The Future of Taxation, Innovation, and Redistribution

Stefanie Stantcheva
(Harvard)

October 2019

Taxation: Balancing Efficiency and Equity

Benefits of Taxation

Raise revenues.

Redistribute (raise more from some people).

Efficiency costs of Taxation:

Labor supply, labor market participation...

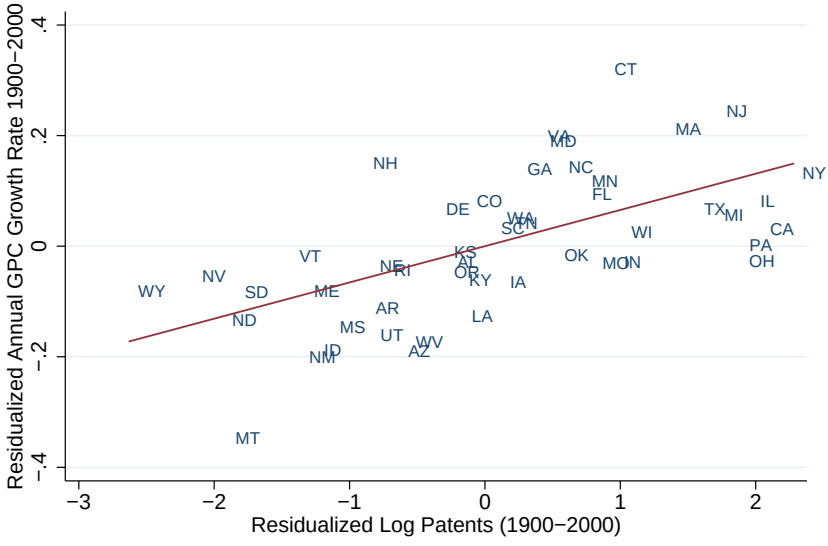
Reduced investment in skills, occupational choice...

Other real responses: Savings? Investment? Migration?

Evasion?

Taxation and Innovation

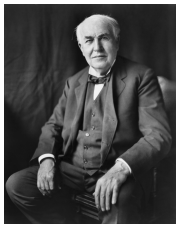
Innovation is One of Main Drivers of Long-Run Growth



Growth = 0.000 + 0.066 * Patents
Slope coefficient statistically significant at 1% level

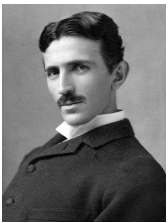
1. Taxation and Innovation in the U.S. over the 20th Century

Taxation and Innovation



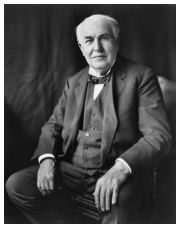
Thomas A. Edison
Light bulb.
Holds 1093 patents.

Melvin De Groote
Chocolate ice cream.
Holds 925 Patents.



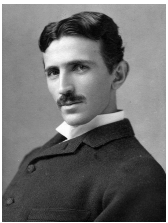
Nikola Tesla
Alternating Current.
Holds 278 Patents.

Taxation and Innovation



Thomas A. Edison
Light bulb.
Holds 1093 patents.

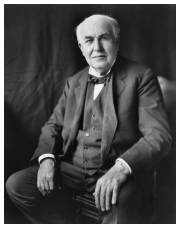
Melvin De Groote
Chocolate ice cream.
Holds 925 Patents.



Nikola Tesla
Alternating Current.
Holds 278 Patents.

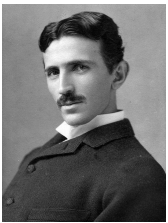
Mad geniuses? Scientific pioneers not considering net returns?

Taxation and Innovation



Thomas A. Edison
Light bulb.
Holds 1093 patents.

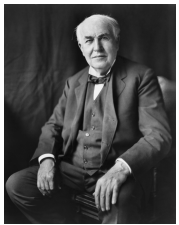
Melvin De Groote
Chocolate ice cream.
Holds 925 Patents.



Nikola Tesla
Alternating Current.
Holds 278 Patents.

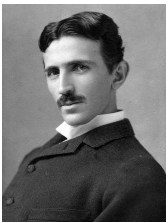
Or were these inventors affected by taxes?

Taxation and Innovation



Thomas A. Edison
Light bulb.
Holds 1093 patents.

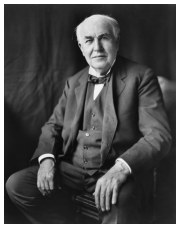
Melvin De Groote
Chocolate ice cream.
Holds 925 Patents.



Nikola Tesla
Alternating Current.
Holds 278 Patents.

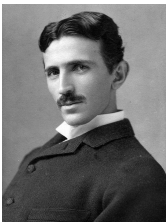
Personal taxes? Corporate taxes?

Taxation and Innovation



Thomas A. Edison
Light bulb.
Holds 1093 patents.

Melvin De Groote
Chocolate ice cream.
Holds 925 Patents.



Nikola Tesla
Alternating Current.
Holds 278 Patents.

Response margins? Patents produced? Quality of patents produced? Location choice? What firms they work for? Where they open research labs?

A Large-Scale Historical Project

- How do taxes affect innovation?

A Large-Scale Historical Project

- How do taxes affect innovation?
- Challenging question, to a large extent unanswered.

A Large-Scale Historical Project

- How do taxes affect innovation?
- Challenging question, to a large extent unanswered.
- We leverage three newly constructed datasets for the U.S.:
  - i) Panel of the universe of U.S. inventors since 1920 and their patents.
  - ii) Panel of all R&D labs (employment, location, patents) since 1921.
  - iii) Historical state-level corporate tax database.

A Large-Scale Historical Project

- How do taxes affect innovation?
- Challenging question, to a large extent unanswered.
- We leverage three newly constructed datasets for the U.S.:
  i) Panel of the universe of U.S. inventors since 1920 and their patents.
  ii) Panel of all R&D labs (employment, location, patents) since 1921.
  iii) Historical state-level corporate tax database.
- Study systematically the effects of **personal and corporate income taxes** since 1920 on:
  i) Individual inventors (micro level).
  ii) Firms that do R&D (micro level).
  iii) Innovation in states (macro level).

How can we measure innovation?

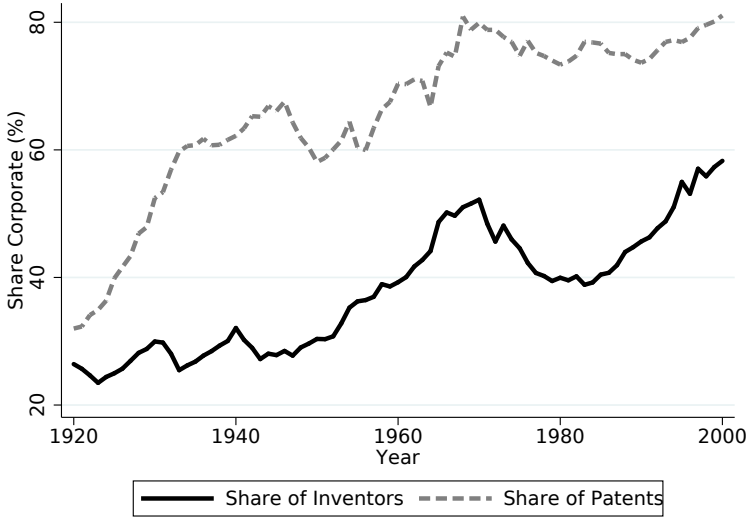
At the macro state-level:

- Number of inventors
- Number of patents
- Number of citations
- Share of corporate patents.

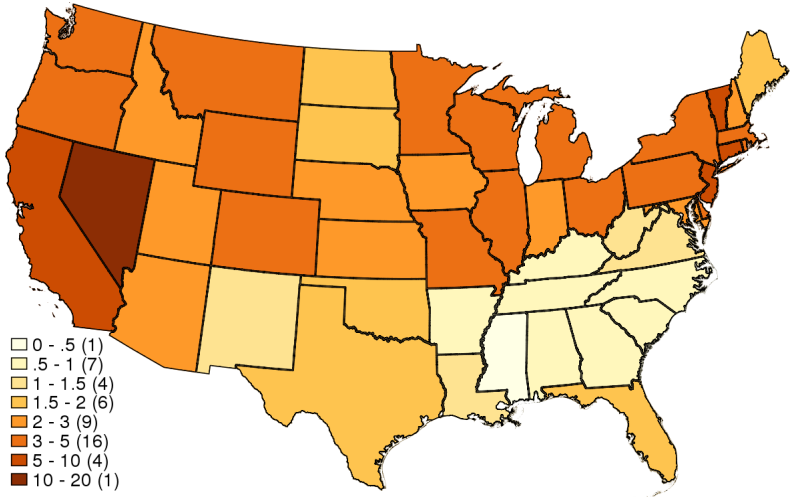
At the individual inventor and firm level:

- Do you patent at all? How many patents over the next years?
- How many citations? Home-run patent?
- Where do you locate?
- How many researchers do you hire (firms)?
- Do you work in corporate sector (inventors)?

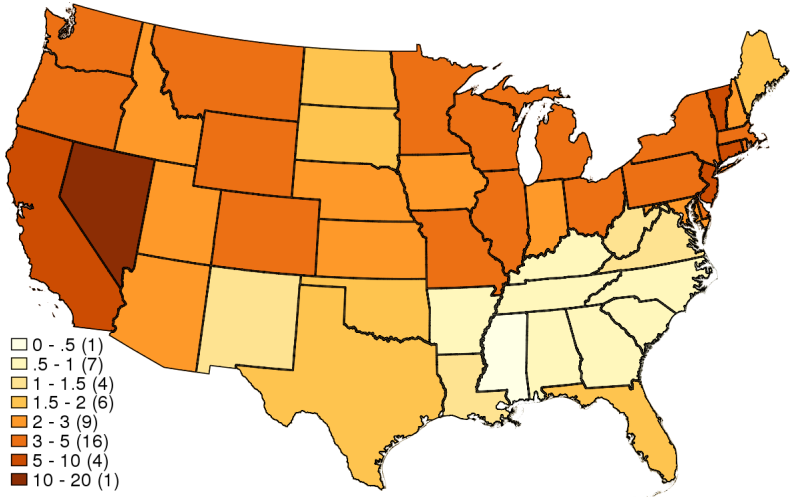
Why should we worry about both personal and corporate taxes?



