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## New Evidence on Taxes and Portfolio Choice

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# Motivation

- Income from different assets taxed differently
  - The degree of differential taxation often depends on tax position of the individual (progressive taxation)
- How does taxation affect the allocation of household savings?
  - Allocation determines supply of funds to particular sectors
  - Affects current and future government revenues
  - Can be an effect of one public policy (personal tax rates) on the goals of another public policy (retirement savings)

## Motivation (2)

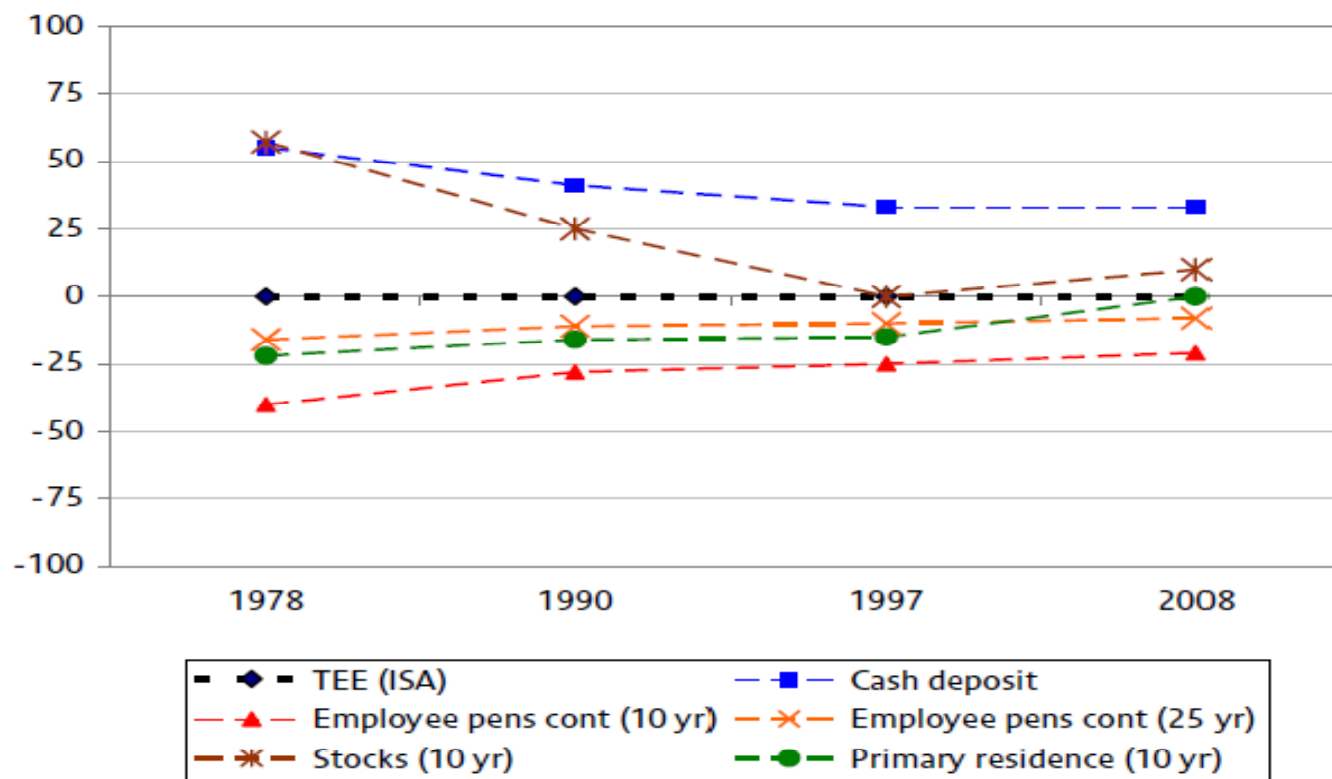
**Table 9. Comparing ETRs for someone who is a basic-rate taxpayer (BRT) throughout life and those for someone who is a higher-rate taxpayer (HRT) throughout life**

