



# Using Big Data to Solve Economic and Social Problems

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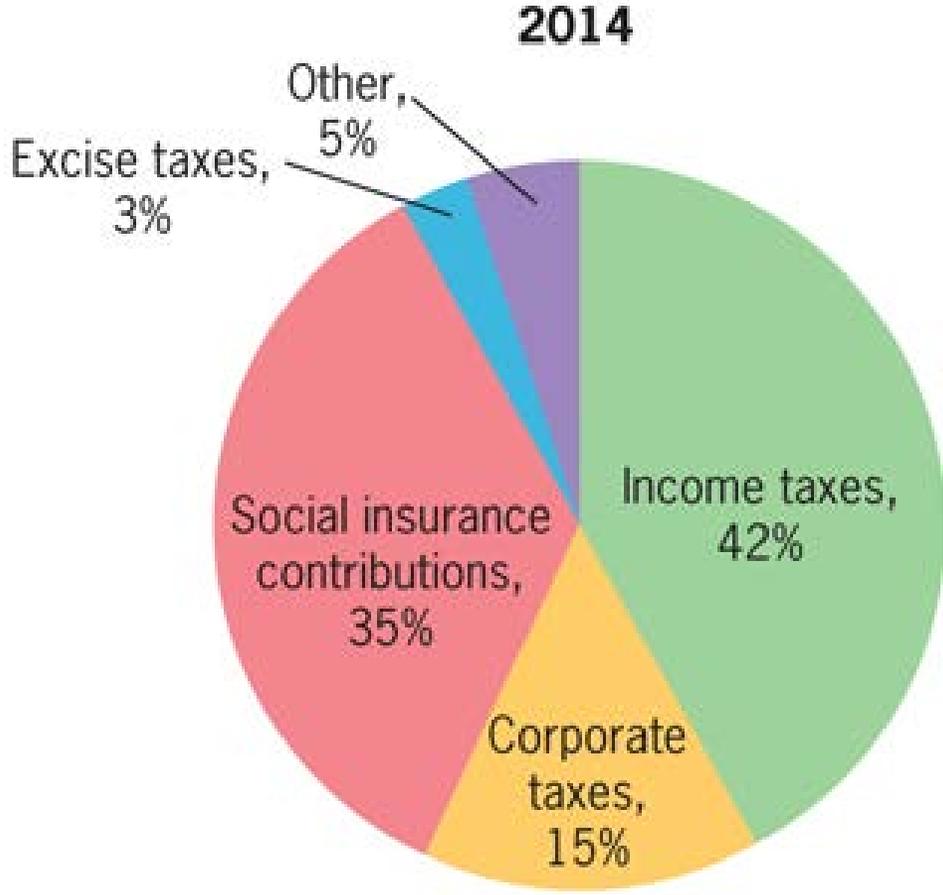
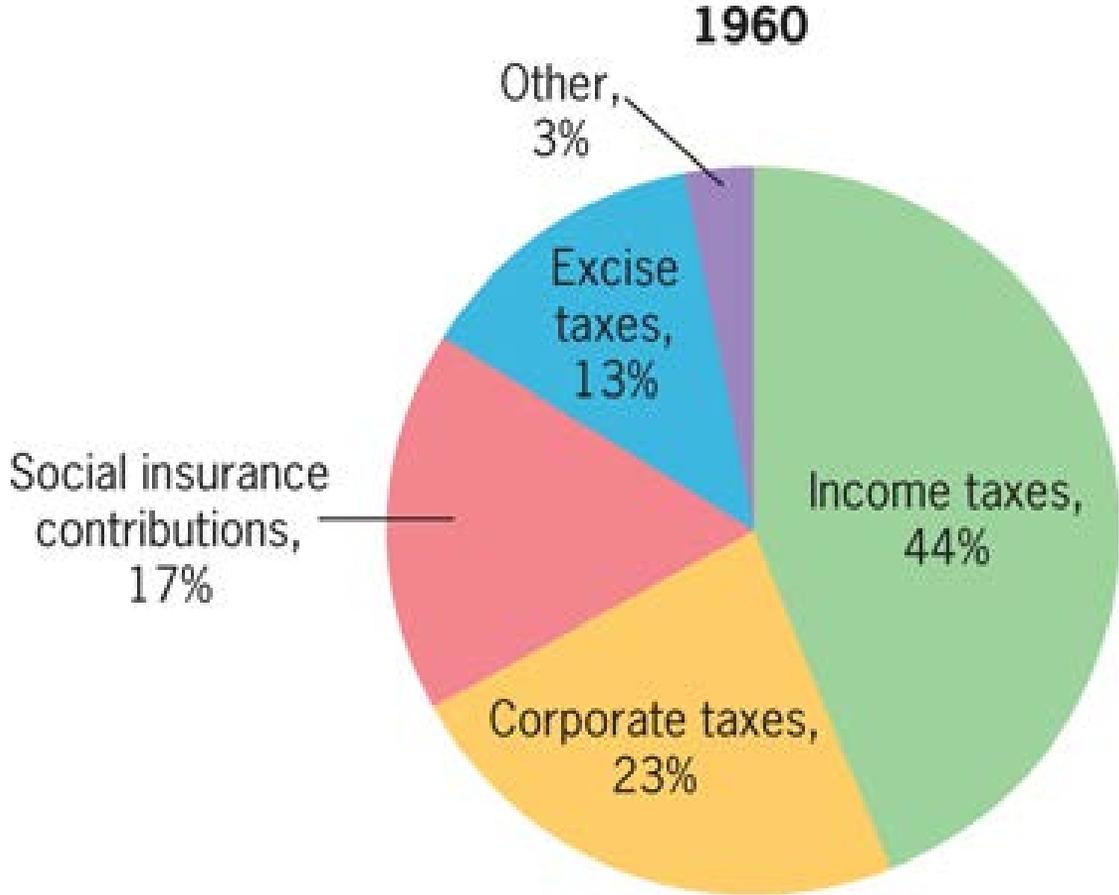