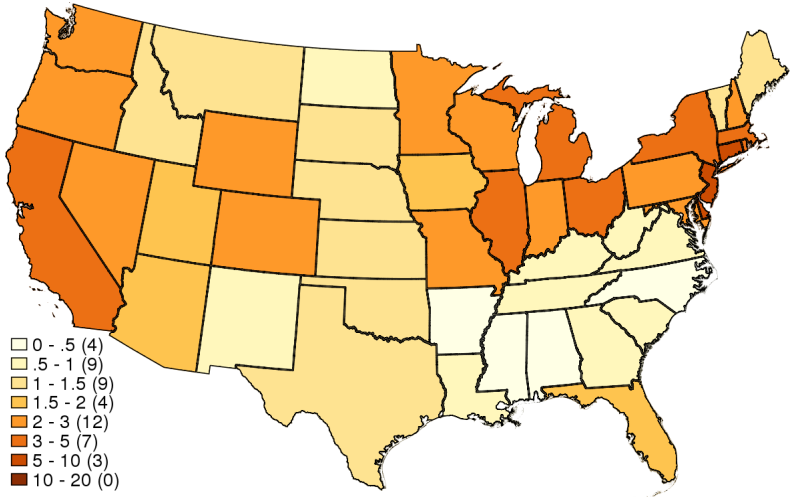
Geography of innovation. Inventors per 10,000: 1920



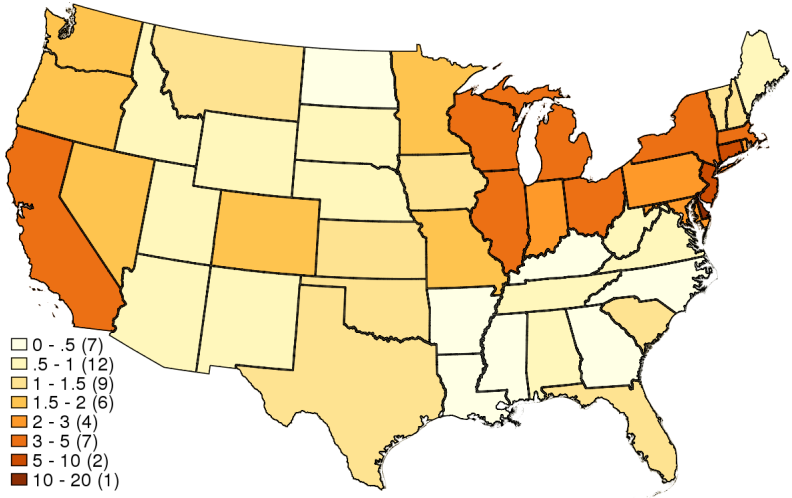
Geography of innovation. Inventors per 10,000: 1920-1930



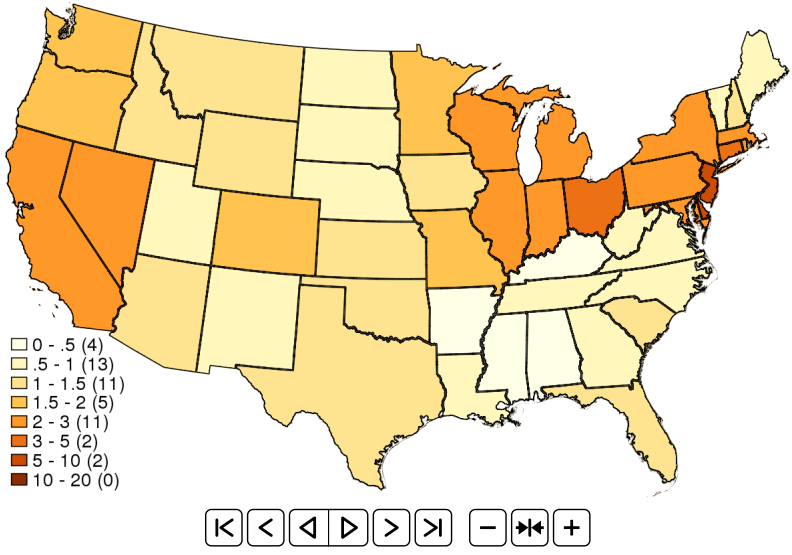
Geography of innovation. Inventors per 10,000: 1930-1940



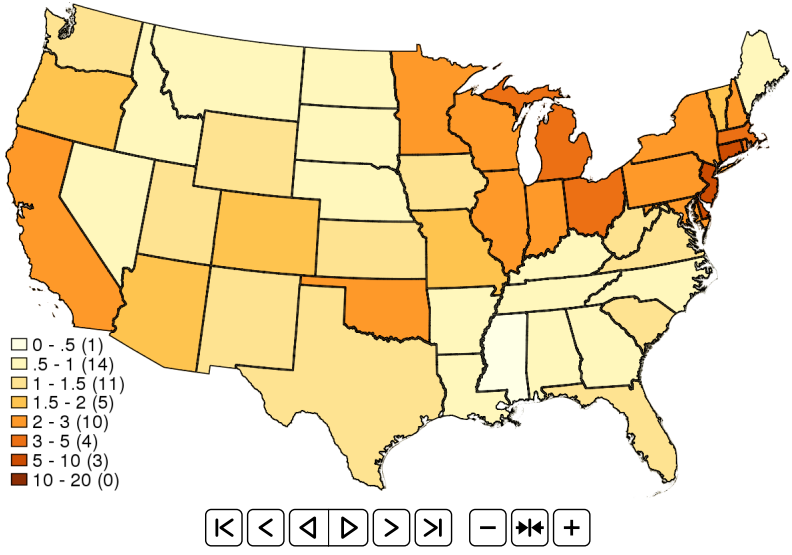
Geography of innovation. Inventors per 10,000: 1940-1950



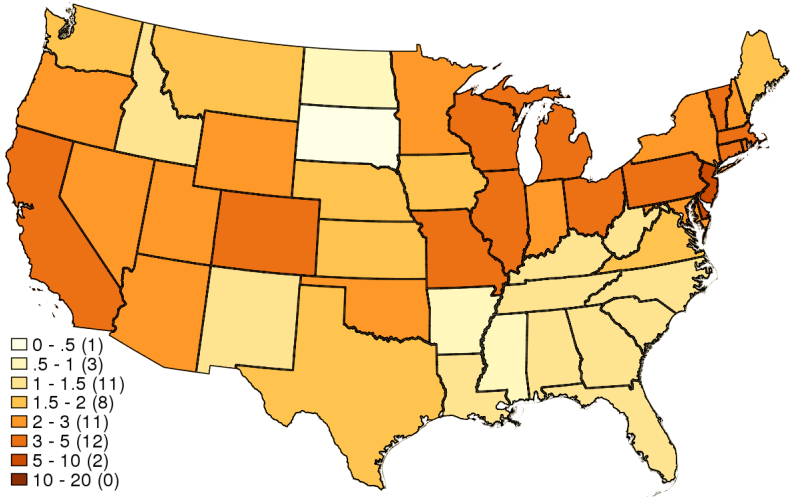
Geography of innovation. Inventors per 10,000: 1950-1960



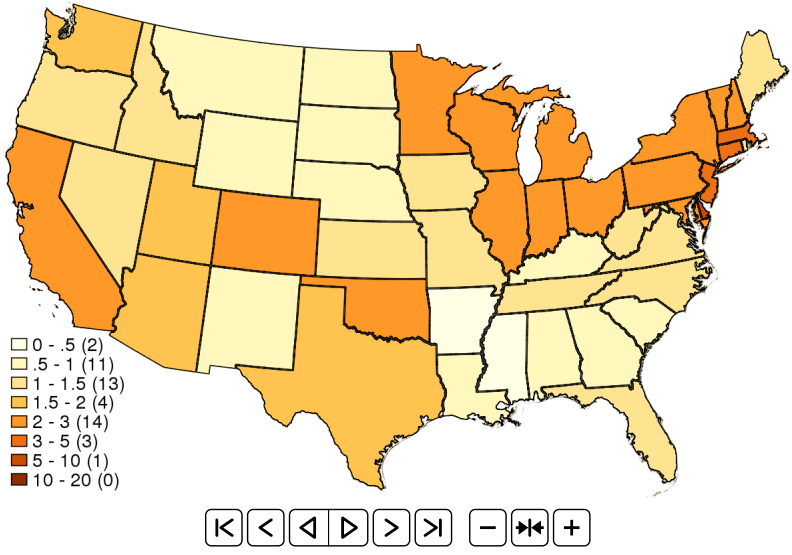
Geography of innovation. Inventors per 10,000: 1960-1970



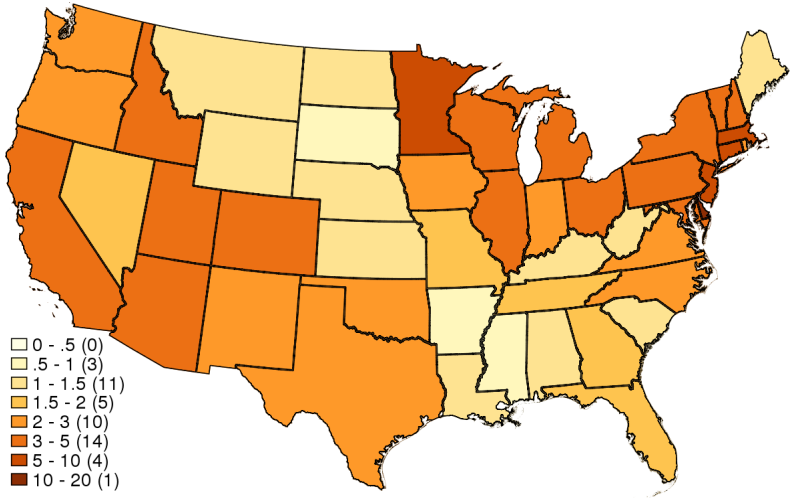
Geography of innovation. Inventors per 10,000: 1970-1980



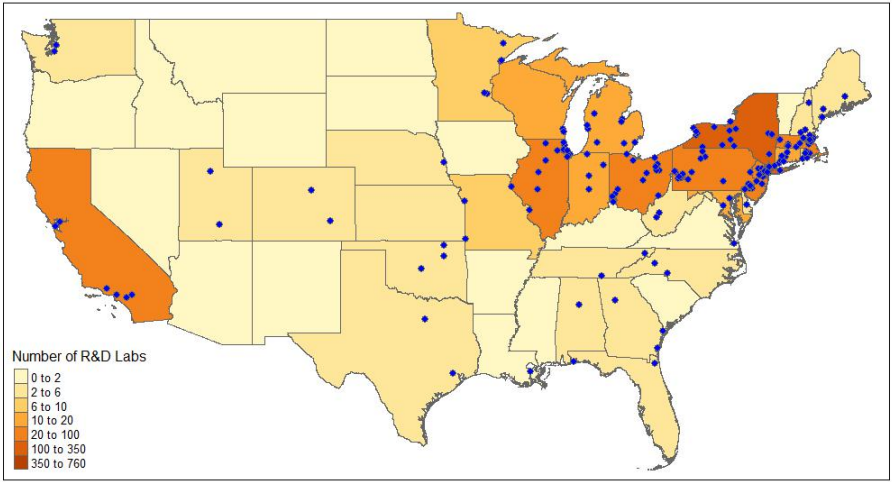
Geography of innovation. Inventors per 10,000: 1980-1990



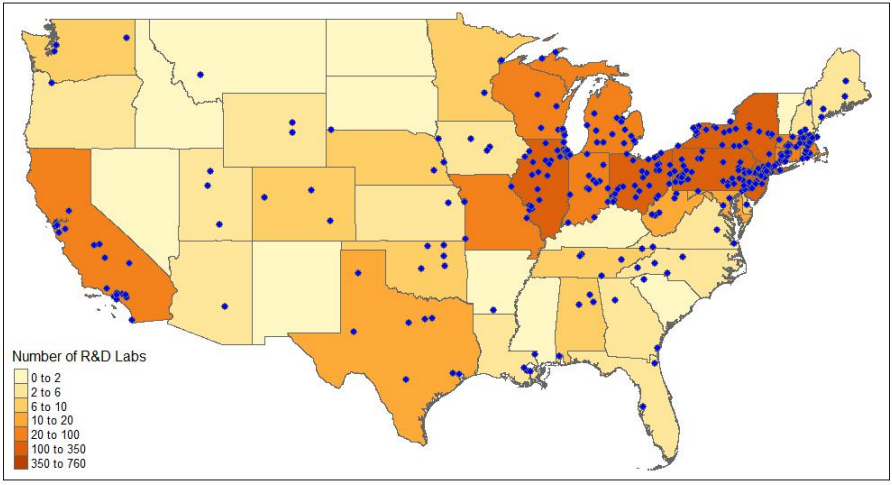
Geography of innovation. Inventors per 10,000: 1990-2000 Pat.



