduced Form Probit Estimates (Summary)

$$\Pr(p_h^k = 1) = F(X_h \beta^k + \alpha^k ES_h)$$

Coefficients on the Income Share(α^k)

	SFS (1999)	
	Full Sample	Restricted Sample
Heavily Taxed	0.022	0.109
	(0.164)	(0.213)
Moderately Taxed	-0.100	-0.223
	(0.120)	(0.158)
Tax-Favored	0.425***	0.411**
	(0.149)	(0.193)

Notes

1. Standard Errors are in parentheses.

2. $\left(p_h^k\right)$ is coded 1 if household has any asset from "*asset group k*".

3. *** significant at 1%, ** significant at 5%.

Appendix – Full Estimation Results (NOT FOR PUBLICATION)

Table A1- Tobit Estimates of Reduced Forms (Full Sample)

	Share of		
	Heavily Taxed	*Moderately Taxed*	*Tax Favored*
Income Share of Lower	**-0.053**	**-0.062**	**0.092**
Earning Partner	**(.030)**	**(.048)**	**(.034)**
Income			
2. Quartile	-0.137	-0.002	0.15
	(.014)	(.026)	(.017)
3. Quartile	-0.163	-0.018	0.196
	(.015)	(.026)	(.018)
4. Quartile	-0.161	0.025	0.175
	(.018)	(.028)	(.020)
Net Worth			
2. Quartile	-0.635	0.402	0.622
	(.015)	(.033)	(.017)
3. Quartile	-0.771	0.56	0.737
	(.016)	(.034)	(.018)
4. Quartile	-0.821	0.851	0.676
	(.018)	(.037)	(.020)
Age			
35-44	0.03	-0.08	-0.018
	(.014)	(.022)	(.015)
45-54	0.04	-0.115	-0.026
	(.016)	(.025)	(.017)
55-65	0.039	-0.159	-0.002
	(.018)	(.030)	(.021)
Education			
High School	-0.057	0.073	0.049
	(.017)	(.030)	(.019)
Some College	-0.106	0.131	0.076
	(.022)	(.036)	(.025)
College Degree	-0.062	0.101	0.043
	(.015)	(.026)	(.017)
Post College	-0.065	0.168	0.003
	(.021)	(.033)	(.024)
Male	-0.018	-0.022	0.03
	(.013)	(.021)	(.015)
Have Children	-0.024	-0.004	0.023
	(.012)	(.019)	(.013)
Owning House	-0.064	0.052	0.057
	(.014)	(.024)	(.016)
Constant	1.238	-0.803	-0.328
	(.026)	(.05)	(.03)

1-.Standard Errors are in parentheses.
2-Each Tobit model allows for censoring below and above (at portfolio shares of zero and one.)
3-The regressions also include indicator variables for the occupation and industry of the head of households. For the brevity of the tables we didn't report them.

Table A2-Tobit Estimates of Reduced Forms (Restricted Sample)

	Share of		
	Heavily Taxed	*Moderately Taxed*	*Tax Favored*
Income Share of Lower	-0.048	-0.088	0.087
Earning Partner	(.039)	(.063)	(.044)
Income			
2. Quartile	-0.136	0.019	0.146
	(.02)	(.036)	(.022)
3. Quartile	-0.173	0.036	0.189
	(.021)	(.037)	(.024)
4. Quartile	-0.148	0.069	0.148
	(.024)	(.039)	(.026)
Net Worth			
2. Quartile	-0.703	0.415	0.706
	(.02)	(.046)	(.023)
3. Quartile	-0.855	0.557	0.849
	(.022)	(.048)	(.025)
4. Quartile	-0.918	0.856	0.803
	(.024)	(.051)	(.027)
Age			
35-44	0.03	-0.091	-0.011
	(.017)	(.028)	(.019)
45-54	0.033	-0.15	-0.012
	(.020)	(.033)	(.022)
55-65	0.035	-0.167	0.001
	(.023)	(.039)	(.026)
Education			
High School	-0.026	0.071	0.014
	(.022)	(.039)	(.025)
Some College	-0.08	0.106	0.061
	(.028)	(.047)	(.032)
College Degree	-0.053	0.068	0.045
	(.019)	(.034)	(.021)
Post College	-0.059	0.147	0.006
	(.028)	(.045)	(.032)
Male	-0.015	-0.007	0.019
	(.018)	(.028)	(.020)
Have Children	-0.03	-0.009	0.027
	(.015)	(.025)	(.017)
Owning House	-0.032	0.06	0.014
	(.017)	(.031)	(.02)
Constant	1.287	-0.846	-0.377
	(.033)	(.067)	(.038)

1-.Standard Errors are in parentheses.