<i>Asset</i>	<i>Effective tax rate (%)</i>		
	<i>BRT</i>	<i>HRT</i>	
ISA (cash or stocks and shares)	0	0	
Cash deposit account	33	67	
Employee contribution to pension			
	(invested 10 years)	-21	-53
	(invested 25 years)	-8	-21
Employer contribution to pension			
	(invested 10 years)	-115	-102
	(invested 25 years)	-45	-40
Owner-occupied housing	0	0	
Rental housing <sup>a</sup>			
	(invested 10 years)	30	50
	(invested 25 years)	28	48
Stocks and shares <sup>b</sup>			
	(invested 10 years)	10	35
	(invested 25 years)	7	33

Source: Wakefield, 2009

## Motivation (3)

Figure 2. Effective tax rates for a range of assets in selected years



Source: Wakefield, 2009

# Literature

- Well developed theory
  - Given risk and return characteristics, households should shift portfolios to minimize tax liabilities
- Relatively few empirical studies
  - Key problem is finding exogenous variation in tax rates

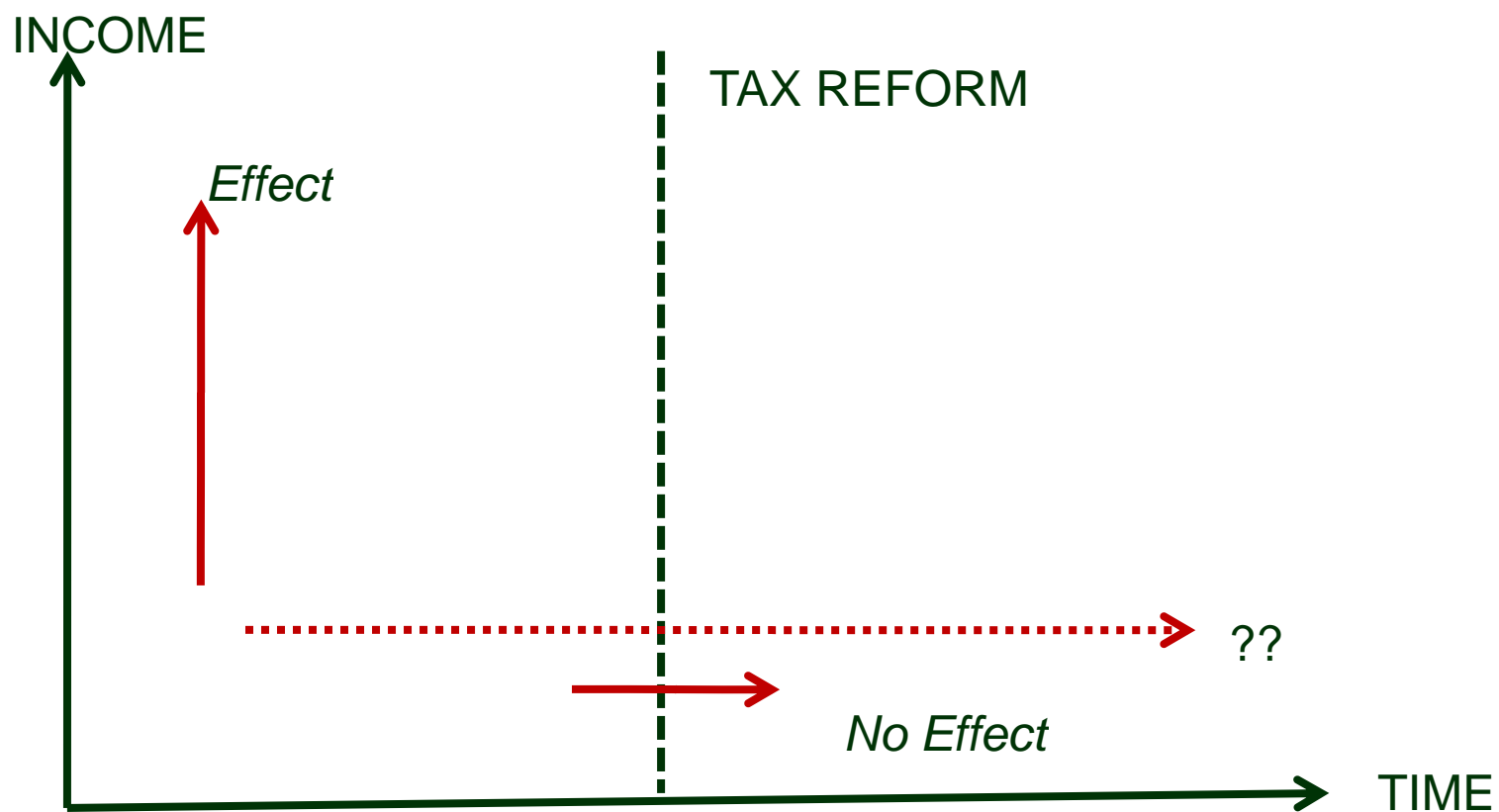
## Literature (2)

