230B: Public Economics

Taxable Income Elasticities

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TAXABLE INCOME ELASTICITIES

Modern public finance literature focuses on taxable income elasticities instead of hours/participation elasticities

Two main reasons:

1) What matters for policy is the total behavioral response to tax rates (not only hours of work but also occupational choices, avoidance, etc.)

2) Data availability: taxable income is precisely measured in tax return data

Overview of this literature: Saez-Slemrod-Giertz JEL'12

FEDERAL US INCOME TAX CHANGES

Tax rates change frequently over time

Biggest tax rate changes have happened at the top:

Reagan I: ERTA'81: top rate $\downarrow$ 70% to 50% (1981-1982)

Reagan II: TRA'86: top rate $\downarrow$ 50% to 28% (1986-1988)

Clinton: OBRA'93: top rate $\uparrow$ 31% to 39.6% (1992-1993)

Bush: EGTRRA '01: top rate $\downarrow$ 39.6% to 35% (2001-2003)

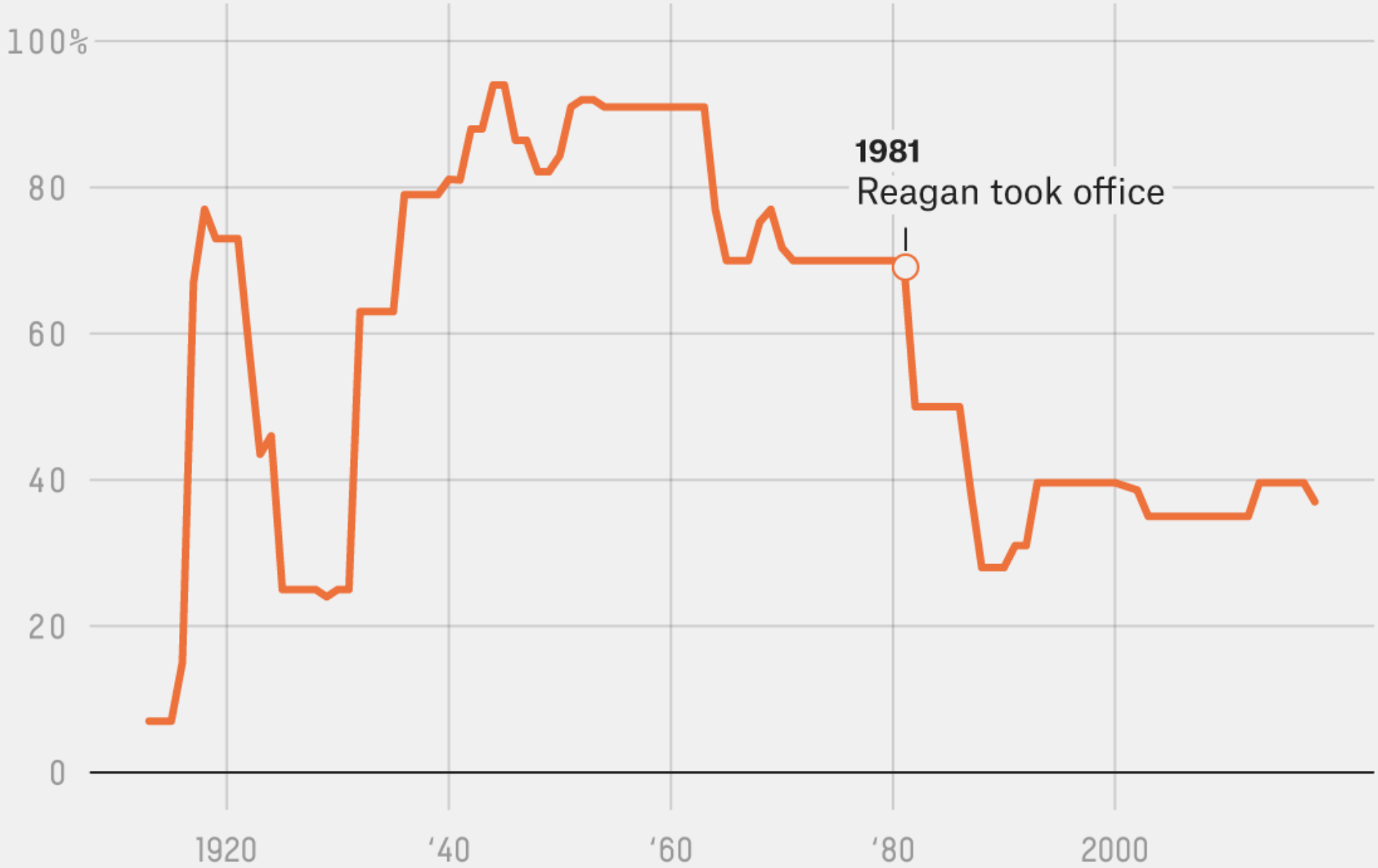
Obama '13: top rate $\uparrow$ 35% to 39.6%+3.8% (2012-2013)

Trump '17: top rate $\downarrow$ 37%+3.8% (2017-2018)

Taxable Income = Ordinary Income + Realized Capital Gains
- Deductions $\Rightarrow$ Each component can respond to MTRs

Historically, a 70 percent marginal tax rate is not unusual

The top marginal income tax rates from 1913 to 2018



FiveThirtyEight

SOURCE: TAX POLICY CENTER

Source: Saez et al. (2010)

Table A1.
Top Federal Marginal Tax Rates

Year	Ordinary Income (1)	Earned Income (2)	Capital Gains (3)	Corporate Income (4)
1952-1963	91.0	91.0	25.0	52
1964	77.0	77.0	25.0	50
1965-1967	70.0	70.0	25.0	48
1968	75.3	75.3	26.9	53
1969	77.0	77.0	27.9	53
1970	71.8	71.8	32.3	49
1971	70.0	60.0	34.3	48
1972-1975	70.0	50.0	36.5	48
1976-1978	70.0	50.0	39.9	48
1979-1980	70.0	50.0	28.0	46
1981	68.8	50.0	23.7	46
1982-1986	50.0	50.0	20.0	46
1987	38.5	38.5	28.0	40
1988-1990	28.0	28.0	28.0	34
1991-1992	31.0	31.0	28.0	34
1993	39.6	39.6	28.0	35
1994-2000	39.6	42.5	28.0	35
2001	39.1	42.0	20.0	35
2002	38.6	41.5	20.0	35
2003-2009	35.0	37.9	15.0	35

Notes: MTRs apply to top incomes. In some instances, lower income taxpayers may face higher MTRs because of income caps on payroll taxes or the so-called 33 percent "bubble" bracket following TRA 86. From 1952 to 1962, a 87% maximum average tax rate provision made the top marginal tax rate 87% instead of 91% for many very top income earners. From 1968 to 1970, rates include surtaxes. For earned income, MTRs include the Health Insurance portion of the payroll tax beginning with year 1994. Rates exclude the effect of phaseouts, which effectively raise top MTRs for many high-income filers. MTRs on realized capital gains are adjusted to reflect that, for some years, a fraction of realized gains were excluded from taxation. Since 2003, dividends are also tax favored with a maximum tax rate of 15%.

LONG-RUN EVIDENCE IN THE US

Goal: evaluate whether top **pre-tax** incomes respond to changes in one minus the marginal tax rate (=net-of-tax rate)

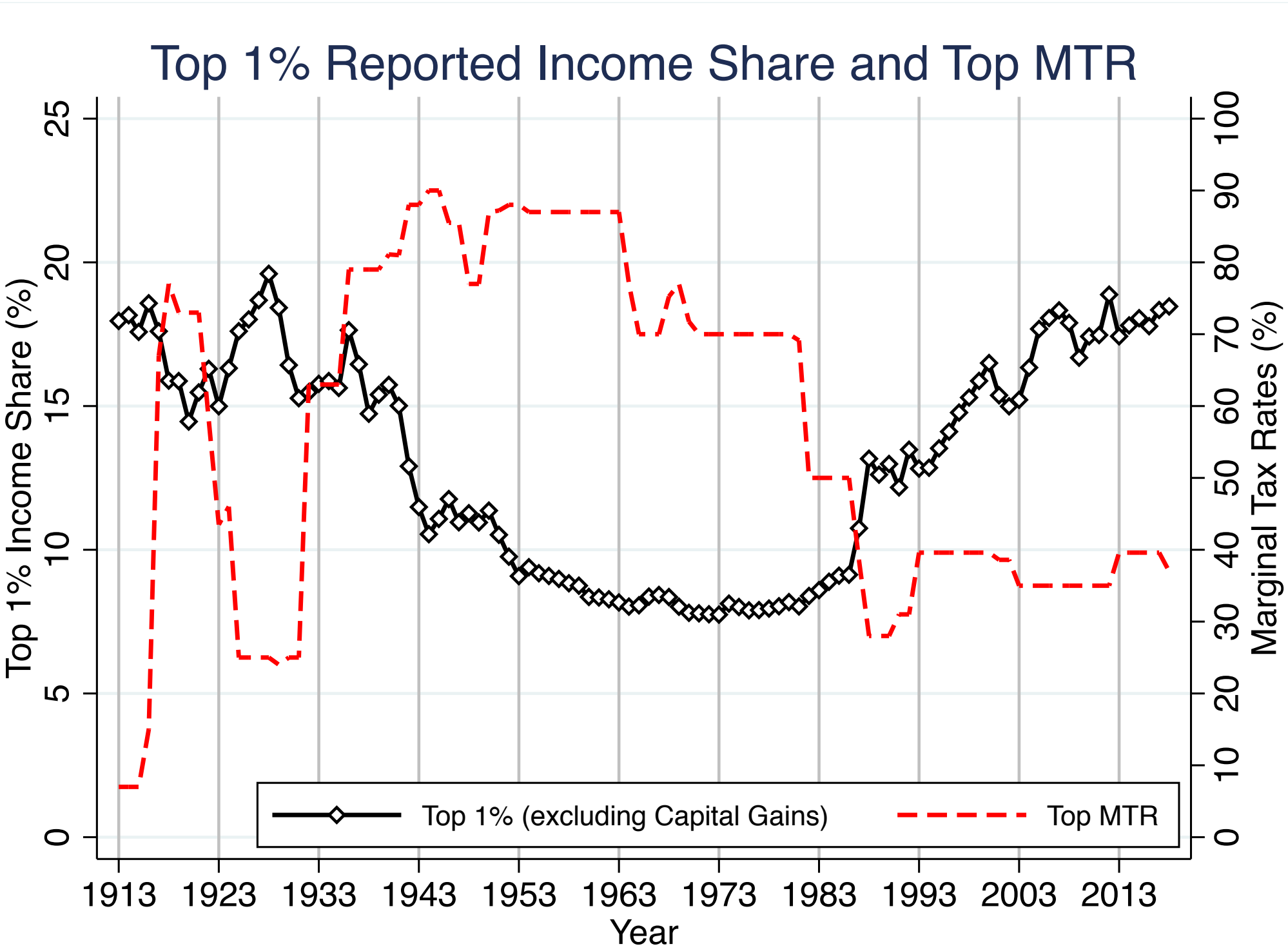
Focus is on pre-tax income before deductions and excluding realized capital gains

Pioneered by Feenberg-Poterba TPE'93 for period 1951-1990

Piketty-Saez QJE'03 estimate top income shares since 1913 [IRS tabulations for 1913-1959, IRS micro-files since 1960]

Saez TPE'04 proposes detailed analysis for 1960-2000 period using TAXSIM calculator at NBER linked to IRS micro-files

Piketty-Saez-Stantcheva AEJ'14 look at 1913-2010 period for the US


Top 1% Reported Income Share and Top MTR
Top 1% Income Share (%)
0
5
10
15
20
25
Marginal Tax Rates (%)
0
10
20
30
40
50
60
70
80
90
100
1913
1923
1933
1943
1953
1963
1973
1983
1993
2003
2013
Year
Top 1% (excluding Capital Gains)
Top MTR

INCOME SHARE BASED ELASTICITY ESTIMATION

1) **Tax Reform Episode:** Compare top **pre-tax** income shares at t_0 (before reform) and t_1 (after reform)

$$e = \frac{\log sh_{t_1} - \log sh_{t_0}}{\log(1 - \tau_{t_1}) - \log(1 - \tau_{t_0})}$$

where sh_t is top income share and τ_t is the average MTR for top group

Identification assumption: absent tax change, $sh_{t_0} = sh_{t_1}$

2) **Full Time Series:** Run regression:

$$\log sh_t = \alpha + e \cdot \log(1 - \tau_t) + \varepsilon_t$$

and adding time controls to capture non-tax related top income share trends

ID assumption: non-tax related changes in $sh_t \perp \tau_t$

Table 1.
Elasticity estimates using top income share time series

	Top 1%	Next 9%
	(1)	(2)
A. Tax Reform Episodes		
1981 vs. 1984 (ERTA 1981)	0.60	0.21
1986 vs. 1988 (TRA 1986)	1.36	-0.20
1992 vs. 1993 (OBRA 1993)	0.45	
1991 vs. 1994 (OBRA 1993)	-0.39	
B. Full Time Series 1960-2006		
No time trends	1.71	0.01
	(0.31)	(0.13)
Linear time trend	0.82	-0.02
	(0.20)	(0.02)
Linear and square time trends	0.74	-0.05
	(0.06)	(0.03)
Linear, square, and cube time trends	0.58	-0.02
	(0.11)	(0.02)

Notes: Estimates in panel A are obtained using series from Figure 1 and using the formula e=[log(income share after reform)-log(income share before reform)]/[log(1- MTR after reform)-log(1- MTR before reform)]

Source: Saez et al. (2010)

Estimates in Panel B are obtained by time-series regression of log(top 1% income share) on a constant, log (1 - average marginal tax rate), and polynomials time controls from 1960 to 2006 (44 observations). OLS regression. Standard Errors from Newey-West with 8 lags.