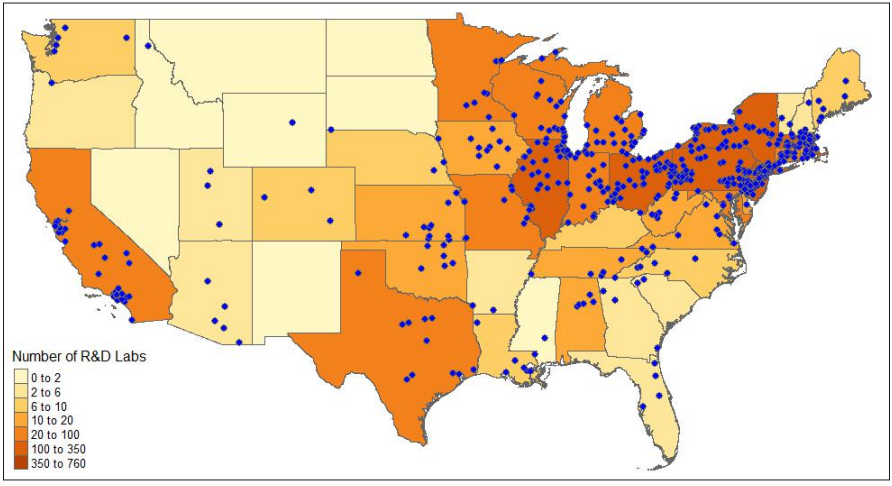
Location of R&D Labs - 1921



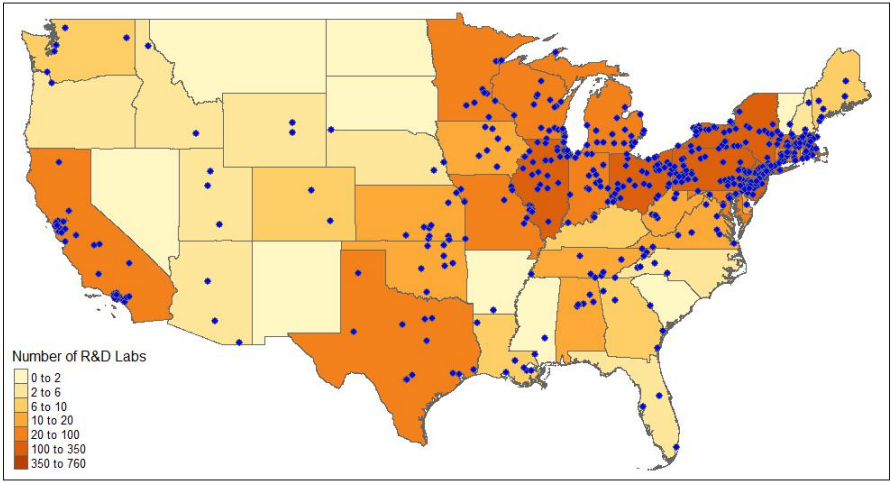
Location of R&D Labs - 1927



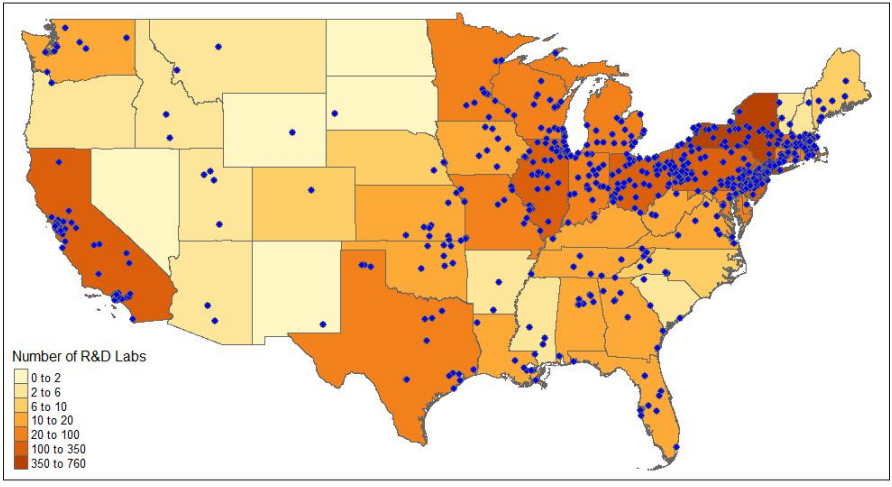
Location of R&D Labs - 1931



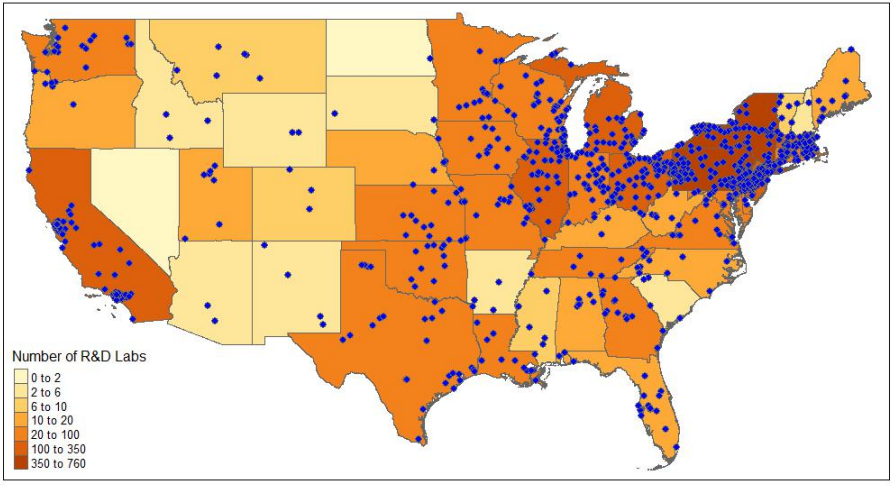
Location of R&D Labs - 1933



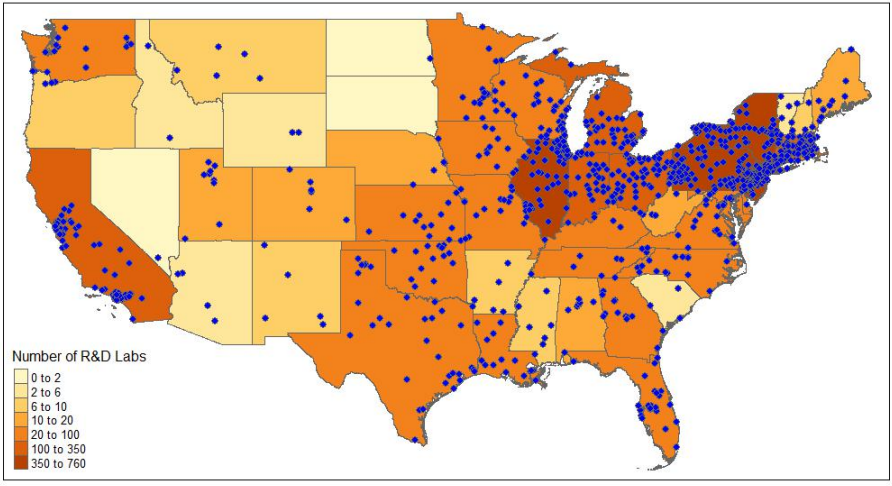
Location of R&D Labs - 1938



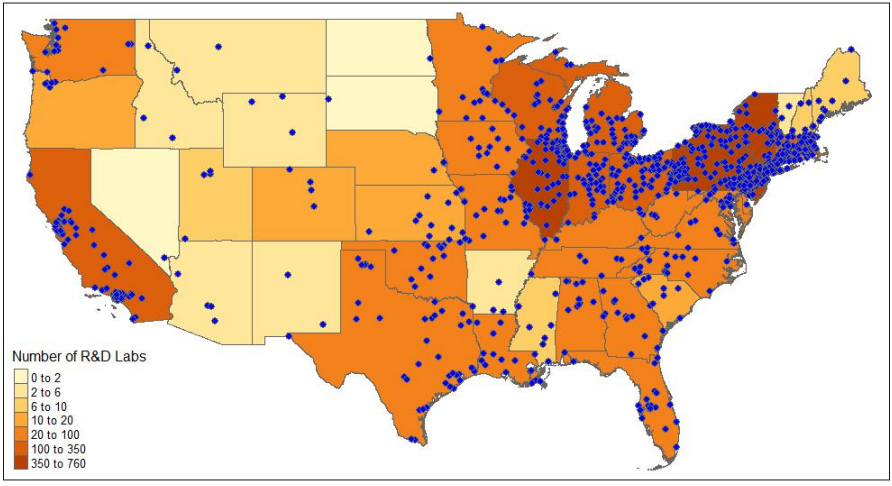
Location of R&D Labs - 1940



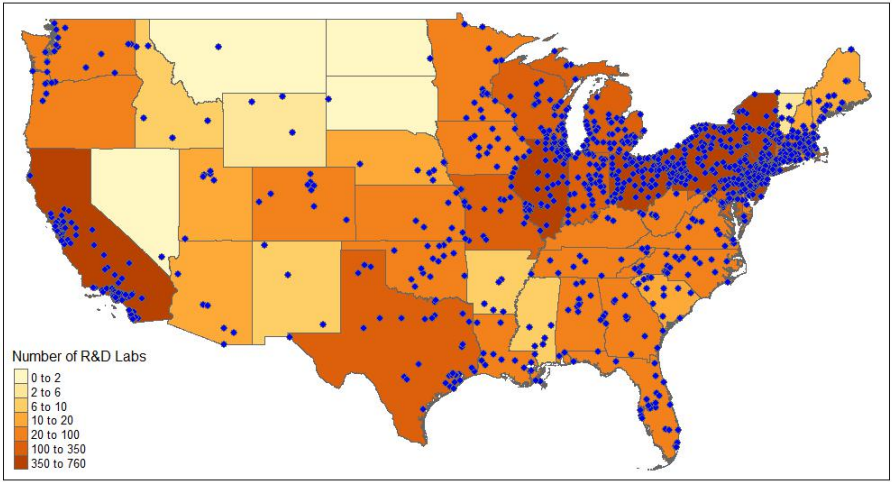
Location of R&D Labs - 1946



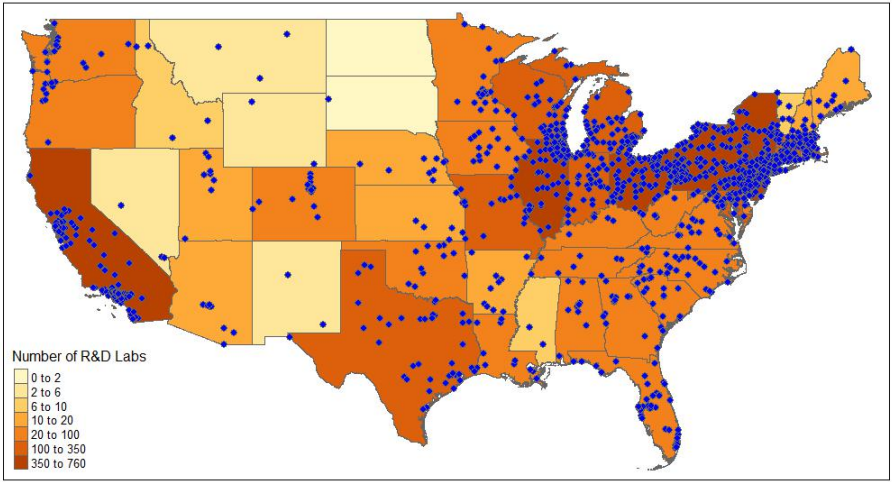
Location of R&D Labs - 1950



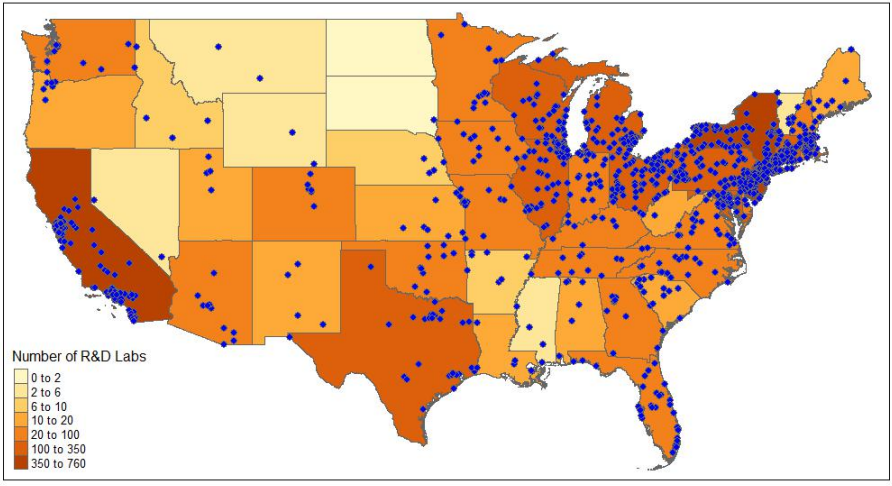
Location of R&D Labs - 1956



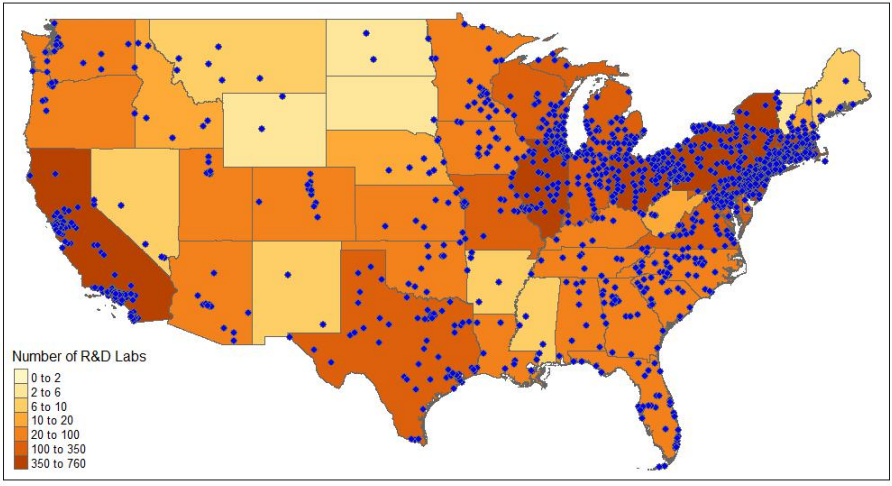
Location of R&D Labs - 1960



Location of R&D Labs - 1965



Location of R&D Labs - 1970



Main Results

Personal income and corporate income taxes– negatively influence:

1. Quantity of innovation,
2. Quality of innovation,
3. Location of innovation.

At the macro level, cross-state spillovers and business-stealing are important, but not the full story.

Corporate inventors more reactive to personal, but especially to corporate taxes (to net returns in general?).

> Could be differential exposure or different motives.

Agglomeration appears to matter: inventors are less sensitive to taxation where there is already more innovation in their own field.

2. International effects of Top Income Taxation since 1975.

Taxes and International Migration: Anecdotes but Little Evidence

- Is the "brain drain" in response to taxes real? Lots of anecdotes:
  - NYT, 2013: 'The Myth of the Rich Who Flee From Taxes"