- Cross –sectional variation in marginal tax rates (MTR)
  - MTR is a function of household taxable income
  - Difficult to distinguish tax effect from income or wealth effects
- Tax Reforms (diff-in-diff)
  - Results are sensitive to interval over which the data are differenced
  - A short before-after interval may miss delayed or gradual portfolio adjustments
  - A long before-after interval risks confounding the tax effect with other time effects
    - Common trends assumption less tenable
    - Large trends in portfolio behaviour

## Literature (3)

- Cross-sectional variation in MTRs
  - Feldstein (1976)
  - Hubbard (1985)
  - King and Leape (1998)
  - Poterba and Samwick (1999, 2002)
  - ***Taxes affect household portfolio behavior***
- Tax Reform
  - Sholz (1994) studies 1986 US tax reform (1983 and 1989 SCF)
  - ***No effect of tax on household portfolios***

## Literature (4)





## Our Strategy

- We identify an alternative source of variation in MTRs.
- US is somewhat unusual in that it has joint taxation.
- In systems with individual taxation, 2 households with ***the same total earnings***, but ***divided differently between the principal and secondary earner***, face a different MTR on the first dollar of household capital income.
  - Households in which most of the labor income is earned by one individual face a lower MTR on the first dollar of capital income than a household with fairly equal income shares.
  - The former household can attribute capital income to the household member with lower labor earnings (and hence lower MTR).
- We study this source of variation in Canadian Data

## Our Strategy (2)

- Our research design depends on:
  1. Households shift capital income to secondary earners (ie., to the lowest MTR) to reduce taxation
  2. Variation in the income share of secondary earners generates significant variation in the minimum MTR faced by the household.
  3. Variation in income share of secondary earners does not affect portfolio allocation through a different channel (eg. Browning, 2000)

## Previous Canadian Literature

- Veall (2001) uses the 1988 Canadian Tax Reform to identify the effect of MTRs on the use of tax-favored retirement saving accounts (RRSPs).
  - Finds a negative (but insignificant) effect
- Milligan (2002) uses temporal and cross-province variation in tax rates to study the effect of taxes on RRSP participation
  - Finds a positive relationship
  - Argues that Veall's analysis confounded by trends in RRSP use
- These papers conflate the level and allocation of saving, but illustrate again the problem with temporal tax variation

# Road Map

- Do households shift capital income to secondary earners to minimize tax liabilities?
  - We study the effect of the 1988 Canadian Tax reform on capital income reported by secondary earners.
- Does variation in the income shares of secondary earners affect portfolio allocation
  - We study this relationship in Canadian data
- Does variation in the income shares of secondary earners affect portfolio allocation through a non-tax channel
  - We study this relationship in US data (a “placebo” test)

## Preview of Results

- Canadian households do shift capital income within the household to reduce taxation
- Holding wealth and household income constant, households with more equal income shares hold more of their portfolios in less-taxed assets
- In US data, we find no relationship between the income shares of different household members and the portfolio shares of different asset classes