LONG-RUN EVIDENCE IN THE US

1) Clear correlation between top incomes and top income rates both in several short-run tax reform episodes and in the long-run [but hard to assess long-run tax causality]

2) Correlation largely absent below the top 1% (such as the next 9%)

3) Top income shares sometimes do not respond to large tax rate cuts [e.g., Kennedy Tax Cuts of early 1960s]

2) and 3) suggest that context matters (such as opportunities to respond / avoid taxes matter), response not due to a universal labor supply elasticity

SPECIFIC TAX REFORM STUDIES

Literature initially developed by analyzing specific tax reforms (instead of full time series)

Lindsey JpubE'87 analyzes ERTA'81 using **repeated cross-section** tax data and finds large elasticities

Feldstein JPE'95 uses **panel** tax data to study TRA'86

Goolsbee JPE'00 uses **executive compensation** data to study OBRA'93

Gruber-Saez JpubE'02 uses 1979-1990 **panel** tax data

Saez TPE'17 uses income share to study 2013 top tax rate increase

Many other studies in the US and abroad (survey by Saez-Slemrod-Giertz JEL'12)

GRUBER AND SAEZ JPUBE'02 (skip)

Use panel data from 1979-1990 on all tax changes available rather than a single reform

Model: $z_{it} = z_{it}^0 \cdot (1 - \tau_{it})^e$ where z_{it}^0 is potential income (if MTR=0), e is elasticity

$$\log\left(\frac{z_{it+3}}{z_{it}}\right) = \alpha + e \cdot \log\left(\frac{1-\tau_{it+3}}{1-\tau_{it}}\right) + \varepsilon_{it}$$

τ_{it+3} and ε_{it} are correlated [because $\tau_{it+3} = T'_{t+3}(z_{it+3})$]

Instrument: predicted change in MTR assuming income stays constant: $\log[(1-\tau^p_{it+3})/(1-\tau_{it})]$ where $\tau^p_{it+3} = T'_{t+3}(z_{it})$

Isolates changes in tax law ($T_t(.)$) as the only source of variation in tax rates

Table 4
Basic elasticity results[a]

Income controls	None		Log income		Log income 10-piece spline	
	Broad income (1)	Taxable income (2)	Broad income (3)	Taxable income (4)	Broad income (5)	Taxable income (6)
Elasticity	−0.300	−0.462	0.170	0.611	0.120	0.400
	(0.120)	(0.194)	(0.106)	(0.144)	(0.106)	(0.144)
Dummy for marrieds	−0.008	−0.062	0.045	0.049	0.050	0.055
	(0.010)	(0.018)	(0.014)	(0.023)	(0.012)	(0.021)
Dummy for singles	−0.037	−0.053	−0.034	−0.032	−0.036	−0.027
	(0.012)	(0.019)	(0.013)	(0.022)	(0.013)	(0.021)
Log(income) control			−0.083	−0.167		
			(0.015)	(0.021)		

Source: Gruber and Saez 2002

GRUBER AND SAEZ JPUBE'02 (skip)

Find an elasticity of roughly 0.3-0.4 BUT results are very fragile [Saez-Slemrod-Giertz JEL'12]

1) Sensitive to exclusion of low incomes

2) Sensitive to controls for mean reversion

3) Subsequent studies find smaller elasticities using data from other countries [Kleven-Schultz AEJ-EP'14 for Denmark]

4) Bundles together small tax changes and large tax changes: if individuals respond only to large changes in short-medium run, then estimated elasticity is too low [Chetty et al. QJE'11]

KLEVEN AND SCHULTZ AEJ-EP'14

Key Advantages:

a) Use full population of tax returns in Denmark since 1980 (large sample size, panel structure, many demographic variables, stable inequality)

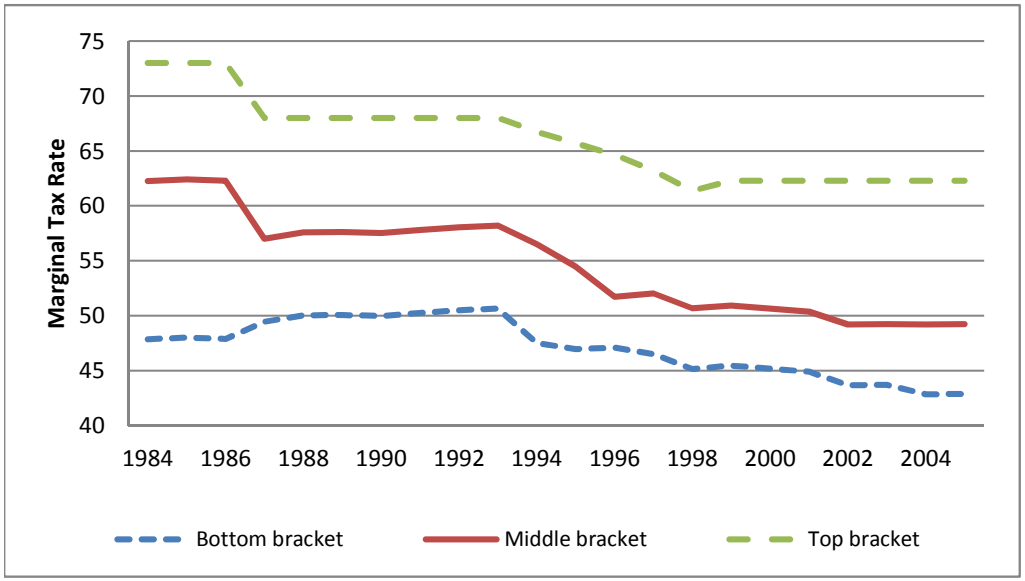
b) A number of reforms changing tax rates differentially across three income brackets and across tax bases (capital income taxed separately from labor income)

c) Show compelling visual DD-evidence of tax responses around the 1986 large reform:

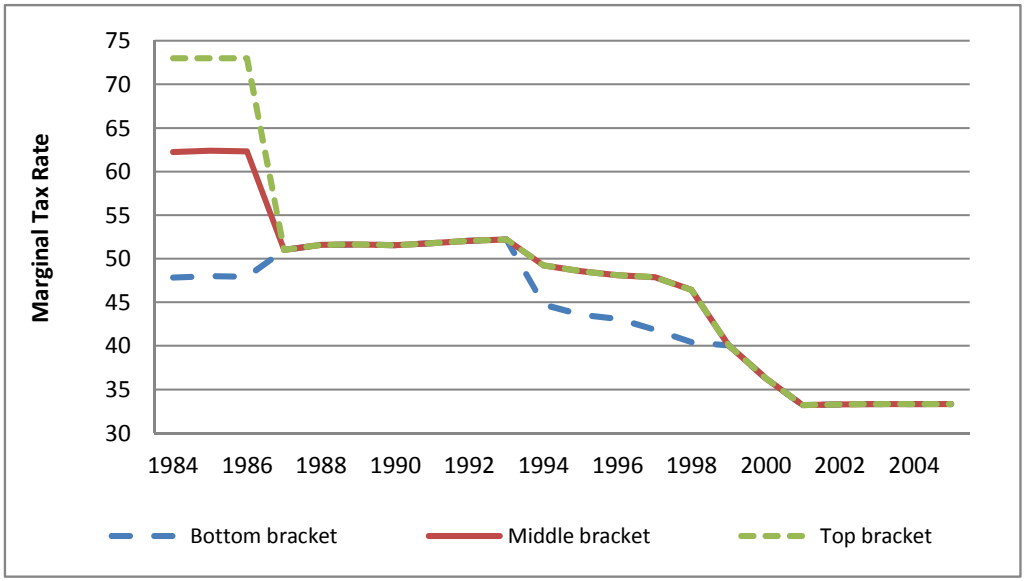
Define treatment and control group in year 1986 (pre-reform), follow the same group in years before and years after the reform (panel analysis)

Figure 2. Two Decades of Danish Tax Reform

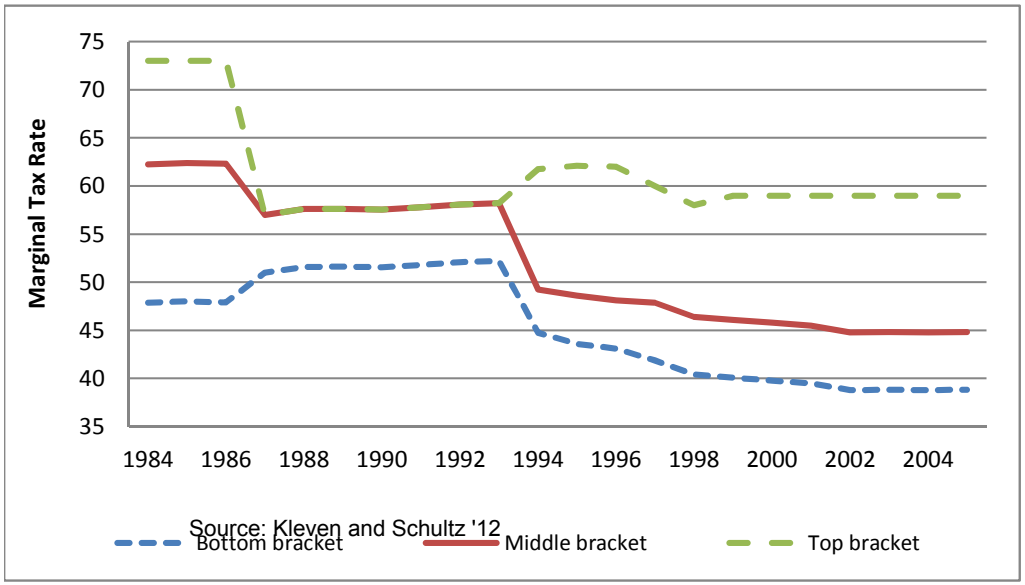
Panel A. Marginal Tax Rate on Labor Income