  - Forbes, 2 days later: "Sorry New York Times, Tax Flight of the Rich Is Not a Myth."
  - Famous people migrating for tax reasons? Rolling Stones to France (!), David Bowie to Switzerland, Rod Stewart to California, Sting to Ireland, Gerard Depardieu's Russian citizenship, Edoardo Saverin (facebook co-founder) to Singapore, ...
- Scarcity of rigorous evidence due to a lack of **international panel data**.
  - Exceptions: Kleven, Landais and Saez (2013) on football players.
- This paper: study the effect of taxes on the **international mobility of inventors**.

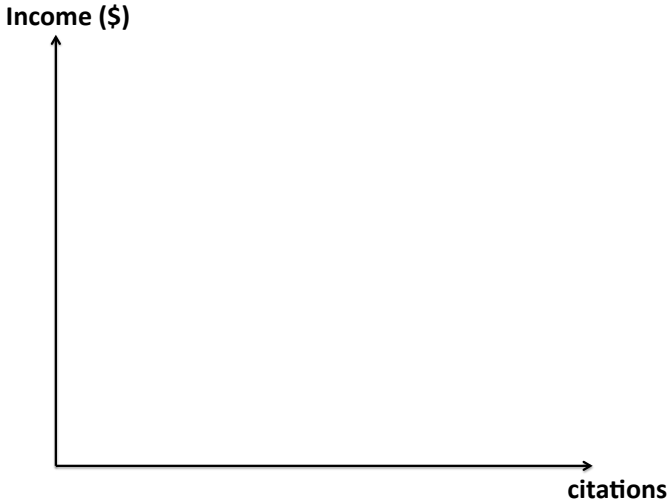
Study the Effects of Taxes on Migration using Patent Data

- Use a **unique international panel data** to overcome challenges:
  - **Patent data** from the USPTO and EPO, 1977-2000.
  - Track inventors in 8 big patenting countries: CA, CH, DE, FR, IT, JP, UK, US through residential addresses.
- Study effects of **top tax rates** on **"superstar"** inventors' locations.
- Patent data gives direct measures of inventor quality.
- Detailed controls for ***counterfactual*** earnings in each potential location.

Three levels of analysis:

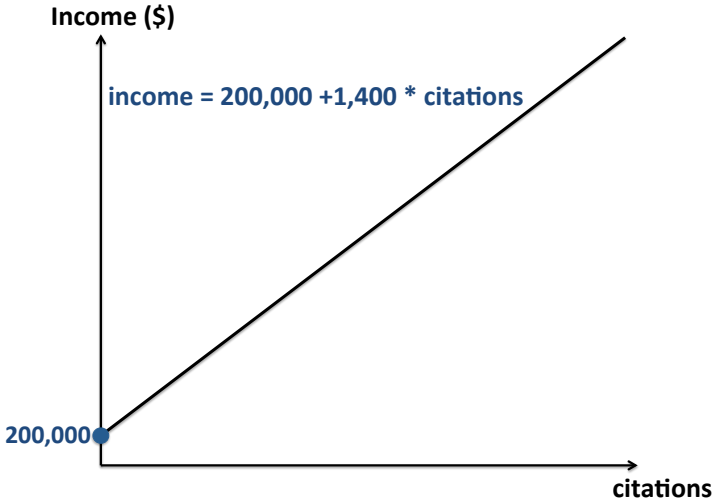
1. Macro country-year level migration flows (country-by-year variation).
2. Country case studies (quasi-experimental variation from reforms).
3. Micro inventor level location choice model
   (differential impact of top MTR within country-year.
   Inventor quality $\rightarrow \uparrow$ propensity to be treated).

Link between Inventor Quality and Income in IRS data



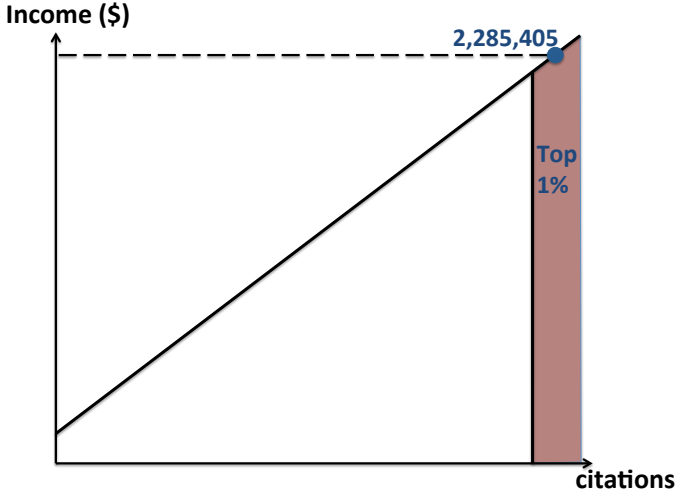
Source: Bell *et al.* (2015).