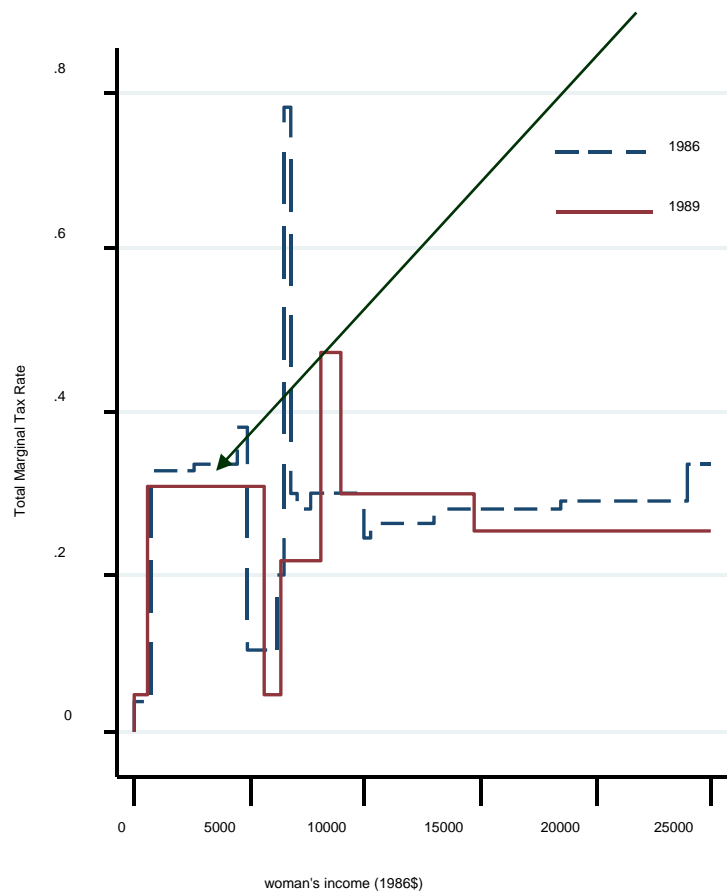
# Is Capital Income Shifted to Secondary Earners to Reduce Taxation?

- UK Evidence: Stephens and Ward Batts (2004)
  - Study the effect of the UK switch from joint to individual taxation in 1990.
  - Diff-in-Diff strategy
  - Report a significant increase in the share of capital income reported by wives.

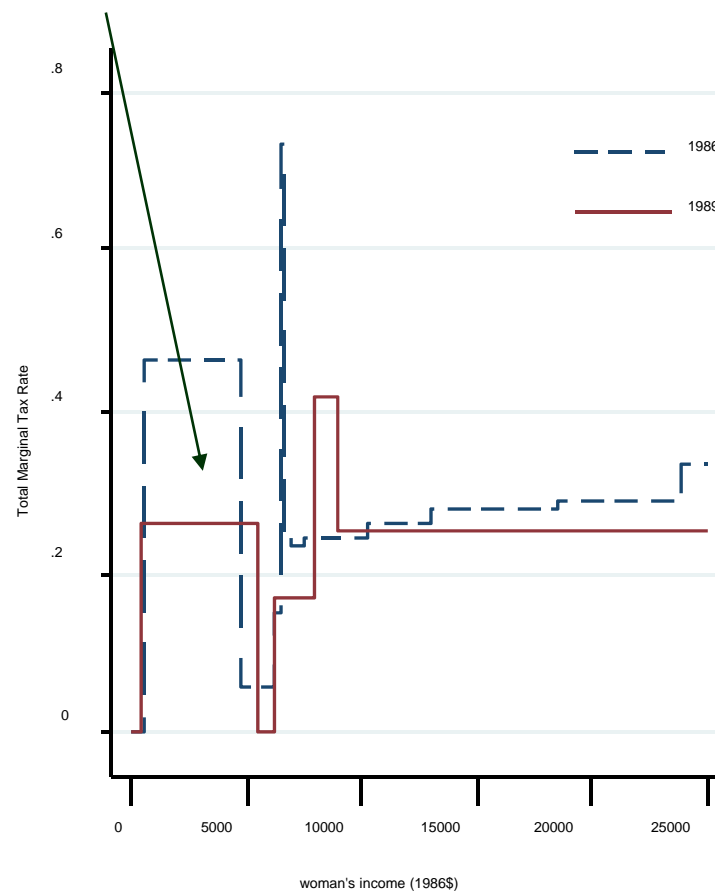
# New Evidence from the 1988 Canadian Tax Reform

- Replaced a spousal exemption with a non-refundable tax credit
  - A *Spousal Exemption* reduces the primary earner's taxable income, therefore its value depended on the marginal tax rate of primary earner and was much higher for high-income husbands.
    - Prior to reform, a secondary earner faced a first dollar marginal tax rate equal to the main earner's marginal tax rate
  - The value of a *Tax credit* does not depend on the primary earner's MTR.
- The 1988 Canada tax reform reduced the “jointness” of the tax system
- It reduced effective MTRs for women married to high income men, relative to those married to low income men