Panel B. Marginal Tax Rate on Negative Capital Income



Panel C. Marginal Tax Rate on Positive Capital Income



Source: Kleven and Schultz '12

Panel D. Share of Taxpayers in the Three Tax Brackets

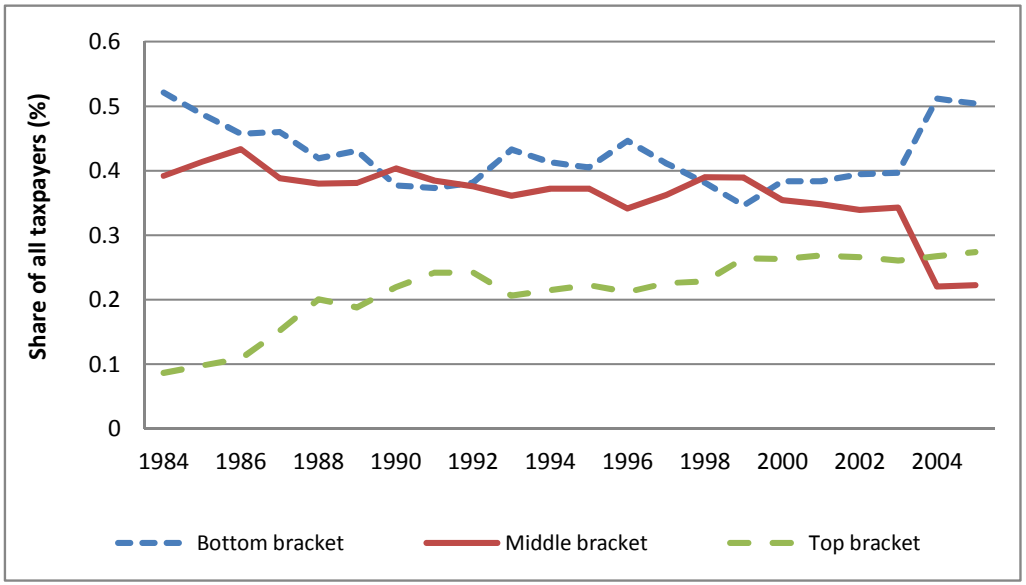
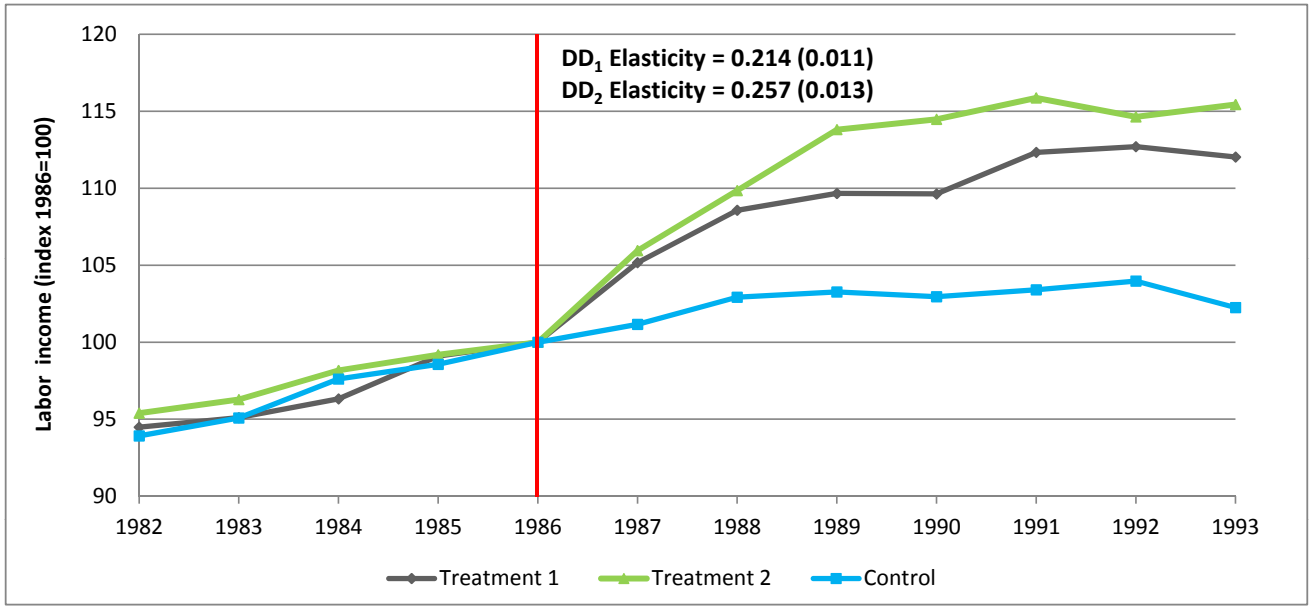


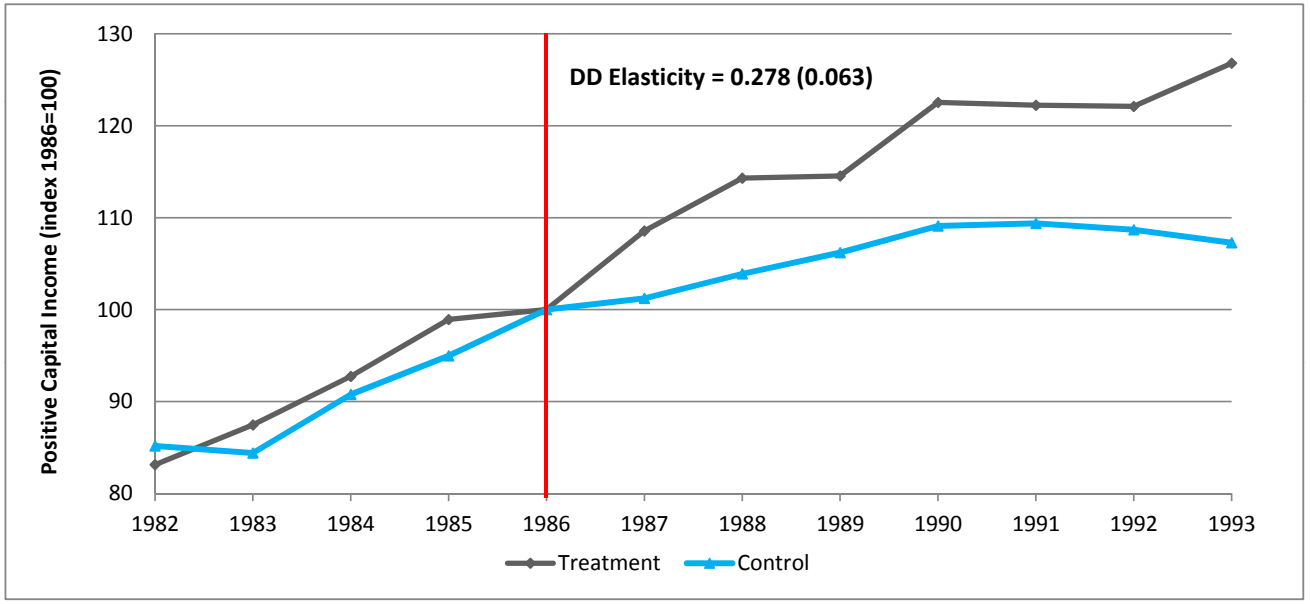
Figure 6. Graphical Evidence on the Effects of the 1987-reform on Taxable Income

Source: Kleven and Schultz '12

Panel A. Labor Income



Panel B. Positive Capital Income



KLEVEN AND SCHULTZ AEJ-EP'14

Key Findings:

a) Small labor income elasticity (.1)

b) bigger capital income elasticities (.2-.3)

c) bigger elasticities for large reforms

d) modest income shifting between labor and capital in Denmark (likely because top rates on labor and capital are carefully aligned)

$\Rightarrow$ Danish tax system optimized to have broad base and few avoidance opportunities

FISCAL EXTERNALITIES

Tax changes due to tax avoidance often generate **fiscal externalities**

A **Fiscal externality** is a change in tax revenue that occurs in any tax base z^B other than z due to the behavioral response to the tax change in the initial base z

(1) z^B can be a different tax base in the same time period (such as corporate income tax base) $\Rightarrow$ **Income shifting**

(2) z^B can be the same tax base in a different time period (such as future income) $\Rightarrow$ **Inter-temporal Substitution**

Efficiency and optimal tax analysis depend on effect on **total** tax revenue so critical to identify fiscal externalities

Inter-Temporal Substitution: Realized Capital Gains

Realized capital gains occur when individual sells asset at a higher price than buying price

Individuals have flexibility in the timing of asset sales and capital gains realizations

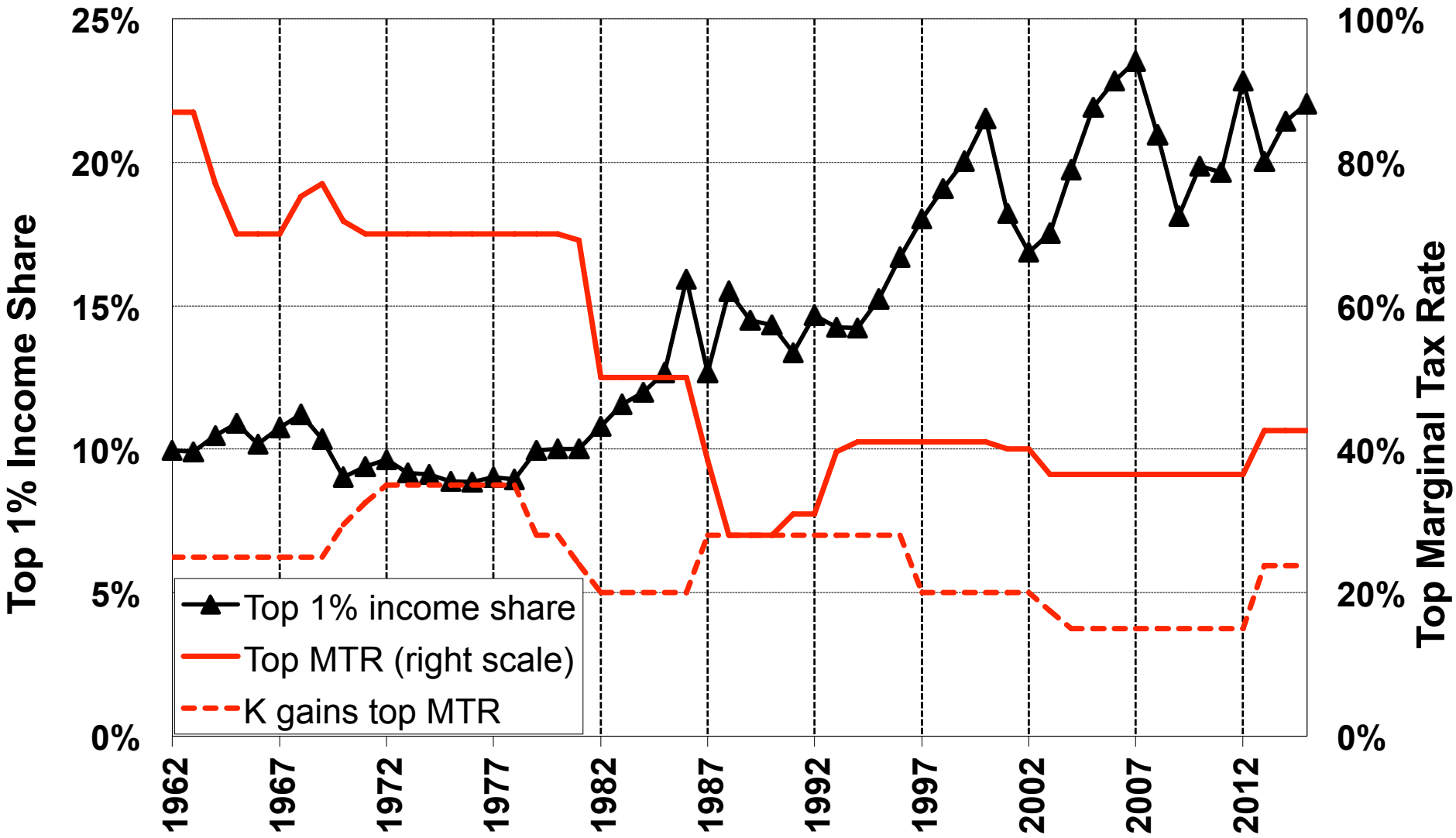
TRA'86 lowered the top tax rate on ordinary income from 50% to 28% but increased the top tax rate on realized capital gains from 20% to 28%

2013: tax rate on KG increased from 15% to 20%+3.8% (Saez TPE'17 proposes simple analysis)

$\Rightarrow$ Surge in capital gains realizations in 1986 and 2012 [and depressed capital gains in 1987 and 2013]

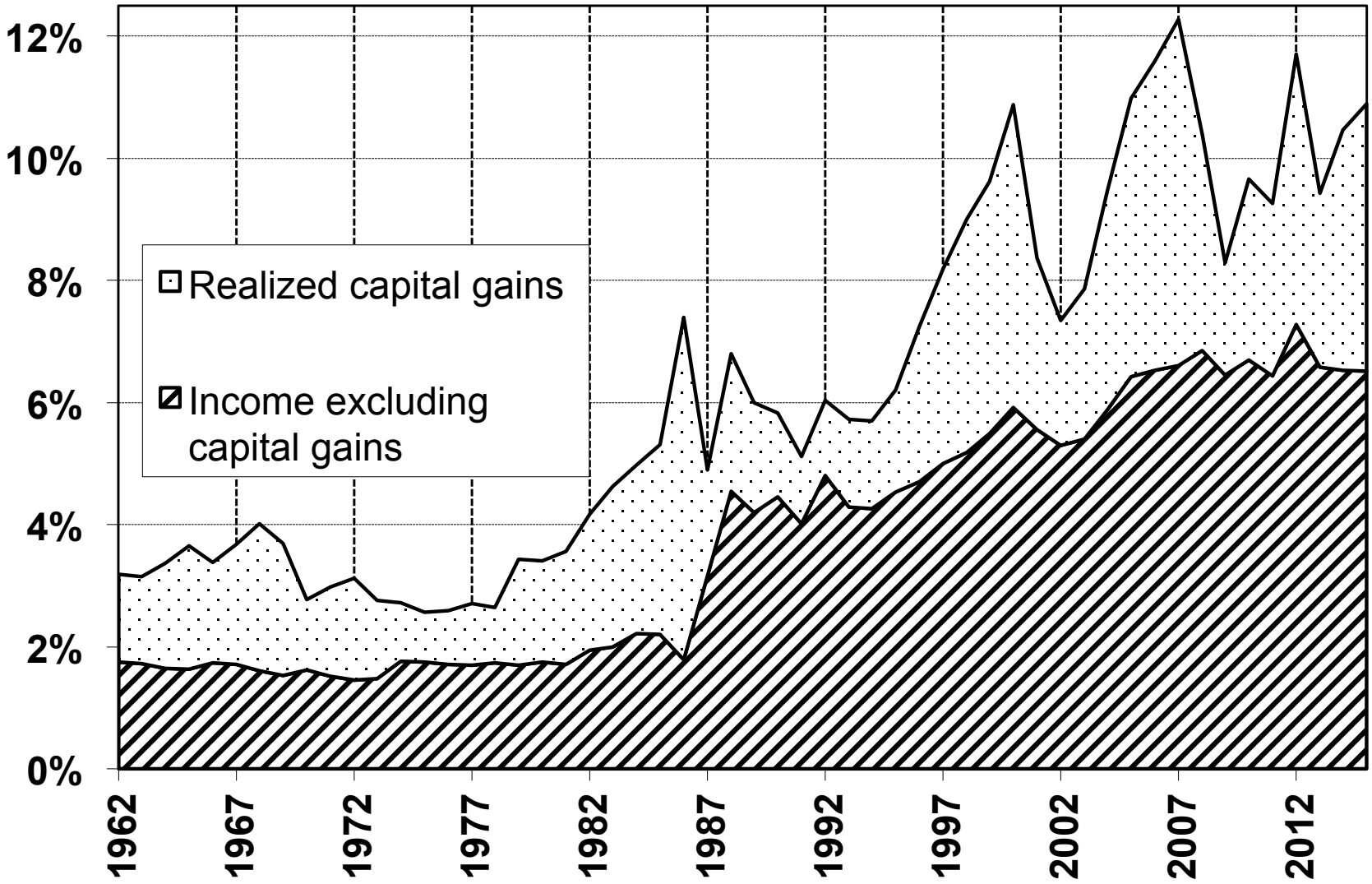
$\Rightarrow$ Short-term elasticity is very large but long-term elasticity is certainly much smaller

Top 1% pre-tax income share and top tax rates



Source: Top 1% income share: Piketty and Saez, 2003 updated to 2015, series including realized capital gains. Top MTR include Federal individual tax + uncapped FICA payroll tax.