Link between Inventor Quality and Income in IRS data



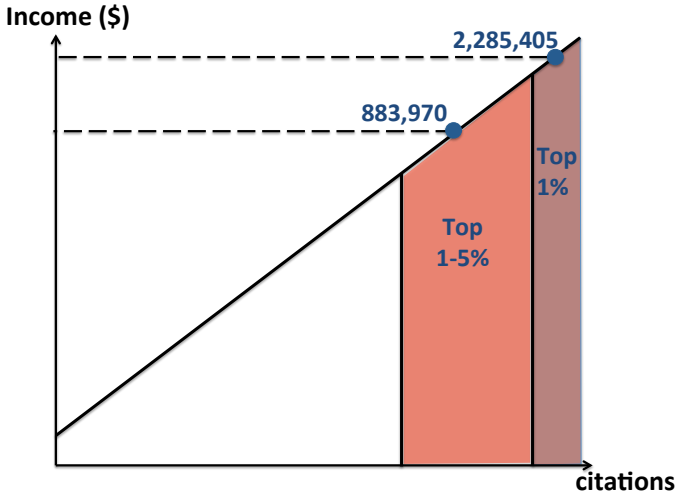
Source: Bell *et al.* (2015).

Link between Inventor Quality and Income in IRS data



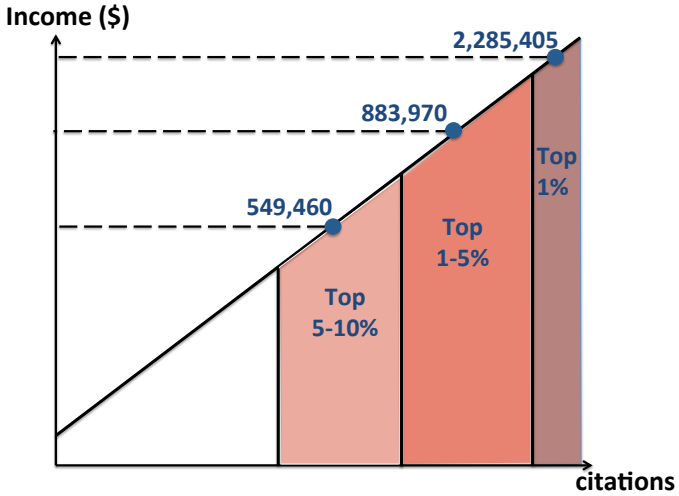
Source: Bell *et al.* (2015).

Link between Inventor Quality and Income in IRS data



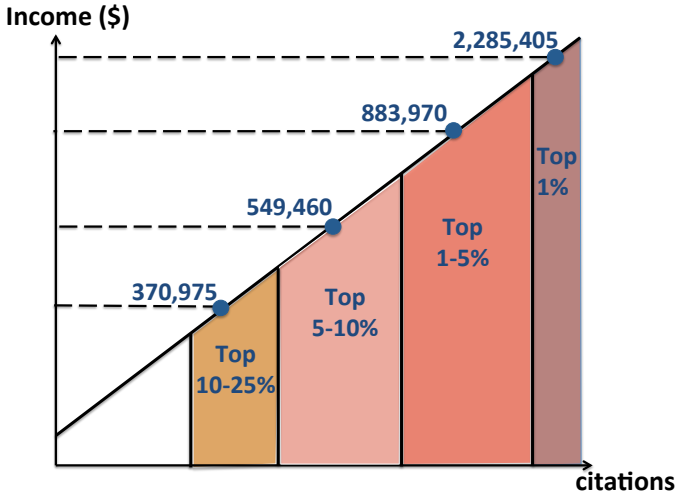
Source: Bell *et al.* (2015).

Link between Inventor Quality and Income in IRS data



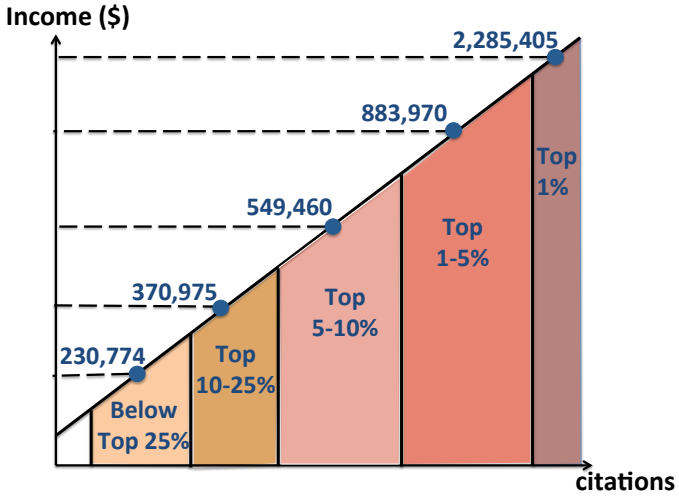
Source: Bell *et al.* (2015).

Link between Inventor Quality and Income in IRS data



Source: Bell *et al.* (2015).

Link between Inventor Quality and Income in IRS data

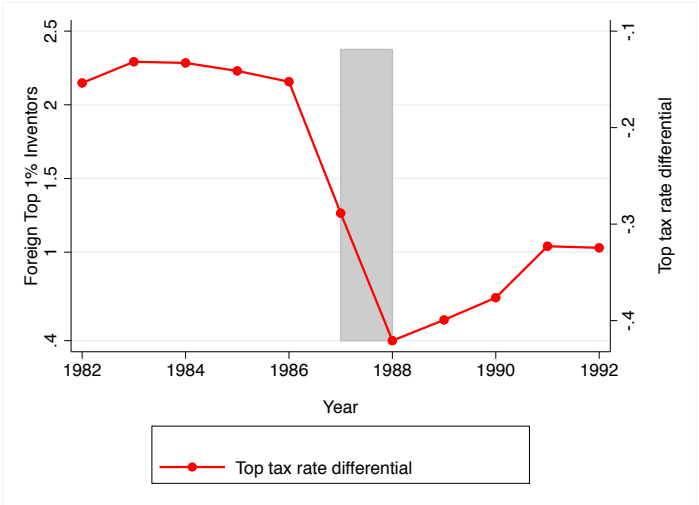


Source: Bell *et al.* (2015).

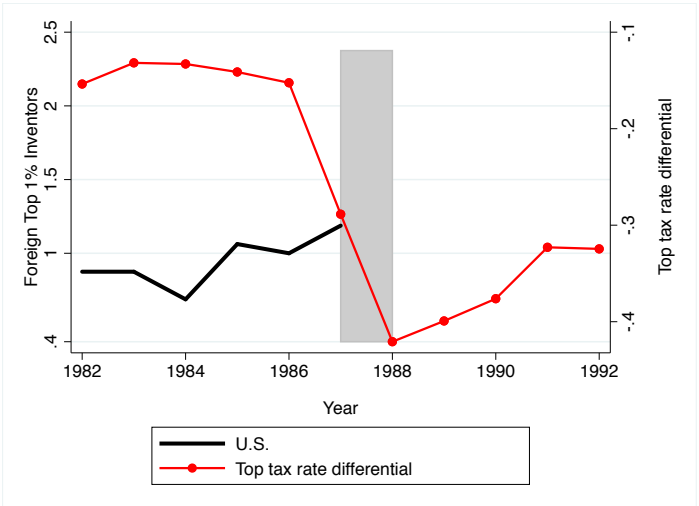
Preview of Findings

- Superstar top 1% inventors' location choice significantly affected by top tax rates.
- If have worked for multinationals more sensitive to tax differentials.
- If company has localized research activity, less sensitive.

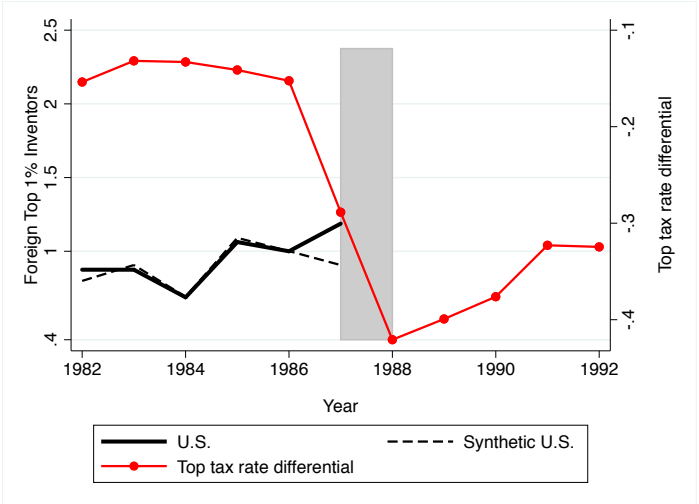
Case Study: U.S. TRA 1986



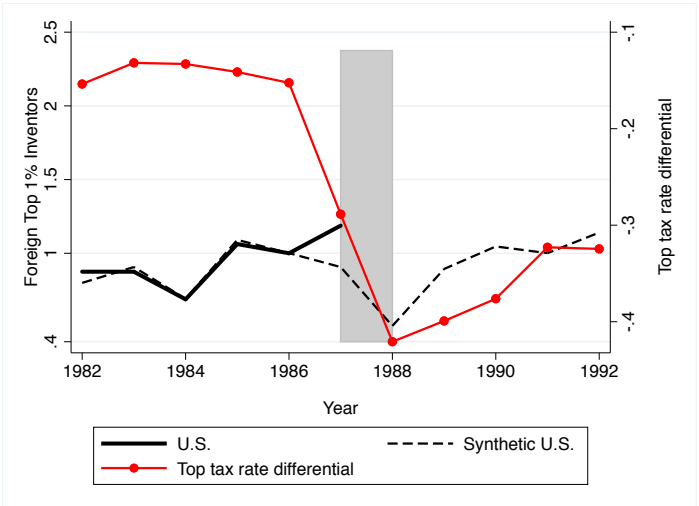
Case Study: U.S. TRA 1986



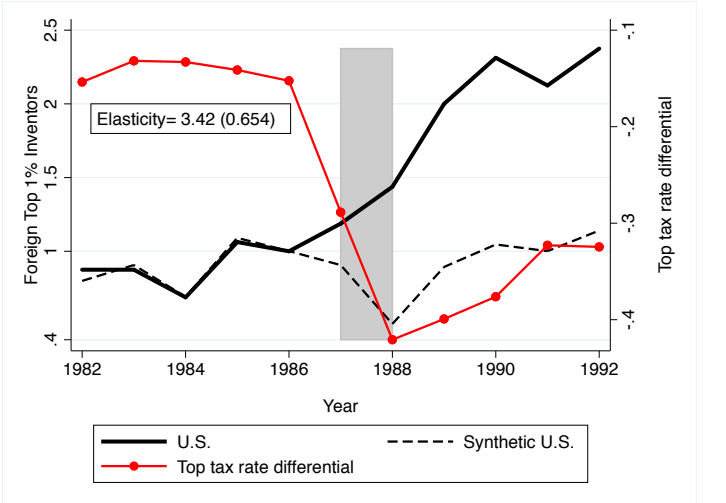
Case Study: U.S. TRA 1986



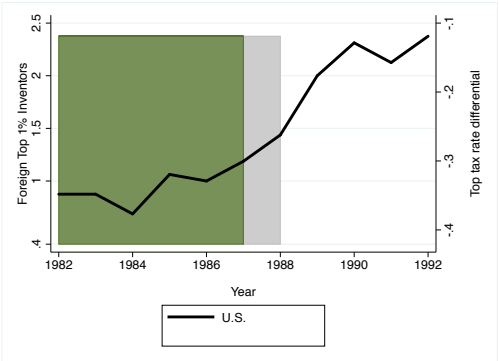
Case Study: U.S. TRA 1986



Case Study: U.S. TRA 1986



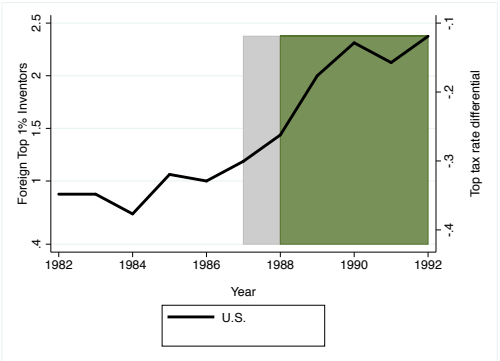
Case Study: U.S. TRA 1986



Structural break in growth of foreign top 1% relative to lower quality inventors.