*Conversion of spousal exemption to tax credit*



Husband's total income 25,000 (1986 \$)  
**(Control)**



Husband's total income 50,000 (1986 \$)  
**(Treatment)**

**Married Women's Effective Marginal and Average Tax Rates, Pre- and Post- 1988 Tax Reform**



# Data and Methods

- Difference-in-difference
  - Control Group : Women married with low-income husband
  - Treatment Group : Women married with high-income husband
- Canadian Survey of Consumer Finances
  - 1986 to 1987 and from 1990 to 1991
- 3,231 married women with no more than high school education
  - exclude Quebec residents

# Difference-in-Difference Estimates

## Incidence of Capital Income (%)

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

## Dollars of Capital Income

Control	119	227	108	
Treatment	202	519	317	<b>209**</b> <b>(84.4)</b>

# Discussion

- Results echo Stephens and Ward-Batts
- Canadian couples reallocate their asset ownership to reduce tax liability
- Effective MTR on capital income is often the MTR of the lower income partner
- This gives us variation in effective MTR within couples with the *same household income*
- Next: Effect of income shares and MTRs on portfolios.

# Portfolio Choice - Datasets

## *Main Estimates*

- Canadian Survey of Financial Securities (SFS) 1999
  - Detailed income information at the individual level
  - Detailed asset information at the household level

## *Placebo Tests*

- American Survey of Consumer Finance (SCF) 1998
  - Detailed income information not available at the individual level
- American Panel Study of Income Dynamics (PSID) 1999
  - Less comprehensive asset information, but complete income information at the individual level

# Samples

- married (or common-law) couples with or without children, age 25 to 64.
- We eliminate
  - the self-employed
  - households with negative total income and
  - households whose heads are full-time students during the survey year.
- Canadian SFS
  - Full sample of 4085 households; 3379 without Quebec
- American SCF
  - 905 households
- American PSID
  - 1164 households

# Key Variables

- Individual Income  
Sum of wage and salaries, pensions and taxable government transfers
- Income Share of Lower Income Earner ( ***IncomeShare<sub>h</sub>*** )
- Financial Asset Shares( ***PortfolioShare<sub>h</sub><sup>k</sup>*** )
  - Heavily Taxed Assets (Interest Bearing Assets)
  - Moderately Taxed Assets (Stocks and Mutual Funds)
  - Tax Favored Assets (Retirement , Educational Saving Accounts )

# Asset Classification

	Heavily Taxed Assets	Moderately Taxed Assets	Tax-Favored
<b>SFS (1999) Canadian</b>	<ul style="list-style-type: none"> <li>a) Bonds (Saving + Other)</li> <li>b) Term Deposits</li> <li>c) Guaranteed Income Certificates</li> <li>d) Mortgage Backed Security Funds</li> <li>e) Cheq. &amp; Saving Accounts</li> <li>f) T-bills</li> </ul>	<ul style="list-style-type: none"> <li>a) Non-RRSP Stocks</li> <li>b) Mutual funds and other investment funds exclusive of RRSP</li> </ul>	<ul style="list-style-type: none"> <li>a) RRSPs</li> <li>b) Registered educational savings</li> <li>c) Home ownership savings plan funds</li> <li>d) Trust funds</li> </ul>
<b>SCF (1998)</b>	<ul style="list-style-type: none"> <li>a) Cheq. &amp; Saving Accounts</li> <li>b) Money market funds (excluding tax-free ones)</li> <li>c) CDs</li> <li>d) Savings bonds</li> <li>e) Mortgage-backed bonds</li> <li>f) Corporate Bonds</li> <li>g) Foreign Bonds</li> <li>h) T-bills</li> <li>i) government bond funds and other bond funds</li> </ul>	<ul style="list-style-type: none"> <li>a) Stock mutual funds</li> <li>b) Stocks</li> </ul>	<ul style="list-style-type: none"> <li>a) 401(k), ESOPs</li> <li>b) IRA and Keogh accounts</li> <li>c) Trusts</li> <li>d) Tax-free bonds</li> <li>e) Tax-Free Bond Funds</li> <li>f) Tax-free Money market funds</li> </ul>
<b>PSID (1999)</b>	<ul style="list-style-type: none"> <li>a) Checking &amp; Savings accounts</li> <li>b) Money market funds</li> <li>c) Certificates of deposit</li> <li>d) government savings bonds</li> <li>e) T-bills</li> </ul>	<ul style="list-style-type: none"> <li>a) Directly held publicly and privately issued stocks and mutual funds</li> <li>b) Bond funds, cash value in a life insurance policy, a valuable collection for investment purposes, or rights in a trust or estate</li> </ul>	<ul style="list-style-type: none"> <li>a) IRA and Keogh accounts</li> </ul>