US Top 0.1% Income Share and Composition



Source: Piketty and Saez, 2003 updated to 2015. Series based on pre-tax cash market income including realized capital gains, and always excluding government transfers.

INTER-TEMPORAL SUBSTITUTION: STOCK-OPTIONS

Goolsbee JPE'00 analyzes CEO pay around the 1993 Clinton top tax rate increase ↑ [from 31% in 1992 to 39.6% in 1993 announced in late 1992] on executive pay

Finds a strong re-timing response through stock-option exercise (executive can choose the timing of their stock-option exercises)

$\Rightarrow$ Large short-term response due to re-timing, small long-term response

Some response but smaller around the 2013 tax increase

STOCK OPTIONS

Major form of compensation of US top executives. Theoretical goal is to motivate executives to increase the value of the company (stock price $P(t)$)

Stock-options granted at date t_0 allow executives to buy N company shares at price $P(t_0)$ on or after t_1 (in general $t_1 - t_0 \simeq 3-5$ years = vesting period)

Executive exercises option at (chosen) time $t_2 \geq t_1$: pays $N \cdot P(t_0)$ to get shares valued $N \cdot P(t_2)$. Exercise profit $N \cdot [P(t_2) - P(t_0)]$ (taxed as wage income in the US)

After t_2, executive owns N shares, eventually sold at time $t_3 \geq t_2$: realized capital gain $N \cdot [P(t_3) - P(t_2)]$ (taxed as KG)

TABLE 2

AVERAGE COMPENSATION BY TYPE FOR HIGH-INCOME EXECUTIVES
(in Thousands)

	1991	1992	1993	1994	1995
Taxable income	911	1,153	974	965	1,173
Salary	347	336	336	351	373
Bonus	198	207	241	284	330
LTIP payout	57	72	57	64	89
Options exercised	268	496	293	235	381
Other income (nontaxed)	36	37	66	54	78

SOURCE.—Author's calculations for executives with permanent income greater than $275,000 per year.

Source: Goolsbee (2000), p. 365

Income Shifting: Corporate and Individual Tax Base

Businesses can be organized as **corporations** or **unincorporated businesses** [also called **pass-through** entities]

Corporate profits first taxed by corporate tax [rate $\tau_c = 21\%$]

Net-of-tax profits are taxed again at rate τ_{distrib} when finally distributed to shareholders. Two distribution options:

a) dividends [tax rate $\tau_d = 20\%$ today]

b) retained profits increase stock price: shareholders realize capital gains when finally selling the stock [tax rate $\tau_{cg} = 20\%$]

But distributions can be deferred so that $\tau_{\text{distrib}} << \tau_d, \tau_{cg}$

For **unincorporated businesses** (sole proprietorships, partnerships, S-corporations) profits are taxed directly and solely as individual income (tax rate $\tau_i = 37\%$ top MTR or even 30% with 20% business profit deduction since 2018)

CORPORATE AND INDIVIDUAL TAX BASE

Corporate form best if $(1-\tau_c)\cdot(1-\tau_{\text{distrib}}) > 1-\tau_i$

US fed taxes in 2018: $\tau_c = 21\%$, $\tau_{cg} = \tau_d = 20\%$, (but $\tau_{\text{distrib}} << 20\%$ if distribution deferred), $\tau_i = 37\%$ or 30%

After 2018 Trump change: corporate form is best, especially if wealthy business owner can defer distribution

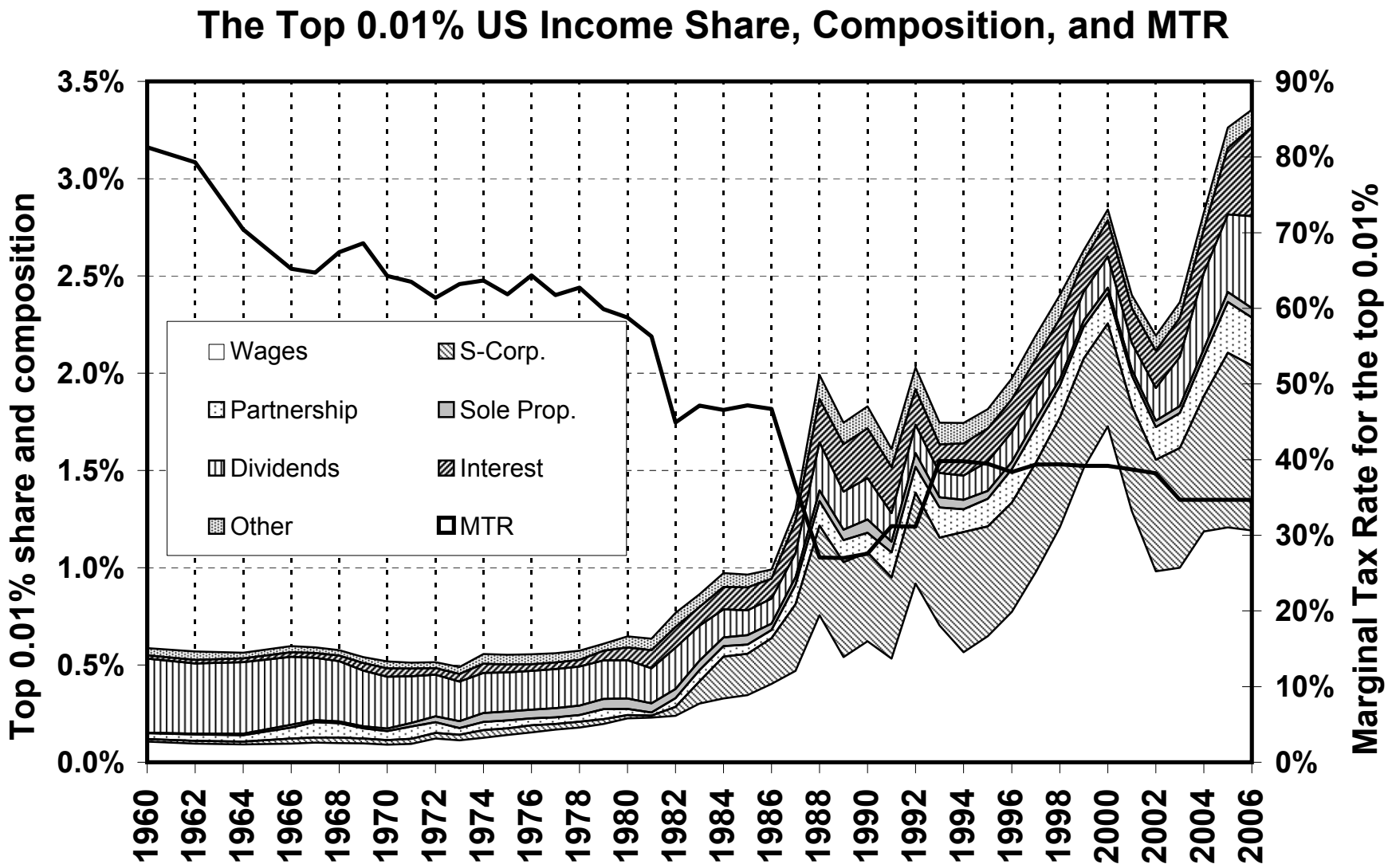
Pre 2018, $\tau_c = 35\%$ and $\tau_i = 39.6\% \Rightarrow$ individual form better

$\Rightarrow$ wealthy people likely to incorporate their businesses in 2018+

Before TRA'86 (and especially before ERTA'81), top individual rate τ_i was much higher so corporate form was best

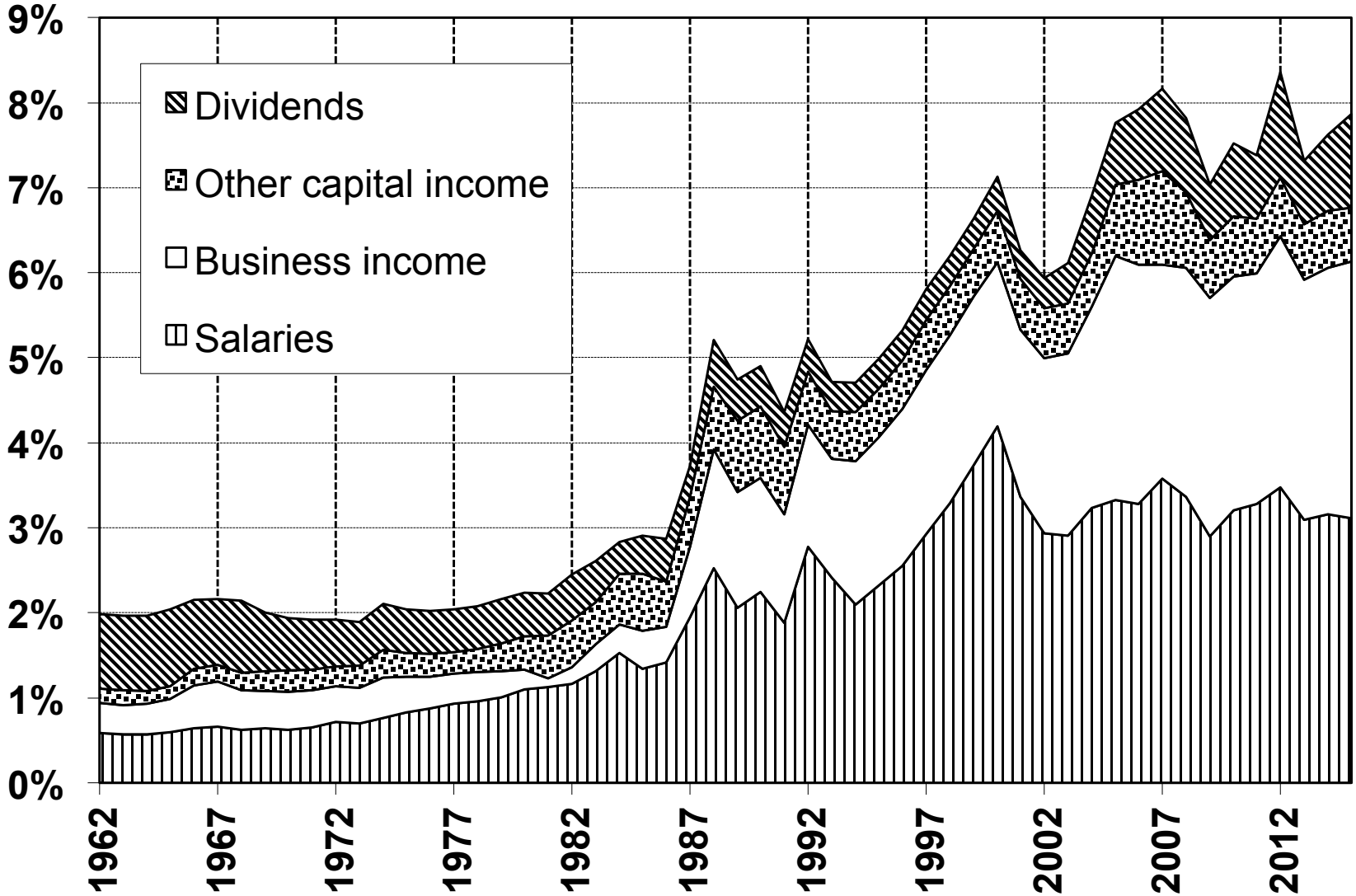
Shifts from corporate to individual base increases business profits at the expense of dividends and realized capital gains