Inventor quality	Pre T.R.A 1986	Post T.R.A 1986
Top 1%	6.8%	16.4%
Top 10-25%	13%	11.4%

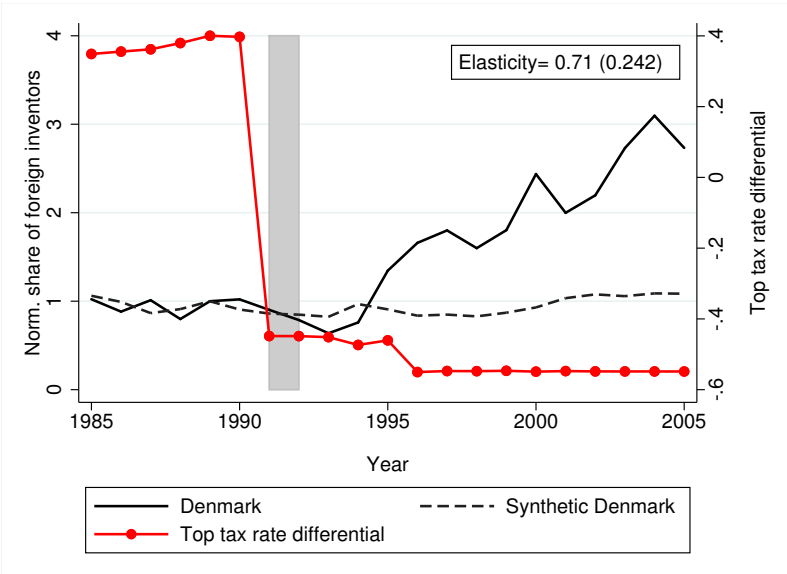
Case Study: U.S. TRA 1986



Structural break in growth of foreign top 1% relative to lower quality inventors.

Inventor quality	Pre T.R.A 1986	Post T.R.A 1986
Top 1%	6.8%	16.4%
Top 10-25%	13%	11.4%

Case Study: Denmark's 1992 Preferential Tax Reform



Taking Stock: So.. should we slash taxes?

This is just one part of the (literal) equation – namely part of the efficiency cost.

$$\tau^* = \frac{1 - \overbrace{\bar{g}}^{\text{Social preferences}} + \overbrace{C}^{\text{Externalities}}}{1 - \bar{g} + \underbrace{e}_{\substack{\text{Efficiency} \\ \text{effects}}}}$$

The desired level of taxes crucially depends on your "social preferences" and wish for redistribution.

Social Preferences

A Tool for Research: Why Use Surveys?

Some things are invisible in other datasets, no matter how high quality.

- Surveys were used before for things we can now see better in admin data.

Perceptions, attitudes, reasoning underlying econ behavior & outcomes.

High-quality surveys are key. Large sample, representative or targeted.

- There are "surveys" .. and then there are "surveys." Design interactive, animated, intuitive questions and treatments.
- Experimental components. Can control info and frame provided.
- Combined with natural experiments.

Belief in the “American Dream" Shapes Views on Redistribution

MORE SOCIAL MOBILITY & EQUAL OPPORTUNITY

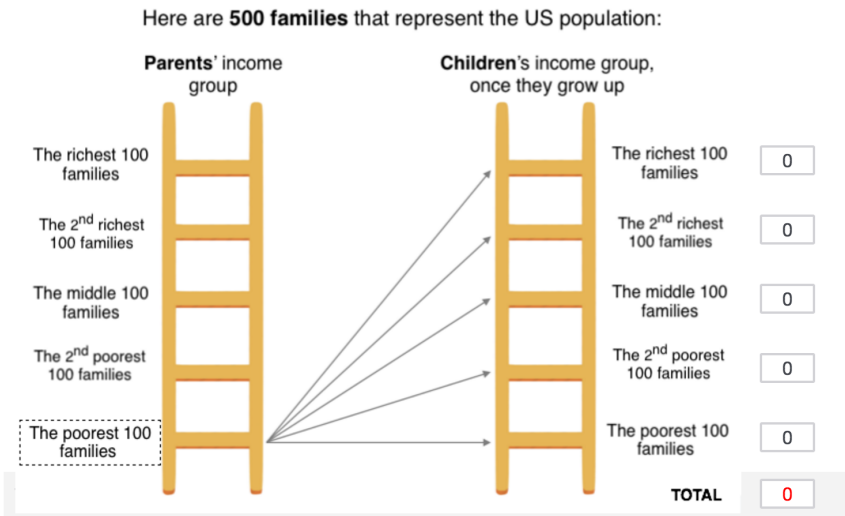
LESS NEED FOR REDISTRIBUTION & MORE UNEQUAL OUTCOMES ARE FAIR

MORE PERCEIVED
SOCIAL MOBILITY &
EQUAL OPPORTUNITY

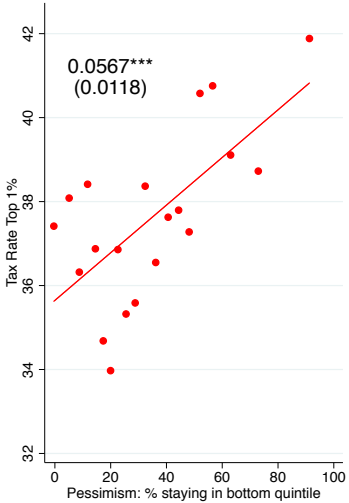
$\Rightarrow$

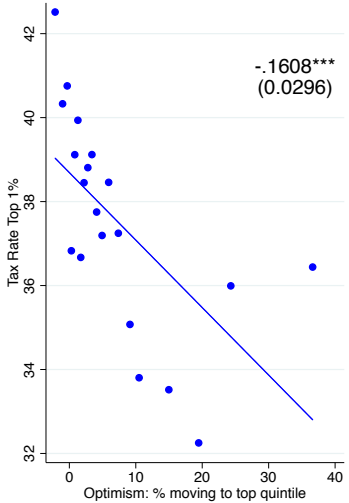
LESS NEED FOR
REDISTRIBUTION &
MORE UNEQUAL
OUTCOMES ARE FAIR

Eliciting respondent's beliefs on upward mobility

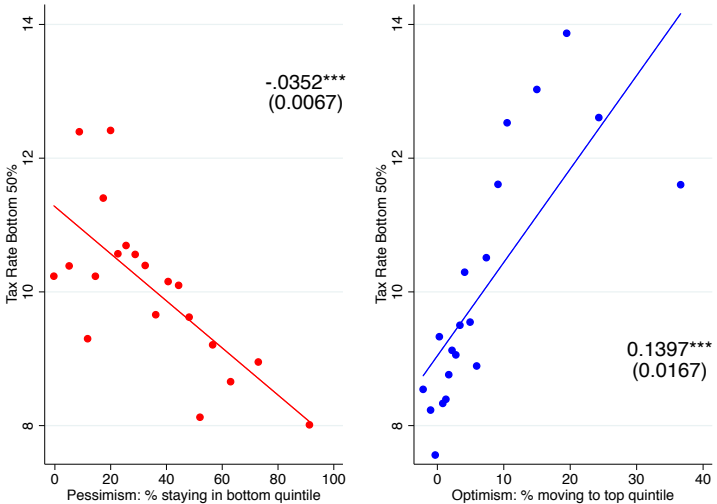


Pessimism, Optimism, and Top Tax Rate

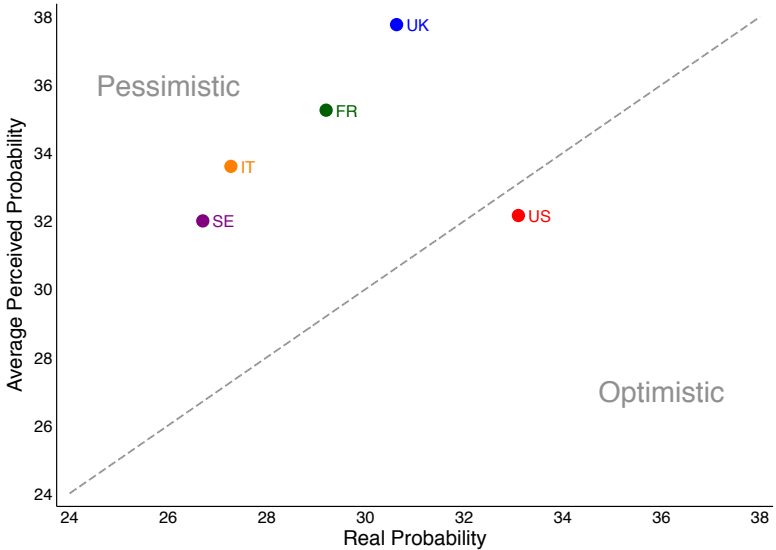




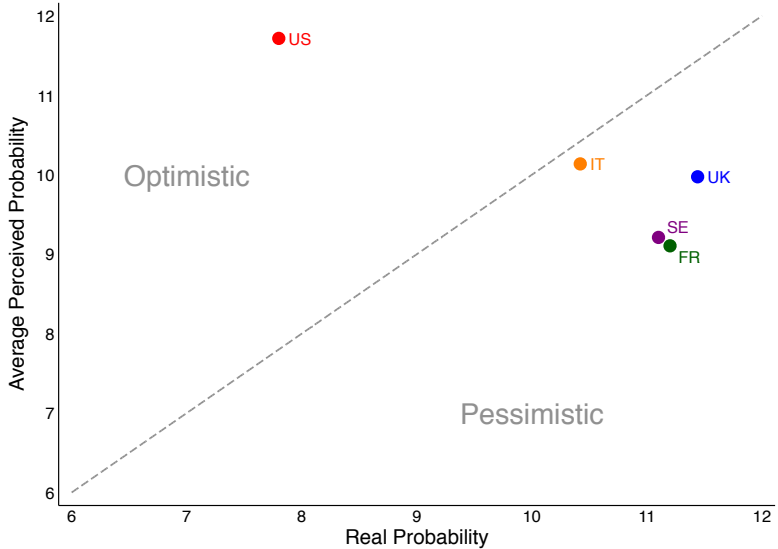
Pessimism, Optimism, and Bottom Tax Rate