# Summary Statistics

	CANADA Survey of Financial Securities 1999				UNITED STATES OF AMERICA			
	ALL CANADA		QUEBEC EXCLUDED		SCF (1998)		PSID (1999)	
	Full	Top Half*	Full	Top Half*	Full	Top Half*	Full	Top Half*
<i>Income Share of Lower Earning Partner</i>	0.255 [0.295]	0.312 [0.351]	0.256 [0.294]	0.312 [0.352]	0.227 [.261]	0.268 [0.310]	0.253 [0.290]	0.282 [0.331]
Heavily Taxed	0.344 [0.180]	0.238 [0.125]	0.329 [0.164]	0.226 [0.120]	0.472 [0.342]	0.357 [0.222]	0.603 [0.8]	0.469 [0.333]
Moderately Taxed-Favored	0.073 [0]	0.091 [0]	0.079 [0]	0.099 [0]	0.116 [0]	0.152 [0]	0.229 [0]	0.303 [0.09]
Number of Households	4085	2015	3379	1606	905	531	1164	581

## Notes

1. Median values are reported in square parentheses [].
2. For SFS and SCF survey weights are used in all calculations.



## Additional Controls

- Dummies for household income (8) and net worth (5)
- Demographic variables
  - age, gender and education of household head and spouse
  - Marital status, family size, presence and number of children households has a child
- Occupation of the household head and spouse
- Dummies for homeownership

# Results

- First Stage (instrument relevance)

$$MTR_h = X_h \theta + \gamma \text{IncomeShare}_h + \varepsilon_h^k$$

- Reduced form, Canada

$$\text{PortfolioShare}_h^k = X_h \beta^k + \alpha^k \text{IncomeShare}_h + e_h^k$$

- Robustness checks
  - Asset Classification
  - Participation margin (contribution limits)
  - Specification of household income controls
  - Alternative approaches to modelling shares
- Reduced form, US (instrument validity – “placebo test”)

## Results (2)

- Tax effects (IV), Canada

$$\text{PortfolioShare}_h^k = X_h \pi^k + \phi^k \text{MTR}_h + u_h^k$$

- IV also addresses measurement error in MTR

# First Stage, Canada (1)

*Panel a)*

EFFECTIVE MARGINAL TAX RATE						
Household Income	Mean	Median	25 <sup>th</sup> Percentile	75 <sup>th</sup> Percentile	95 <sup>th</sup> Percentile	Standard Deviation
1 <sup>st</sup> Decile	0.085	0	0	0.235	0.278	0.120
2 <sup>nd</sup> Decile	0.169	0.235	0	0.256	0.289	0.121
3 <sup>rd</sup> Decile	0.187	0.242	0	0.260	0.289	0.115
4 <sup>th</sup> Decile	0.202	0.235	0.235	0.255	0.289	0.104
5 <sup>th</sup> Decile	0.227	0.243	0.235	0.265	0.376	0.101
6 <sup>th</sup> Decile	0.245	0.248	0.235	0.281	0.384	0.106
7 <sup>th</sup> Decile	0.286	0.269	0.235	0.367	0.415	0.101
8 <sup>th</sup> Decile	0.312	0.368	0.243	0.382	0.422	0.109
9 <sup>th</sup> Decile	0.344	0.383	0.367	0.393	0.418	0.096
10 <sup>th</sup> Decile	0.371	0.400	0.367	0.456	0.504	0.131

Authors' calculations based on the Survey of Financial Securities 1999. Survey weights are used.