Large part of TRA'86 response is due to such shifting



Source: Saez et al. (2010)

US Top 0.1% Income Share and Composition (excl. K gains)



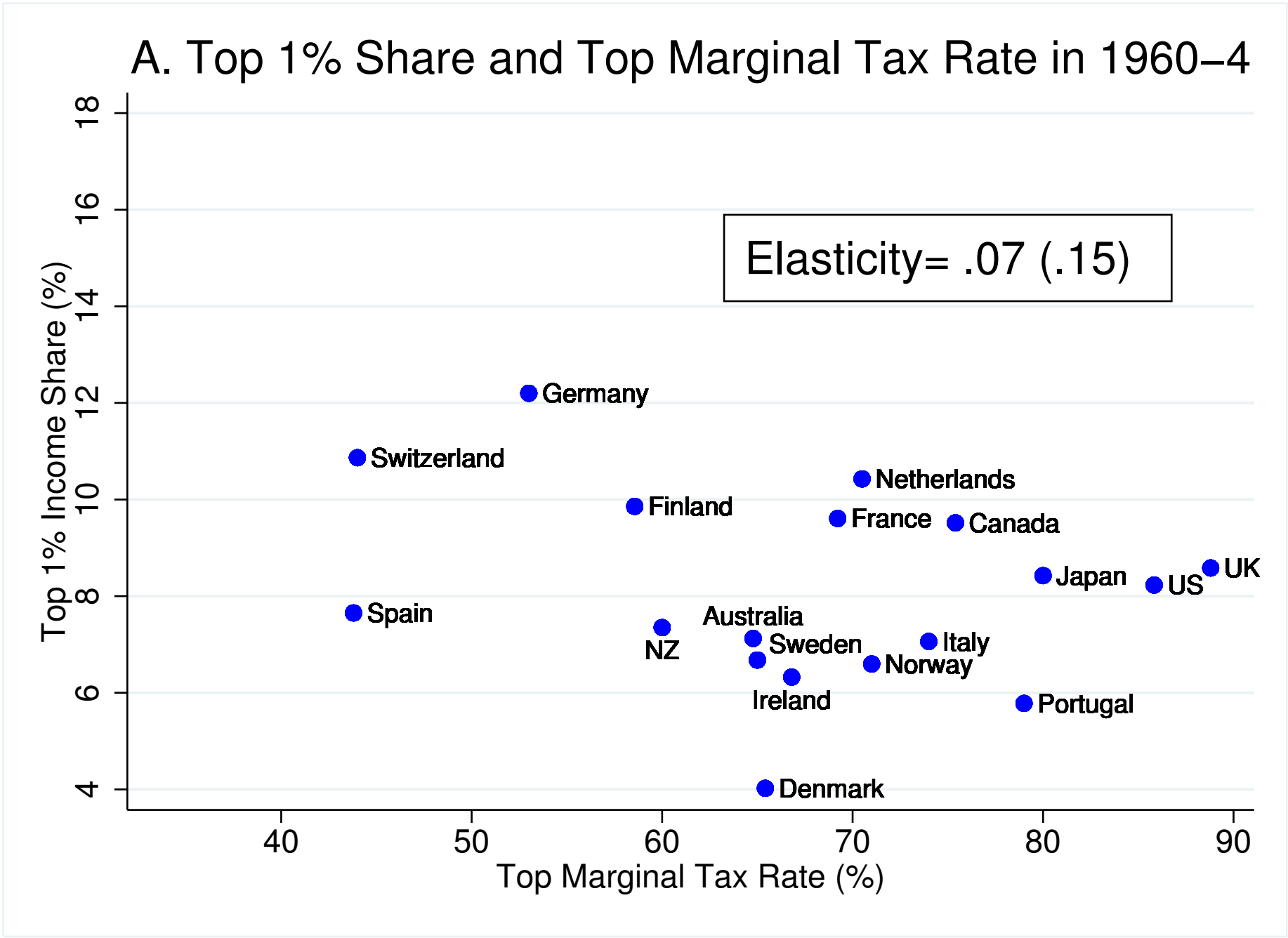
Source: Piketty and Saez, 2003 updated to 2015. Series based on pre-tax cash market income ex cluding realized capital gains, and always excluding government transfers.

TOP RATES AND TOP INCOMES INTERNATIONAL EVIDENCE

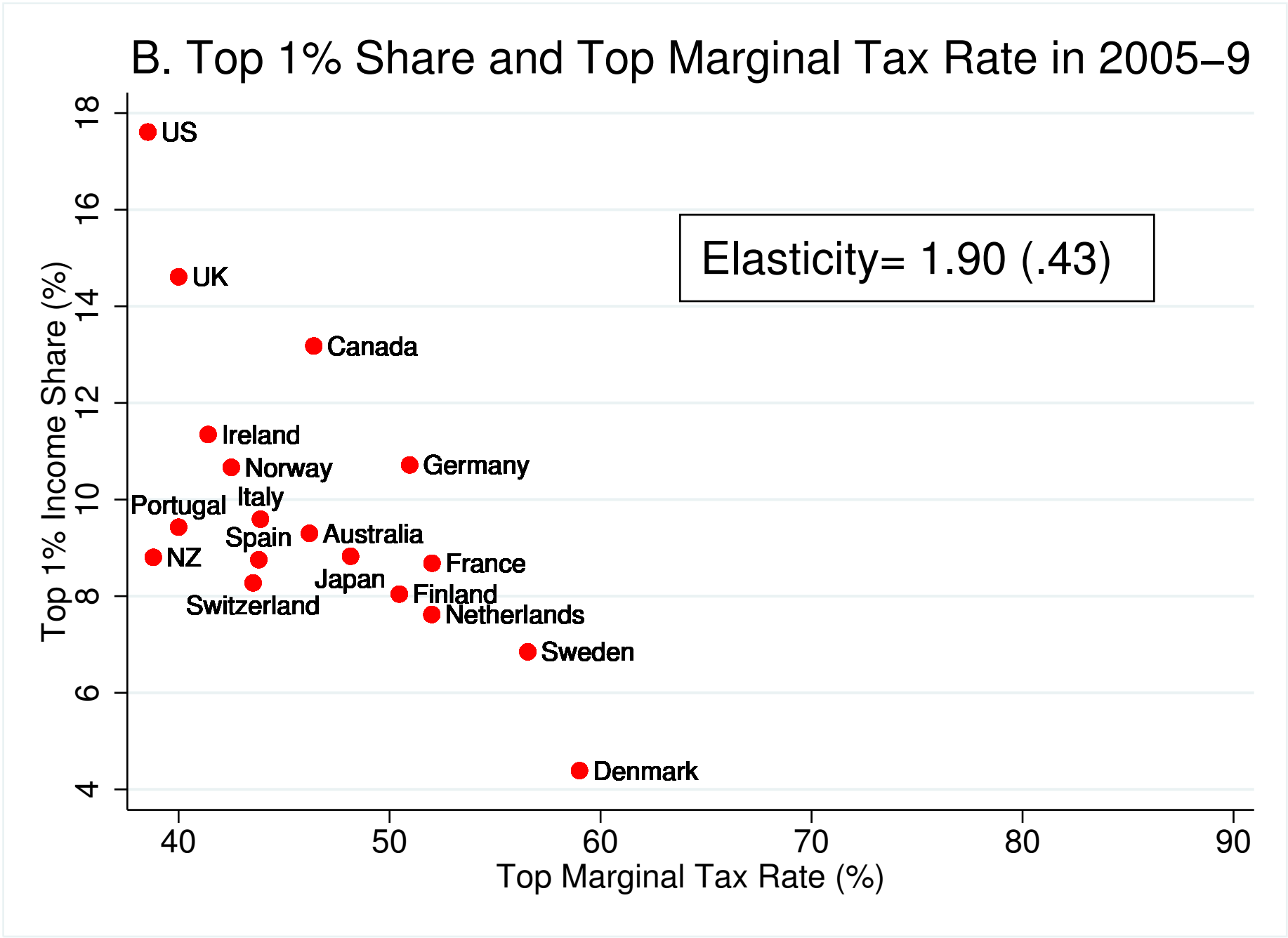
1) Use pre-tax top 1% income share data from 18 OECD countries since 1960 using the **World Inequality Database**

2) Compute top (statutory) individual income tax rates using OECD data [including both central and local income taxes].

Plot top 1% pre-tax income share against top MTR in 1960-4, in 2005-9, and 1960-4 vs. 2005-9



Source: Piketty, Saez, Stantcheva AEJ-EP (2014)



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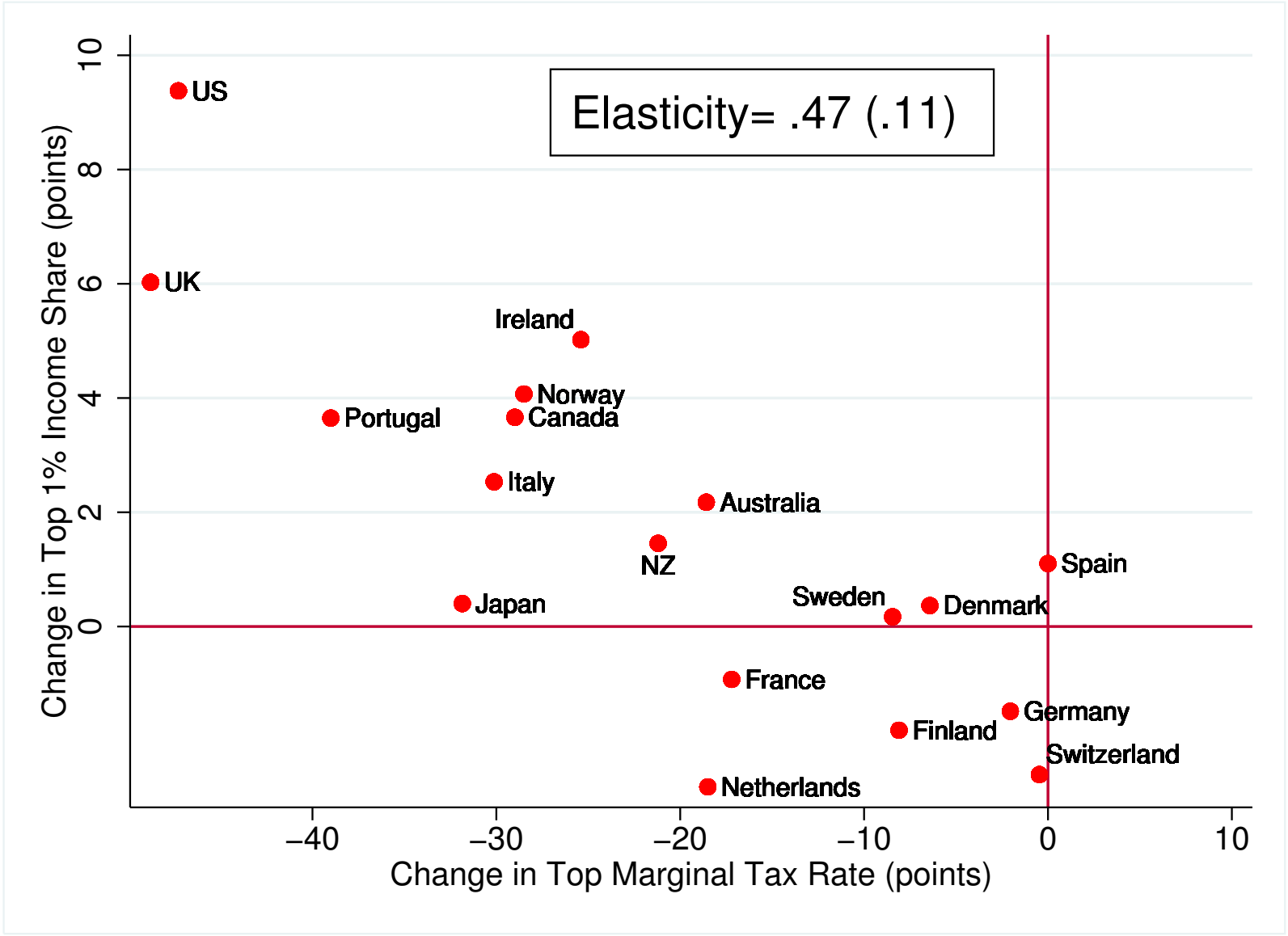


Change in Top Tax Rate and Top 1% Share, 1960-4 to 2005-9

Source: Piketty, Saez, Stantcheva AEJ-EP (2014)

Top tax rates and top 1% income share 1960-2009

Table 2: International Evidence on Top Income Elasticities

	All 18 countries and fixed periods			Bootstrapping period and country set		
	1960-2010	1960-1980	1981-2010	Median	5th percentile	95th percentile
	(1)	(2)	(3)	(4)	(5)	(6)
A. Effect of the Top Marginal Income Tax Rate on Top 1% Income Share						
Regression: log(Top 1% share) = a + e*log(1-Top MTR) + ε						
No controls	0.324	0.163	0.803	0.364	0.128	0.821
	(0.034)	(0.039)	(0.053)	(0.043)	(0.085)	(0.032)
Time trend control	0.375	0.182	0.656	0.425	0.191	0.761
	(0.042)	(0.030)	(0.056)	(0.045)	(0.091)	(0.032)
Country fixed effects	0.314	0.007	0.626	0.267	0.008	0.595
	(0.025)	(0.039)	(0.044)	(0.035)	(0.070)	(0.026)
Number of observations	774	292	482	286	132	516

ECONOMIC EFFECTS OF TAXING THE TOP 1%

Strong empirical evidence that **pre-tax** top incomes are affected by top tax rates

3 potential scenarios with very different policy consequences

1) Supply-Side: Top earners work less and earn less when top tax rate increases $\Rightarrow$ Top tax rates should not be too high

2) Tax Avoidance/Evasion: Top earners avoid/evade more when top tax rate increases

$\Rightarrow$ a) Eliminate loopholes, b) Then increase top tax rates

3) Rent-seeking: Top earners extract more pay (at the expense of the 99%) when top tax rates are low $\Rightarrow$ High top tax rates are desirable

Real changes vs. tax avoidance?