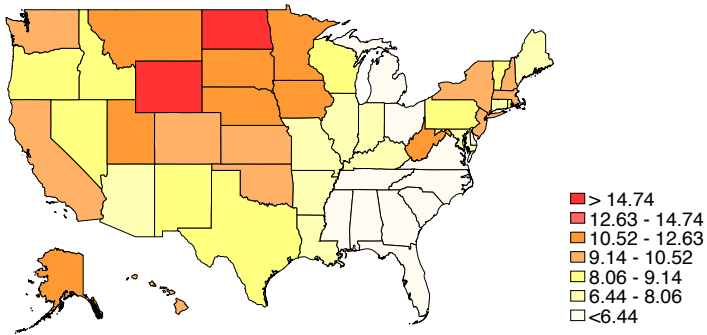
Probability of Staying in Bottom Quintile (Actual vs. Perceived)



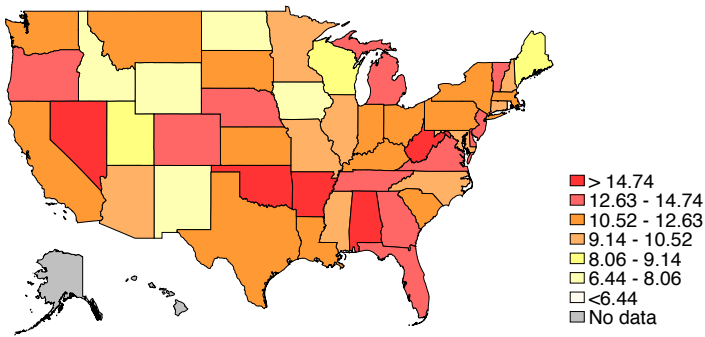
Probability of Moving to Top Quintile (Actual vs. Perceived)



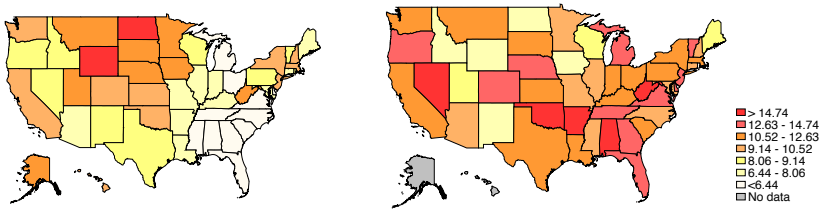
Actual probability of moving from bottom to top quintile



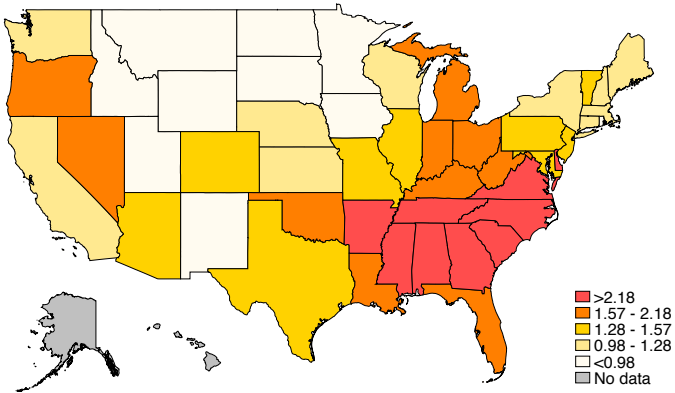
Perceived probability of moving from bottom to top



Actual and perceived probability of moving from bottom to top quintile



Ratio of actual local and perceived probability of moving from bottom to top



What are local perceptions correlated with, controlling for individual-level characteristics? National

Who Benefits from Redistribution? Wrong Views about Immigrants

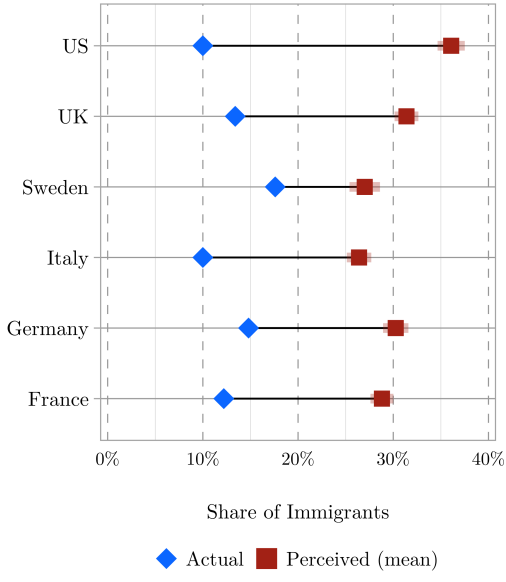
Generosity travels less well across national, religious, ethnic lines

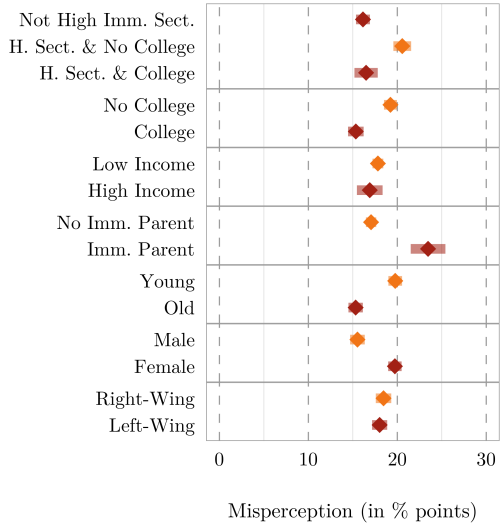
Simply making people think about immigrants before asking questions on preferred progressivity and redistribution reduces support for redistribution.

Including private donations to charity.

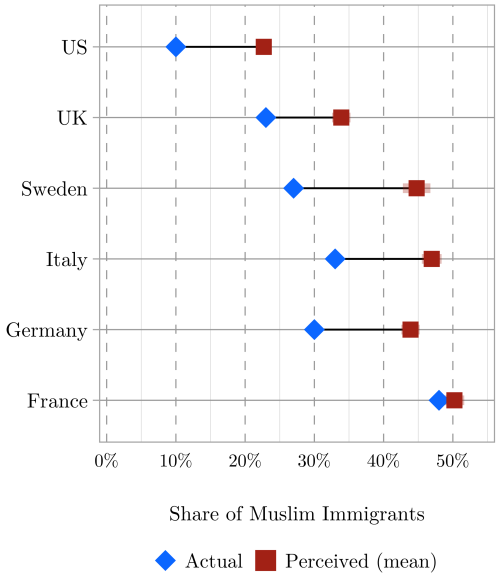
But perceptions about immigrants are very wrong.

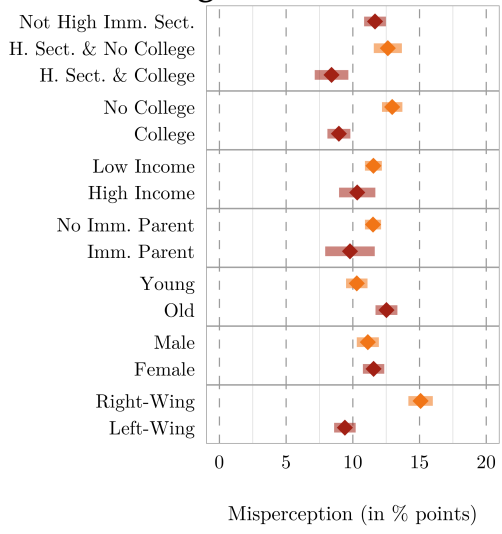
Perceived Share of Immigrants



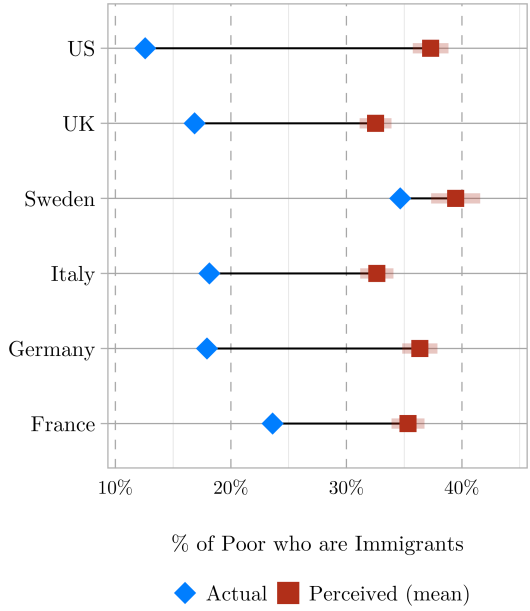


Perceived Share of Muslim Immigrants

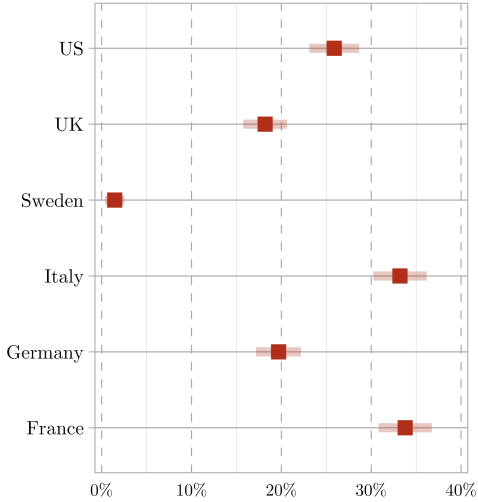


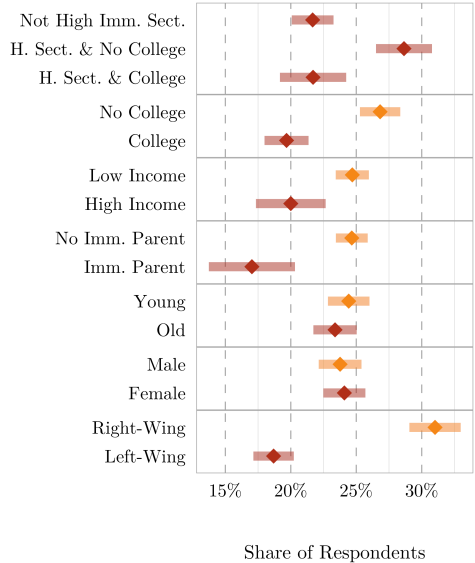


Perceived Share of Poor that are Immigrants



Does Mohammad Get More Transfers & Pay Less Taxes than John?