## First Stage, Canada (2)

$$MTR_h = X_h \theta + \gamma \text{IncomeShare}_h + \varepsilon_h^k$$

**Coefficients on the Income Share( $\gamma$ )**

	<b>Full Sample</b>	<b>Top Half</b>
Income Share	0.435*** (0.010)	0.518*** (0.015)
<i>R-Squared</i>	0.6521	0.6416
F-Test	1575	1213
<i>Partial R-Squared</i>	0.322	0.438

Notes

- Instrument Relevance:
  - Income share of the minor earner is the significant determinant of MTR

## Reduced Form, Canada (1)

$$\text{PortfolioShare}_h^k = X_h \beta^k + \alpha^k \text{IncomeShare}_h + e_h^k$$

SFS 1999

	Full Sample			Top Half		
	Heavily Taxed	Moderately Taxed	Tax-Favored	Heavily Taxed	Moderately Taxed	Tax-Favored
<i>Income Share of Lower Earning Partner</i>	0.034 (0.042)	-0.149** (0.069)	0.001 (0.048)	-0.024 (0.046)	-0.270*** (0.083)	0.145** (0.057)

- Two-limit Tobits with controls; full results in paper
- A larger income share of the secondary earner tilts portfolios away from moderately taxed assets and towards tax-favoured assets
- Results stronger in top half of the income distribution.

## Reduced Form, Canada (2)

TABLE 5: Specification Tests, Top Half

<i>Asset Class:</i>	<i>Heavily</i>	<i>Moderately</i>	<i>Tax Favored</i>
<b>All Canada</b>	-0.024 (.046)	-0.270*** (.083)	.145** (.057)
<b>Quebec Excluded</b>	-0.015 (.049)	-0.187** (.092)	.113* (.063)
<b><u>Income Specification</u></b>			
<i>Expanded Dummies<sup>†</sup></i>	-0.023 (.046)	-0.239*** (.085)	.129** (.058)
<i>Income Spline<sup>†</sup></i>	-0.016 (.046)	-0.209** (.083)	.106* (.057)
<i>Cubic Polynomial</i>	-0.012 (.046)	-0.201** (.083)	.101* (.057)
<b><u>Model Specification</u></b>			
<i>Average Marginal Effects from Tobit</i>	-0.018 (.035)	-0.099*** (.031)	.117** (.046)
<i>Average Marginal Effects from Negative Binomial</i>	-0.024 (.042)	-0.108*** (.034)	.136*** (.051)
<i>Marginal Effects from OLS</i>	-0.022 (.041)	-0.115*** (.036)	.137*** (.051)
<i>Average Marginal Effects from Probit</i>	0.018 (0.039)	-0.216*** (0.077)	0.062* (0.037)

## Reduced Form, US (Placebo Test)

$$\text{PortfolioShare}_h^k = X_h \beta^k + \alpha^k \text{IncomeShare}_h + e_h^k$$

	SURVEY OF CONSUMER FINANCES (1998)		PSID (1999)	
	Full	Top Half	Full	Top Half
Heavily Taxed	-0.024 (.112)	0.137 (.123)	-0.020 (.120)	-0.097 (.142)
Moderately Taxed	-0.002 (.143)	-0.179 (.169)	0.171 (.153)	0.029 (.190)
Tax-Favored	0.047 (.136)	-0.021 (.154)	-0.211 (.173)	-0.015 (.213)

- Instrument validity:
  - No evidence that the income share of the minor earner influences portfolio choice through a channel other than MTR



## MTRs and Portfolio Shares, Canada

$$\text{PortfolioShare}_h^k = X_h \pi^k + \phi^k \text{MTR}_h + u_h^k$$

Coefficients on the Marginal Tax Rate ( $\phi^k$ )

	<i>TOBIT</i>		<i>IV-TOBIT</i>		<i>IV-Probit</i>	
	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>Coefficient</i>	<i>Marginal Effect</i>	<i>Coefficient</i>	<i>Marginal Effect</i>
<b>Heavily Taxed</b>	-0.006 (.064)	-0.004	-0.031 (.096)	-0.023	.0467 (.856)	0.047
<b>Moderately Taxed</b>	-0.109 (.116)	-0.042	-0.348* (.178)	-0.133*	-0.754 (0.530)	-0.238
<b>Tax-Favored</b>	0.088 (.081)	0.070	0.214* (.123)	0.171*	1.916* (1.133)	0.134*

## Conclusions

- Using a new identification strategy we find:
  - Among more affluent households, a 10 ppt increase in MTR leads to a 1.7 ppt (2.5%) increase in the portfolio share of tax-favored accounts, and a 1.3 ppt increase in participation in tax-favoured accounts.
  - Statistically significant but economically very modest.
- As much as an order of magnitude smaller than Poterba and Samwick (2002) or Milligan (2002).
- Results also suggest a potentially important role for liquidity concerns.