Long-term Correlation between **pre-tax** top reported incomes and top tax rates

If due solely to tax avoidance, true top income shares were high in the 1950s-1970s but top earners could lower their taxable income (by retaining earnings in businesses and benefit from lower tax rate on capital gains)

But top income share including K gains follows the same U-shape (Piketty, Saez, Stantcheva '14)

Piketty, Saez, Zucman QJE'18: comprehensive national income estimates are also U-shaped over the century

$\Rightarrow$ Long-run evolution of inequality is not an artifact of tax avoidance or evasion

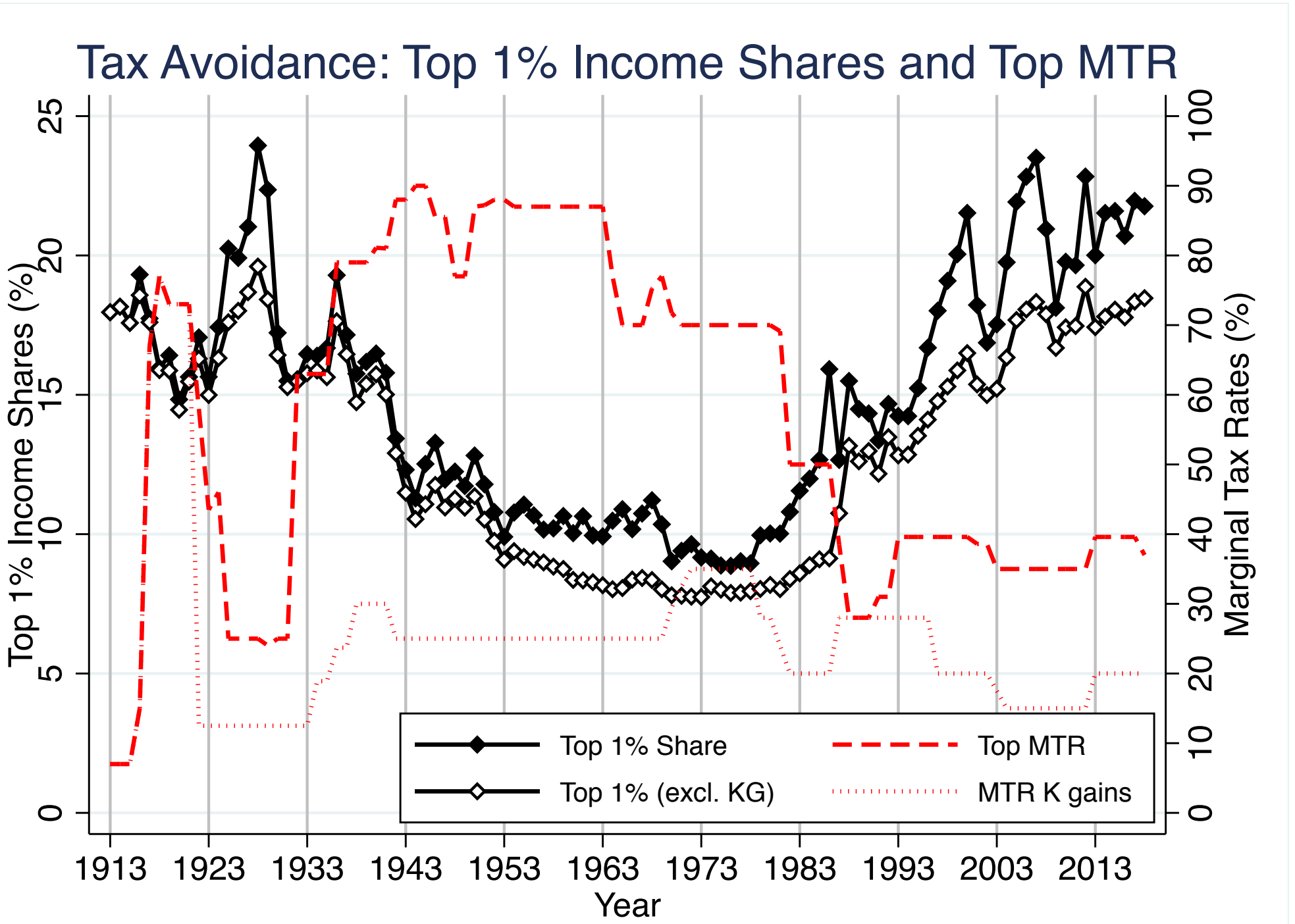
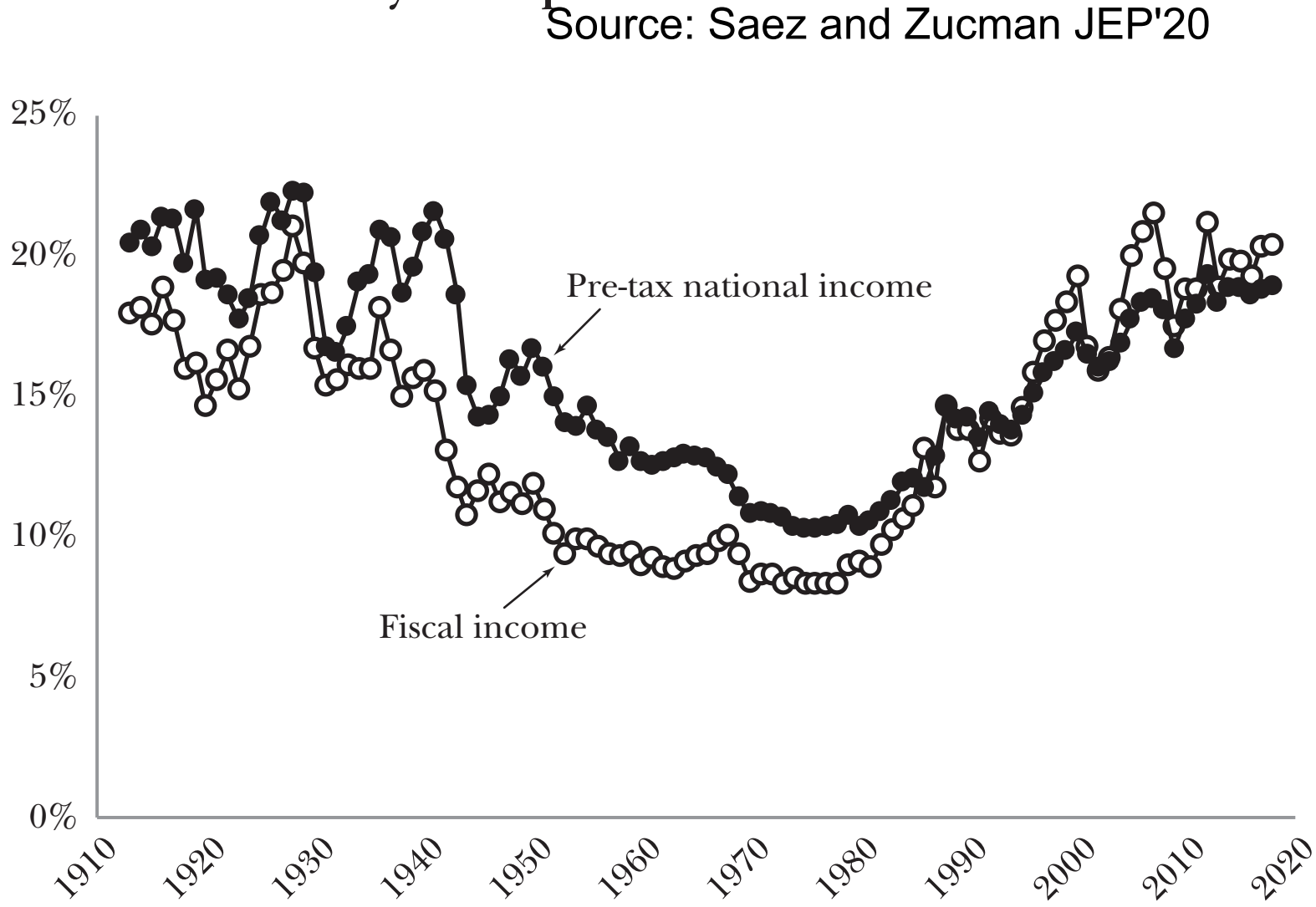

Tax Avoidance: Top 1% Income Shares and Top MTR
Top 1% Income Shares (%)
0
5
10
15
20
25
Marginal Tax Rates (%)
0
10
20
30
40
50
60
70
80
90
100
1913
1923
1933
1943
1953
1963
1973
1983
1993
2003
2013
Year
Top 1% Share
Top 1% (excl. KG)
Top MTR
MTR K gains

Figure 3

Share of Income Earned by the Top 1 Percent



Note: This figure compares the share of fiscal income earned by the top 1 percent tax units (from Piketty and Saez 2003, updated series including capital gains in income to compute shares but not to define ranks, to smooth the lumpiness of realized capital gains) to the share of pre-tax national income earned by the top 1 percent equal-split adults (from Piketty, Saez, and Zucman 2018, updated September 2020, available on WID.world).

Real changes vs. tax Avoidance? Charitable giving

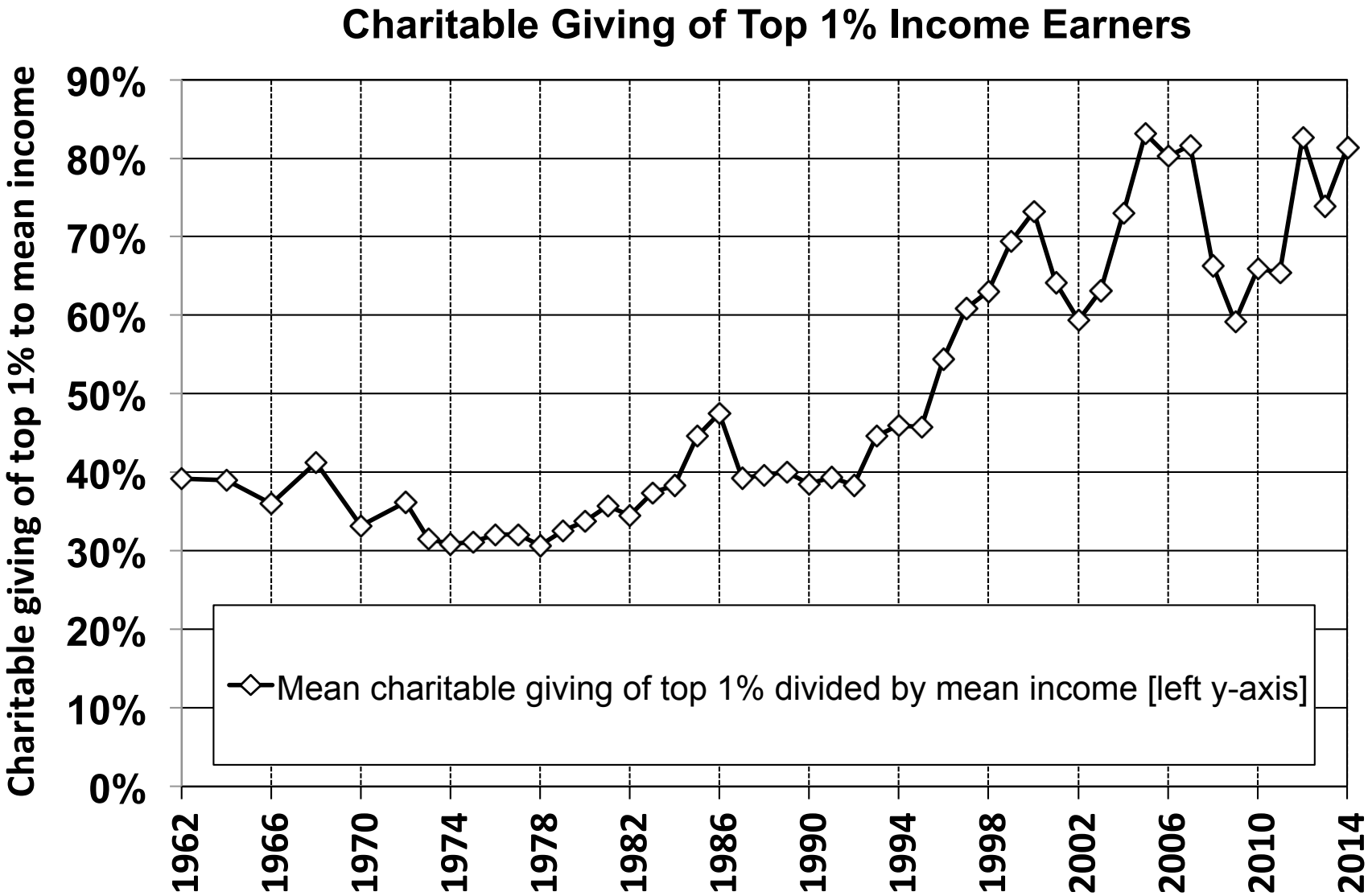
Test using charitable giving behavior of top income earners (Saez TPE '17)