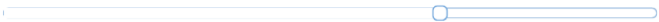
Worse News about Inequality: Less Trust in Government, Not More Demand for Redistribution

Where are you in the income distribution?

Please enter your annual household income* in the box below:

$ 25000

39% of US households earn less than your household



We now encourage you to move the blue slider above (by clicking on the line) to explore the US income distribution on your own and to answer the questions below.

79% of households earn less than **$73,000** .

https://hbs.qualtrics.com/SE/?SID=SV_77fSvTy12ZSBihn

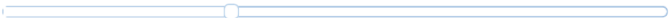
Back to Main

Where would you have been in the income distribution?

Income Inequality has increased dramatically in the United States since 1980.
Incomes of poorer and middle-income families have grown very little while top incomes have grown a lot.

How would YOU be doing if inequality had not increased?

The slider below shows how much each group would make if incomes had grown by the same percentage since 1980 for all groups: the poor, the middle class, and the rich. Use the slider to answer the questions below.



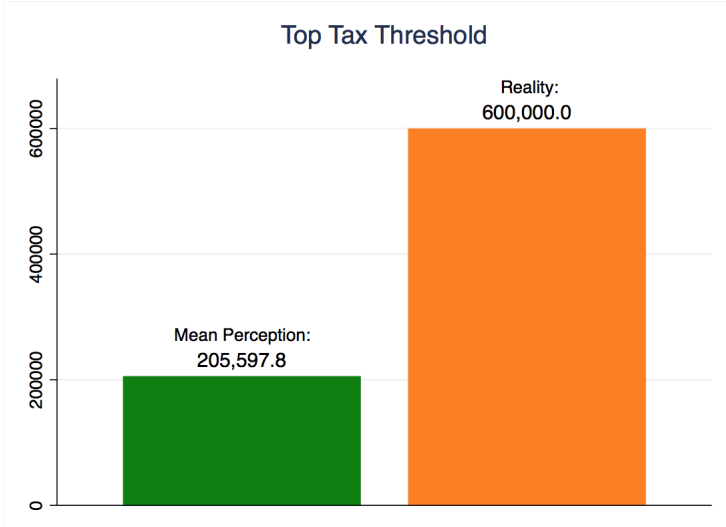
A household making **$25,800** today would instead be making
$35,200 if inequality had not changed since 1980.
In other words, if growth had been evenly shared, this household would have earned
37% more.

https://hbs.qualtrics.com/SE/?SID=SV_77fSvTy12ZSBihn

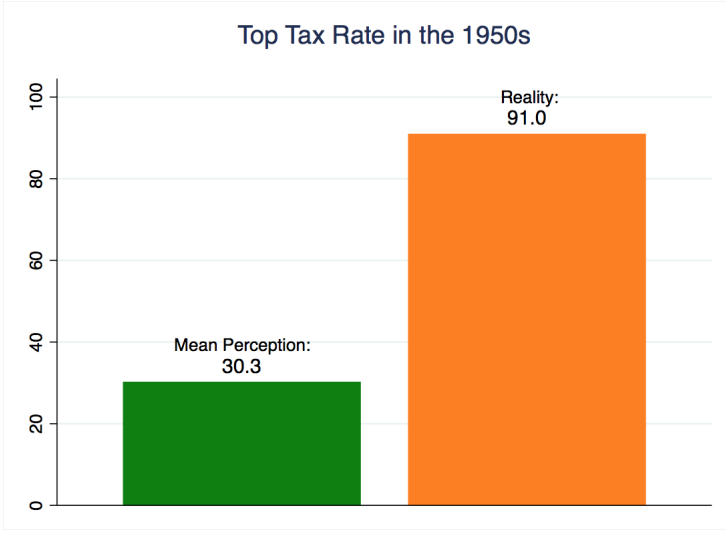
Back to Main

Misunderstanding of and Views on Tax Policy

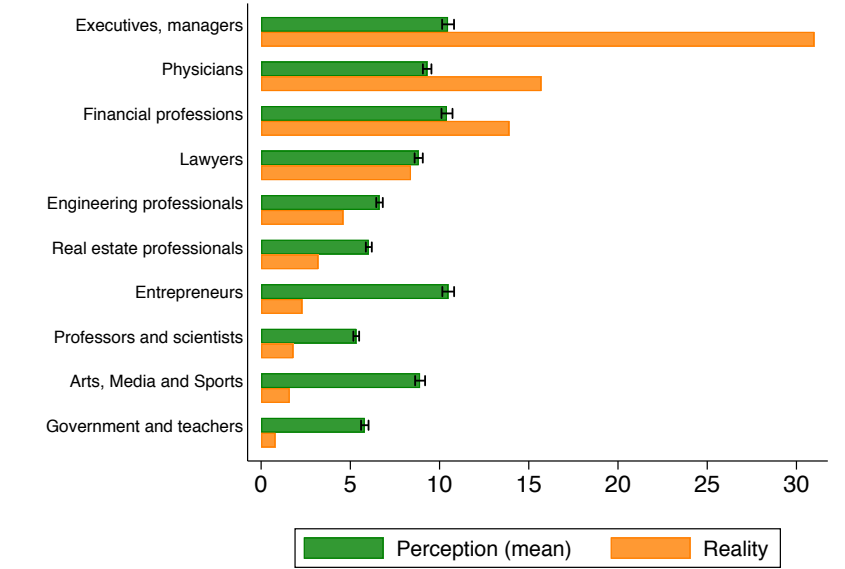
Everyone Thinks Top Tax Bracket Kicks In at Much Lower Income Levels



No One Knows How High Top Tax Rates Were in the 1950s

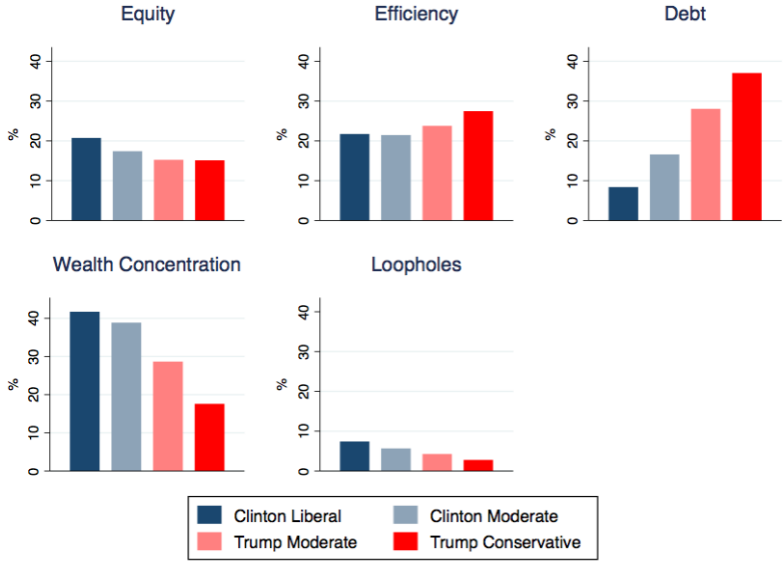


Overestimate Share of Entrepreneurs , Scientists, Entertainers in Top 1%. Underestimate Managers and Executives.



What Should Be the Goal of a Good Income Tax System?

What are Key Considerations about Income Tax?



The Estate Tax: Unpopular and Misunderstood

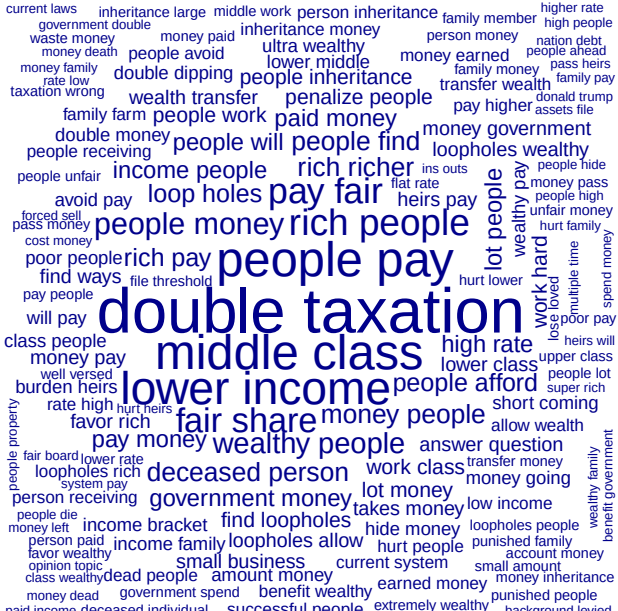
People think 364 out of 1000 households pay estate tax.

Exemption threshold believed to be $4.6 million

Do parts of tax reforms go unnoticed when packaged with others?

Just informing people about who pays estate tax leads to much more support for it.

What are the main perceived shortcomings of the estate tax?


current laws
inheritance large
middle work
person inheritance
family member
higher rate
government double
inheritance money
high people
waste money
money paid
person money
nation debt
money death
people avoid
ultra wealthy
money earned
people ahead
money family
lower middle
family money
pass heirs
rate low
double dipping
people inheritance
transfer wealth
family pay
taxation wrong
wealth transfer
penalize people
pay higher
donald trump
family farm
people work
paid money
assets file
double money
people will people find
money government
people receiving
loopholes wealthy
people unfair
income people
rich richer
ins outs
people hide
flat rate
money pass
avoid pay
loop holes
pay fair
heirs pay
people high
forced sell
people money
rich people
unfair money
pass money
hurt family
cost money
poor people
rich pay
people pay
lot people
wealthy pay
work hard
multiple time
spend money
find ways
file threshold
hurt lower
pay people
double taxation
lose loved
poor pay
will pay
heirs will
class people
middle class
high rate
upper class
money pay
lower class
well versed
people lot
burden heirs
lower income
people afford
super rich
rate high
hurt heirs
short coming
favor rich
fair share
money people
allow wealth
people property
pay money
wealthy people
answer question
fair board
lower rate
transfer money
loopholes rich
deceased person
work class
money going
system pay
lot money
person receiving
government money
takes money
low income
people die
wealthy family
benefit government
money left
income bracket
find loopholes
hide money
loopholes people
person paid
income family
loopholes allow
hurt people
punished family
favor wealthy
account money
opinion topic
small business
current system
small amount
class wealthy
dead people
amount money
earned money
money inheritance
money dead
government spend
benefit wealthy
punished people
paid income
deceased individual
successful people
extremely wealthy
background levied

What are Key Considerations about Estate Tax?