2-Each Tobit model allows for censoring below and above (at portfolio shares of zero and one.)

3-The regressions also include indicator variables for the occupation and industry of the head of households. For the brevity of the tables we didn't report them.

Table A3 - First Stage Estimates

Marginal Tax Rate

Income Share of Lower Earning Partner	**0.346** **(.010)**
Income	
2. Quartile	0.020
	(.005)
3. Quartile	0.027
	(.005)
4. Quartile	0.086
	(.006)
Net Worth	
2. Quartile	-0.003
	(.005)
3. Quartile	-0.005
	(.005)
4. Quartile	.021
	(.006)
Age	
35-44	-0.011
	(.004)
45-54	-0.012
	(.005)
55-65	-0.016
	(.006)
Education	
High School	0.002
	(.005)
Some College	0.005
	(.007)
College Degree	0.004
	(.005)
Post College	-.0003
	(.007)
Male	0.009
	(.004)
Have Children	0.026
	(.004)
Owning House	.007
	(.004)
Constant	.103
	(.008)
R-squared	*0.43*

1-Standard Errors are in parentheses
2-The regressions also include indicator variables for the occupation and industry of
the head of households. For the brevity of the tables we didn't report them.

Table A4 - Placebo Test: Tobit Estimates of Reduced Forms
Survey of Consumer Finances (1998)

	Share of		
	Heavily Taxed	*Moderately Taxed*	*Tax Favored*
Income Share of Lower Earning	0.039	-0.046	0.014
Partner	(.024)	(.030)	(.029)
Income			
2. Quartile	-0.009	0.001	0.026
	(.013)	(.018)	(.017)
3. Quartile	0.042	-0.001	-0.042
	(.015)	(.019)	(.018)
4. Quartile	0.049	0.011	-0.054
	(.016)	(.02)	(.019)
Net Worth			
2. Quartile	-0.684	0.629	0.553
	(.015)	(.021)	(.019)
3. Quartile	-1	0.934	0.74
	(.016)	(.023)	(.021)
4. Quartile	-1.122	1.254	0.599
	(.018)	(.025)	(.023)
Age			
35-44	0.01	-0.088	0.085
	(.015)	(.019)	(.019)
45-54	0.003	-0.13	0.126
	(.015)	(.019)	(.019)
55-65	0.021	-0.226	0.197
	(.017)	(.021)	(.021)
Education			
High School	-0.019	-0.025	0.04
	(.014)	(.018)	(.017)
Some College	0.019	-0.054	0.041
	(.017)	(.022)	(.020)
College Degree	-0.059	0.022	0.07
	(.014)	(.018)	(.017)
Post College	-0.068	0.032	0.084
	(.015)	(.018)	(.018)
Male	0.014	-0.194	0.3
	(.065)	(.076)	(.094)
Have Children	0.011	-0.003	-0.014
	(.01)	(.012)	(.012)
Owning House	-0.103	0.113	0.06
	(.013)	(.017)	(.016)
Constant	1.394	-0.332	-1.05
	(.068)	(.081)	(.098)

1-Standard Errors are in parentheses.
2-Each Tobit model allows for censoring below and above (at portfolio shares of zero and one.)
3-The regressions also include indicator variables for the occupation and industry of the head of households. For the brevity of the tables we didn't report them.

Table A5 - Placebo Test: Tobit Estimates of Reduced Forms
PSID (1999)

	Share of	
	Heavily Taxed	*Tax Favored*
Income Share of Lower Earning Partner	-0.034	0.035
	(.085)	(.1)
Income		
2. Quartile	-0.009	0.054
	(.048)	(.057)
3. Quartile	-0.019	0.048
	(.048)	(.057)
4. Quartile	-0.086	0.069
	(.049)	(.058)
Net Worth		
2. Quartile	-0.372	0.403
	(.077)	(.105)
3. Quartile	-1.025	1.026
	(.077)	(.105)
4. Quartile	-1.376	1.302
	(.08)	(.108)
Age		
35-44	-0.027	0.089
	(.04)	(.049)
45-54	0.018	0.061
	(.042)	(.051)
55-65	-0.056	0.166
	(.054)	(.064)
Male	-0.583	0.365
	(.273)	(.298)
Have Children	-0.03	0.056
	(.033)	(.039)
Owning House	-0.107	0.081
	(.043)	(.052)
Constant	2.575	-1.643
	(.291)	(.325)

1-Standard Errors are in parentheses.
2-Each Tobit model allows for censoring below and above (at portfolio shares of zero and one).
* Moderately Taxed Asset Group, estimation did not converge.