Because charitable is tax deductible, incentives to give are stronger when tax rates are higher

Under the tax avoidance scenario, reported incomes and reported charitable giving should move in opposite directions

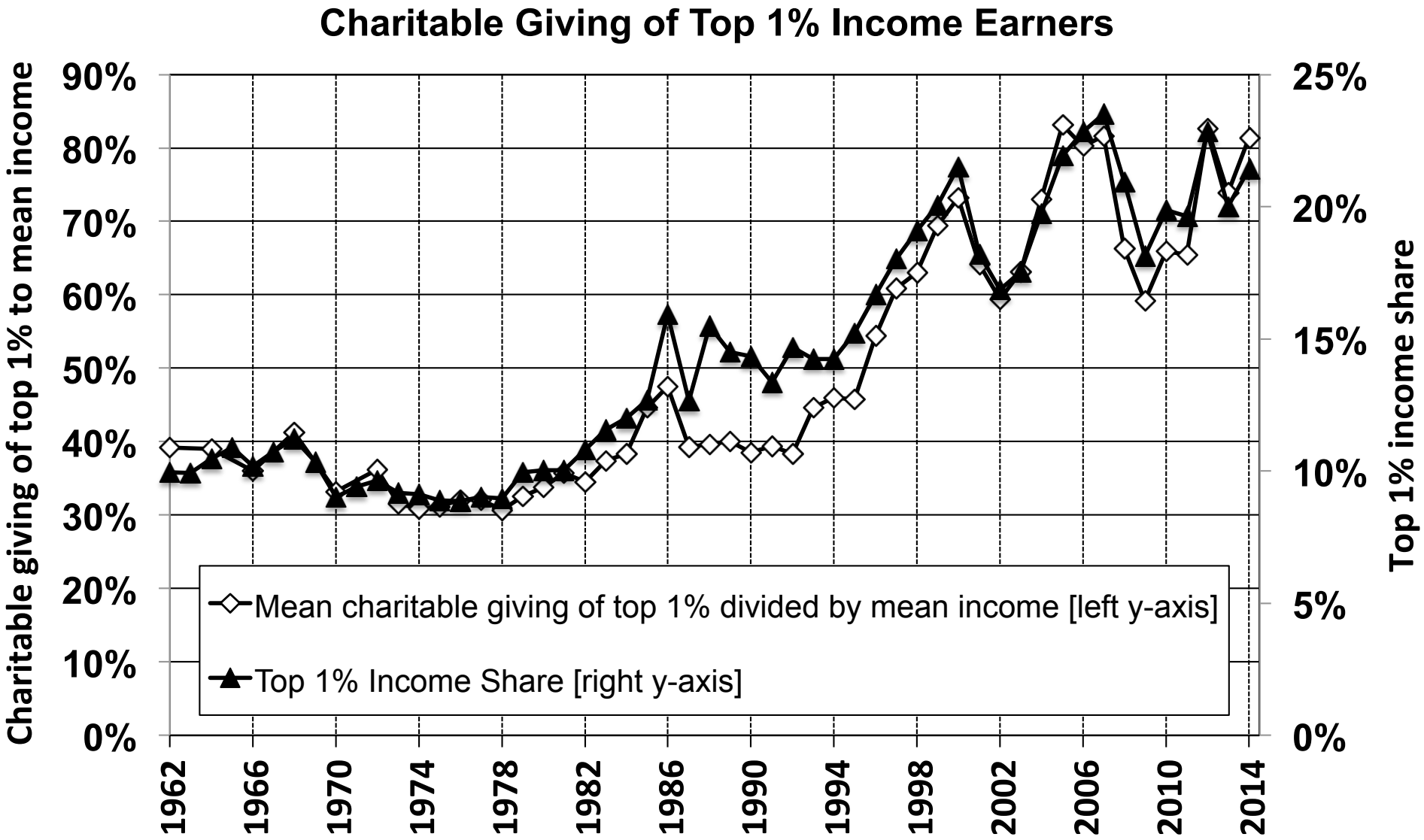
Empirically, charitable giving of top income earners has grown in close tandem with top incomes

$\Rightarrow$ Incomes at the top have grown for real



Source: The figure depicts average charitable giving of top 1% incomes (normalized by average income per family) on the left y-axis.

Source: Saez TPE 2017



Source: The figure depicts average charitable giving of top 1% incomes (normalized by average income per family) on the left y-axis. For comparison, the figure reports the top 1% income share (on the right y-axis).

Source: Saez TPE 2017

Supply-Side or Rent-Seeking?
(Piketty-Saez-Stantcheva)

Correlation between **pre-tax** top incomes and top tax rates

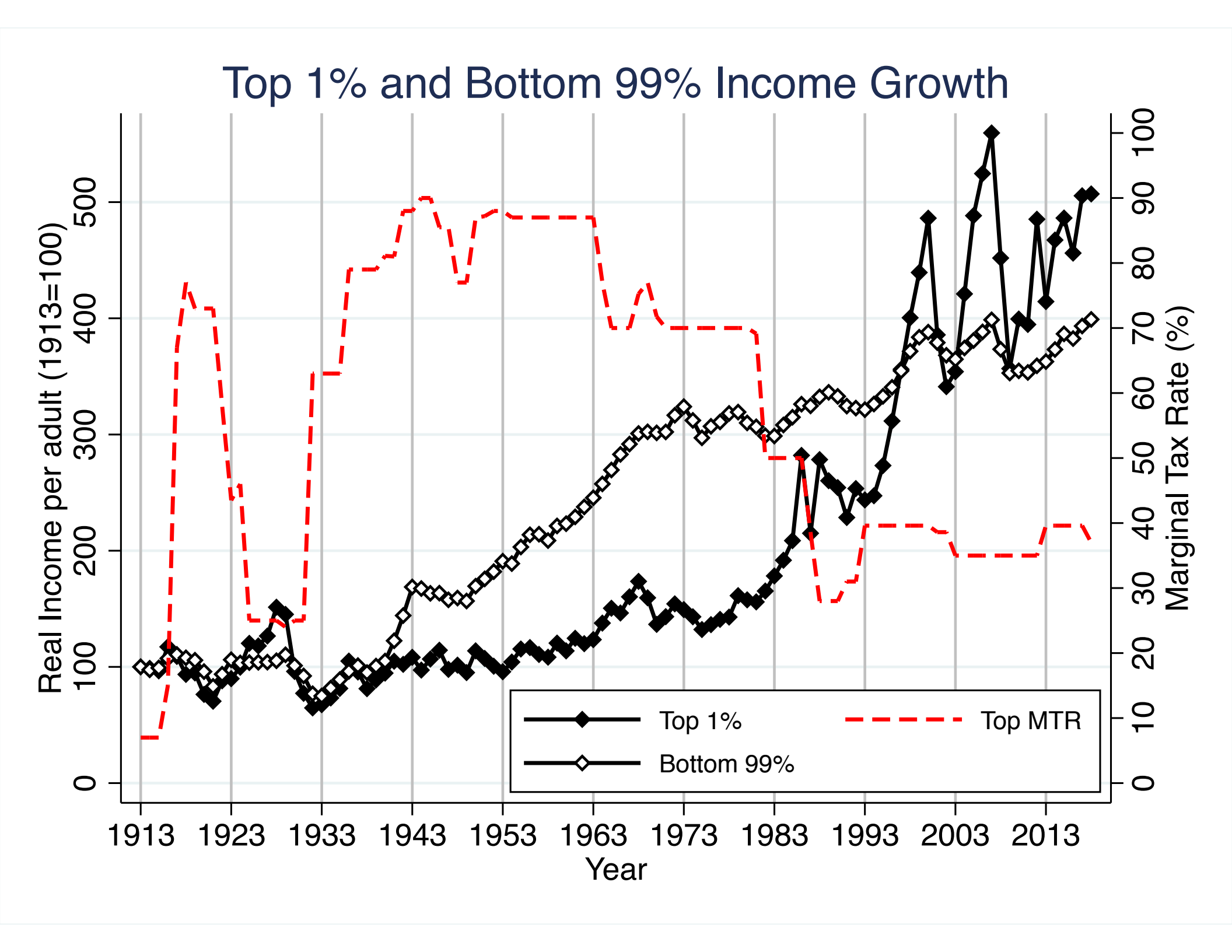
If rent-seeking: growth in top 1% incomes should come at the expense of bottom 99% (and conversely)

Two macro-preliminary tests:

1) In the US, top 1% incomes grow slowly from 1933 to 1975 and fast afterwards. Bottom 99% incomes grow fast from 1933 to 1975 and slowly afterwards $\Rightarrow$ Consistent with rent-seeking effects

2) Look at cross-country correlation between economic growth and top tax rate cuts $\Rightarrow$ No correlation supports trickle-up

One micro-test using CEO pay data


Top 1% and Bottom 99% Income Growth
Real Income per adult (1913=100)
0
100
200
300
400
500
Marginal Tax Rate (%)
0
10
20
30
40
50
60
70
80
90
100
1913
1923
1933
1943
1953
1963
1973
1983
1993
2003
2013
Year
Top 1%
Bottom 99%
Top MTR

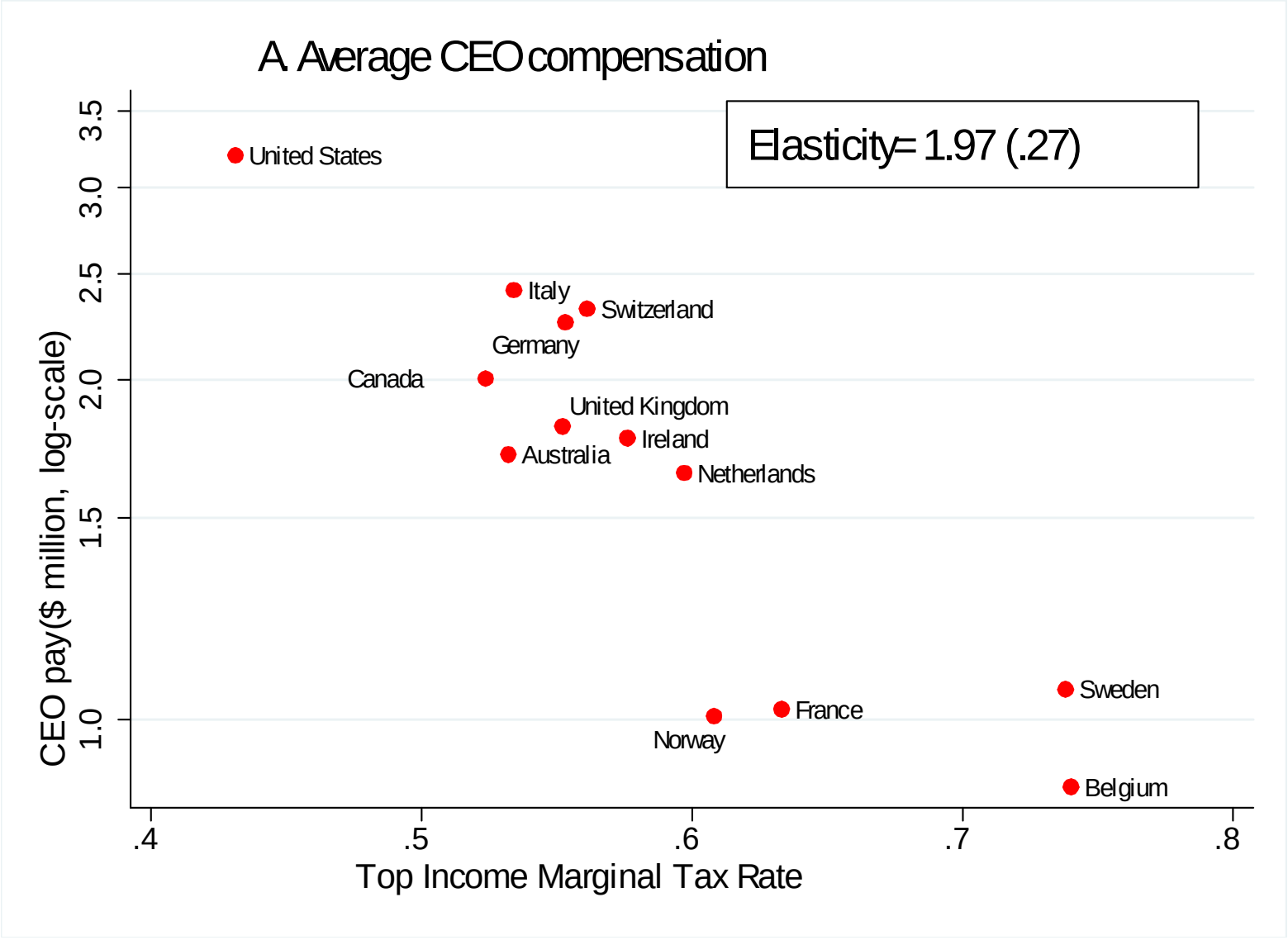
INTERNATIONAL CEO PAY EVIDENCE

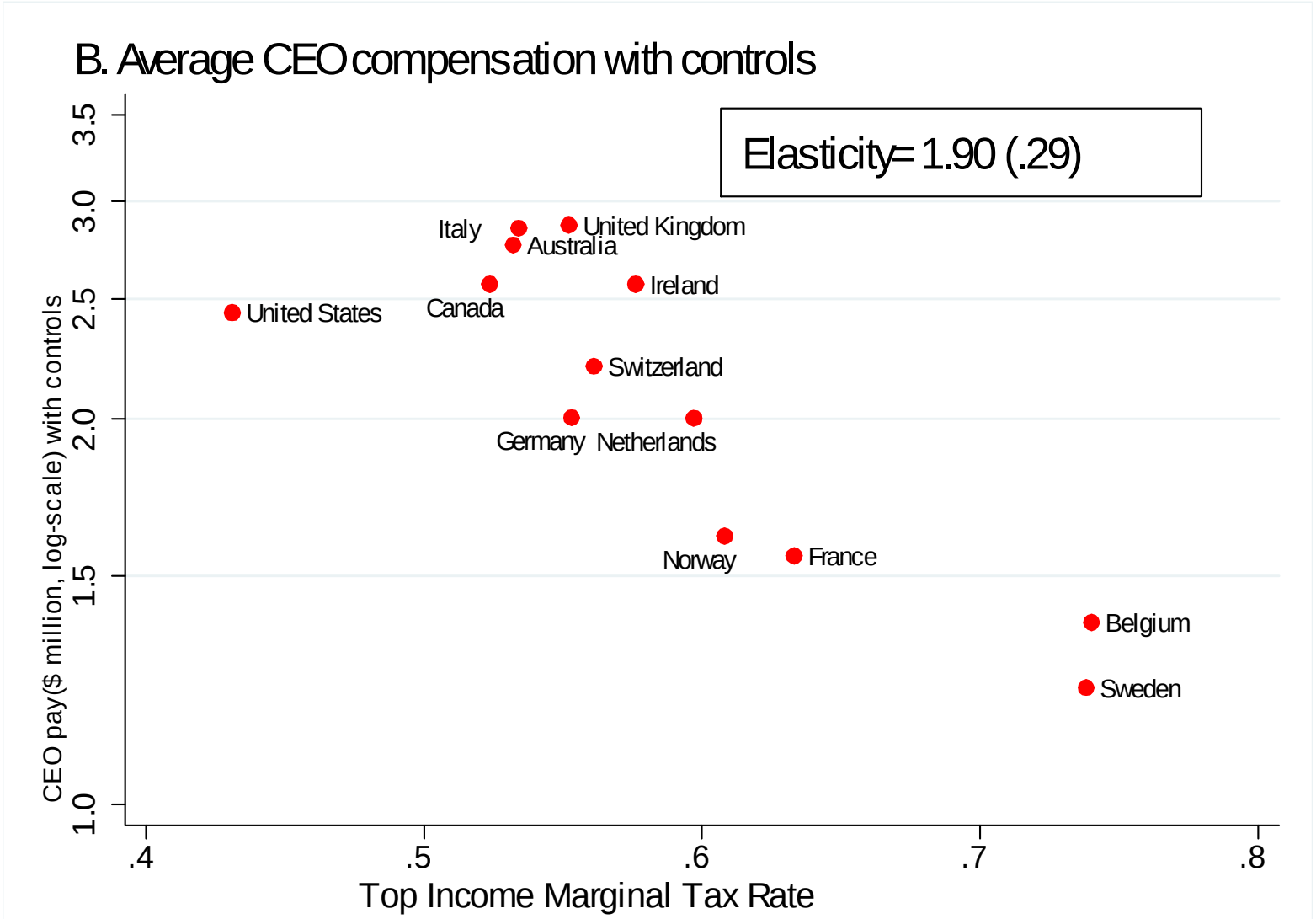
Recent micro-data for 2006 gathered by Fernandes, Ferreira, Matos, Murphy RFS'12.

1) CEO pay across countries strongly negatively correlated with top tax rates

2) Correlation remains as strong even when controlling for firms' characteristics and performance

$\Rightarrow$ Consistent with bargaining effects


A. Average CEO compensation
Elasticity= 1.97 (.27)
United States
Italy
Switzerland
Germany
Canada
United Kingdom
Ireland
Australia
Netherlands
Sweden
France
Norway
Belgium
CEO pay($ million, log-scale)
1.0
1.5
2.0
2.5
3.0
3.5
.4
.5
.6
.7
.8
Top Income Marginal Tax Rate


B. Average CEO compensation with controls
Elasticity= 1.90 (.29)
CEO pay($ million, log-scale) with controls
1.0
1.5
2.0
2.5
3.0
3.5
.4
.5
.6
.7
.8
Top Income Marginal Tax Rate
Italy
United Kingdom
Australia
Ireland
Canada
United States
Switzerland
Germany
Netherlands
Norway
France
Belgium
Sweden

International CEO Pay: Governance

Table 4: International CEO Pay Evidence

Outcome (LHS variable)	Log(CEO pay)	Log(CEO pay)	Log(CEO pay)	Log(CEO pay)	Log(CEO salary)	Log(CEO bonus and equity pay)
	(1)	(2)	(3)	(4)	(5)	(6)
Explanatory variables (RHS variables)						
log(1-Top MTR)	1.97***	1.90***	1.92***	1.90***	0.35*	4.68***
	(0.27)	(0.286)	(0.336)	(0.328)	(0.189)	(0.782)
Governance index			-0.10***	-0.19***	-0.02	-0.26
			(0.020)	(0.038)	(0.072)	(0.201)
log(1-Top MTR)*Governance index				-0.13**	0.06	-0.03
				(0.057)	(0.089)	(0.281)
Firm and CEO controls	no	yes	yes	yes	yes	yes
Number of observations	2,959	2,844	2,711	2,711	2,691	2,711

INTERNATIONAL MIGRATION

Public debate concern that top skilled individuals move to low tax countries (e.g., in EU context) or low tax states (within US Federation)

Migration concern bigger in public debate than supply-side concern within a country

Interesting variation due to proliferation of special low tax schemes for highly paid foreigners in Europe

Kleven-Landais-Saez AER'13 look at **football players** in Europe (highly mobile group, many tax reforms) $\Rightarrow$ Find significant migration responses to taxes after European football market was de-regulated in '95

Akcigit-Baslandze-Stantcheva AER'16 look at **innovators** (using patent data) mobility and find significant tax effects for top innovators

Various US states studies: Moretti-Wilson AER17 , 2019, Rauh-Shyu '19 (huge effects), Young et al. '16 (modest effects)

KLEVEN-LANDAIS-SAEZ-SCHULTZ QJE'14

Exploit the 1991 Danish tax scheme: immigrants with high earnings ($\geq 103,000$ Euros/year) taxed at flat 25% rate (instead of regular progressive tax with top 59% rate) for 3 years

Use population wide Danish tax data and DD strategy: compare immigrants above eligibility earnings threshold (treatment) to immigrants below threshold (control)

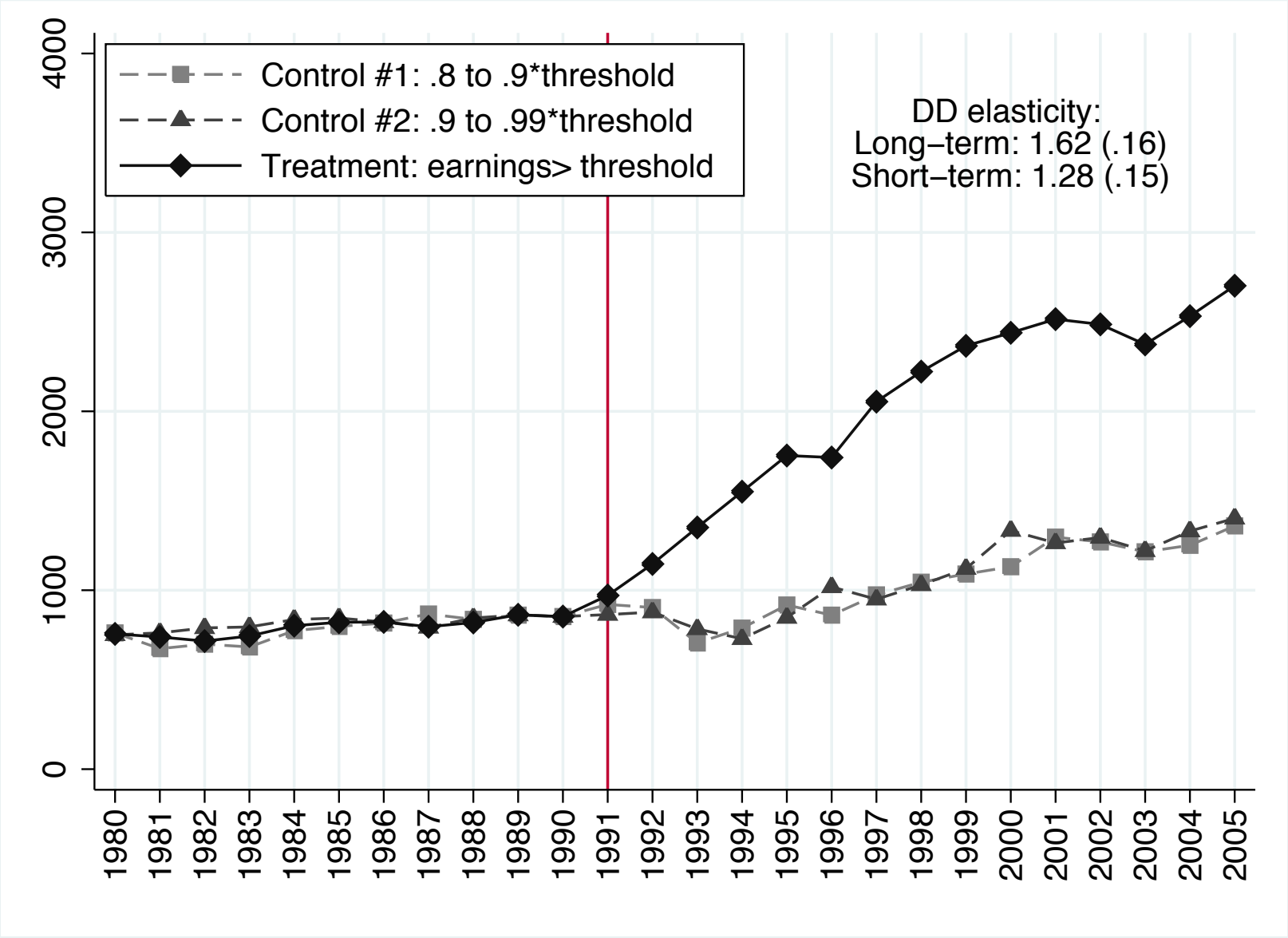
Key Finding: Scheme doubles the number of highly paid foreigners in Denmark relative to controls

$\Rightarrow$ Elasticity of migration with respect to the net-of-tax rate above one (much larger than the within country elasticity of earnings)

$\Rightarrow$ Tax coordination will be key to preserve progressive taxation in the EU (but tax competition hard-coded in EU treaties)

Figure 1 : Total number of foreigners in different income groups

Source: Kleven, Landais, Saez, Schultz QJE (2014)



Control 1= annualized income between .8 and .9 of threshold

Control 2= annualized income between .9 and .995 of threshold.

▸ DD specifications

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