Table A6 - Portfolio Shares on Marginal Tax Rates

	Share of		
	Heavily Taxed	*Moderately Taxed*	*Tax Favored*
Marginal Tax Rate	**-0.029**	**-0.003**	**0.058**
	(.057)	**(.09)**	**(.064)**
Income			
2. Quartile	-0.138	0.013	0.149
	(.02)	(.036)	(.022)
3. Quartile	-0.178	0.024	0.196
	(.021)	(.036)	(.023)
4. Quartile	-0.152	0.054	0.155
	(.024)	(.04)	(.027)
Net Worth			
2. Quartile	-0.704	0.415	0.707
	(.02)	(.046)	(.023)
3. Quartile	-0.856	0.556	0.85
	(.022)	(.048)	(.025)
4. Quartile	-0.916	0.86	0.8
	(.024)	(.051)	(.027)
Age			
35-44	0.03	-0.089	-0.012
	(.017)	(.029)	(.019)
45-54	0.034	-0.145	-0.015
	(.02)	(.033)	(.022)
55-65	0.038	-0.16	-0.004
	(.023)	(.039)	(.026)
Education			
High School	-0.026	0.072	0.013
	(.022)	(.039)	(.025)
Some College	-0.078	0.109	0.059
	(.028)	(.047)	(.031)
College Degree	-0.052	0.071	0.043
	(.019)	(.034)	(.021)
Post College	-0.056	0.154	0.001
	(.028)	(.045)	(.032)
Male	-0.011	0.003	0.011
	(.017)	(.027)	(.019)
Have Children	-0.028	-0.005	0.022
	(.015)	(.025)	(.017)
Owning House	-0.032	0.059	0.014
	(.017)	(.032)	(.02)
Constant	1.279	-0.871	-0.364
	(.034)	(.067)	(.038)

1-Standard Errors are in parentheses.

2-Each Tobit model allows for censoring below and above (at portfolio shares of zero and one.)

3-The regressions also include indicator variables for the occupation and industry of the head of households. For the brevity of the tables we didn't report them.

Table A7 – IVTOBIT Estimates (Marginal Tax Rates instrumented by Income Share)

	Share of		
	Heavily Taxed	*Moderately Taxed*	*Tax Favored*
Marginal Tax Rate	**0.027**	**-0.222**	**0.255**
	(.074)	**(.178)**	**(.114)**
Income			
2. Quartile	-0.062	0.021	0.125
	(.014)	(.035)	(.021)
3. Quartile	-0.071	0.041	0.165
	(.015)	(.037)	(.022)
4. Quartile	-0.078	0.086	0.124
	(.019)	(.045)	(.028)
Net Worth			
2. Quartile	-0.104	0.422	0.696
	(.016)	(.046)	(.021)
3. Quartile	-0.171	0.563	0.853
	(.016)	(.047)	(.022)
4. Quartile	-0.206	0.86	0.81
	(.017)	(.051)	(.024)
Age			
35-44	-0.01	-0.093	-0.012
	(.011)	0.028	0.018
45-54	-0.018	-0.152	-0.013
	(.013)	0.032	0.02
55-65	-0.019	-0.159	0.01
	(.016)	0.038	0.024
Education			
High School	0.004	0.07	0.006
	(.015)	(.037)	(.022)
Some College	-0.014	0.113	0.055
	(.019)	(.045)	(.028)
College Degree	-0.016	0.074	0.051
	(.013)	(.033)	(.019)
Post College	-0.023	0.145	-0.003
	(.018)	(.043)	(.029)
Male	-0.005	0	0.02
	(.011)	(.027)	(.018)
Have Children	0	0.055	0.009
	(.012)	(.03)	(.018)
Owning House	-0.034	0.006	0.012
	(.01)	(.024)	(.015)
Constant	0.445	-0.822	-0.412
	(.027)	(.072)	(.04)

1-We estimate theseTobit Equations with an endogenous regressor by full maximum likelihood Tobit.

2-Income share of minor income earner used as an instrumental variable.

3--Standard Errors are in parentheses.

4-Each Tobit model allows for censoring below and above (at portfolio shares of zero and one.)

5-The regressions also include indicator variables for the occupation and industry of the head of households. For the brevity of the tables we didn't report them.