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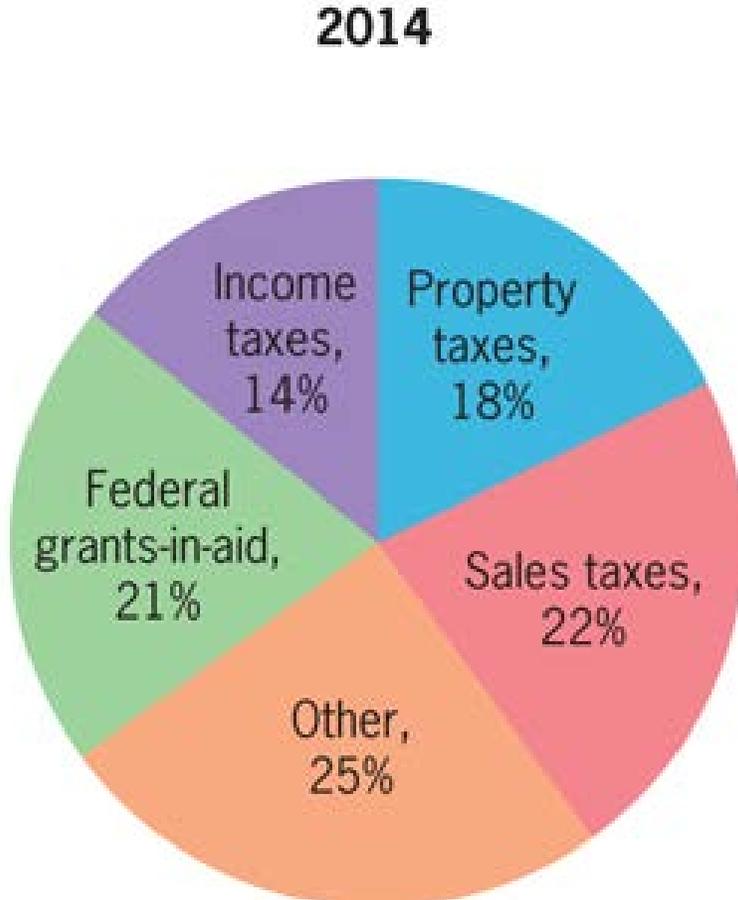
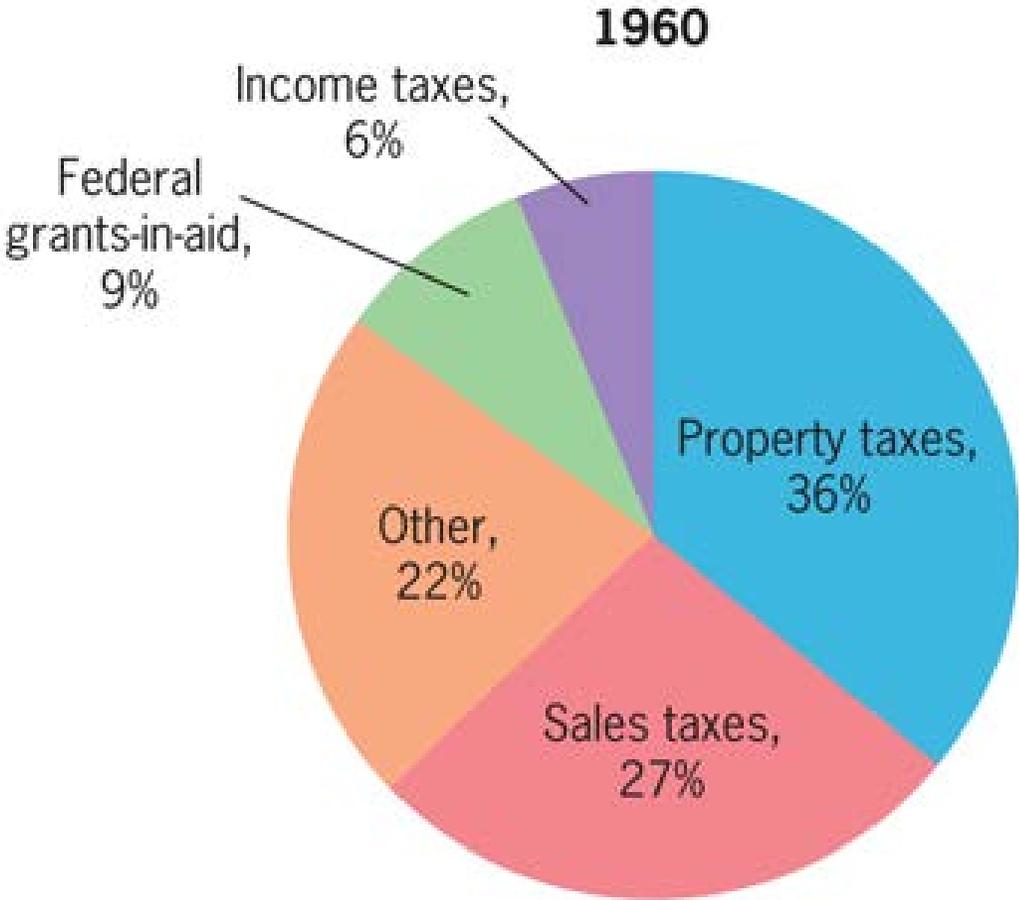
# **Tax Policy**

# Federal Tax Revenues, by Type of Tax: 1960 vs 2014



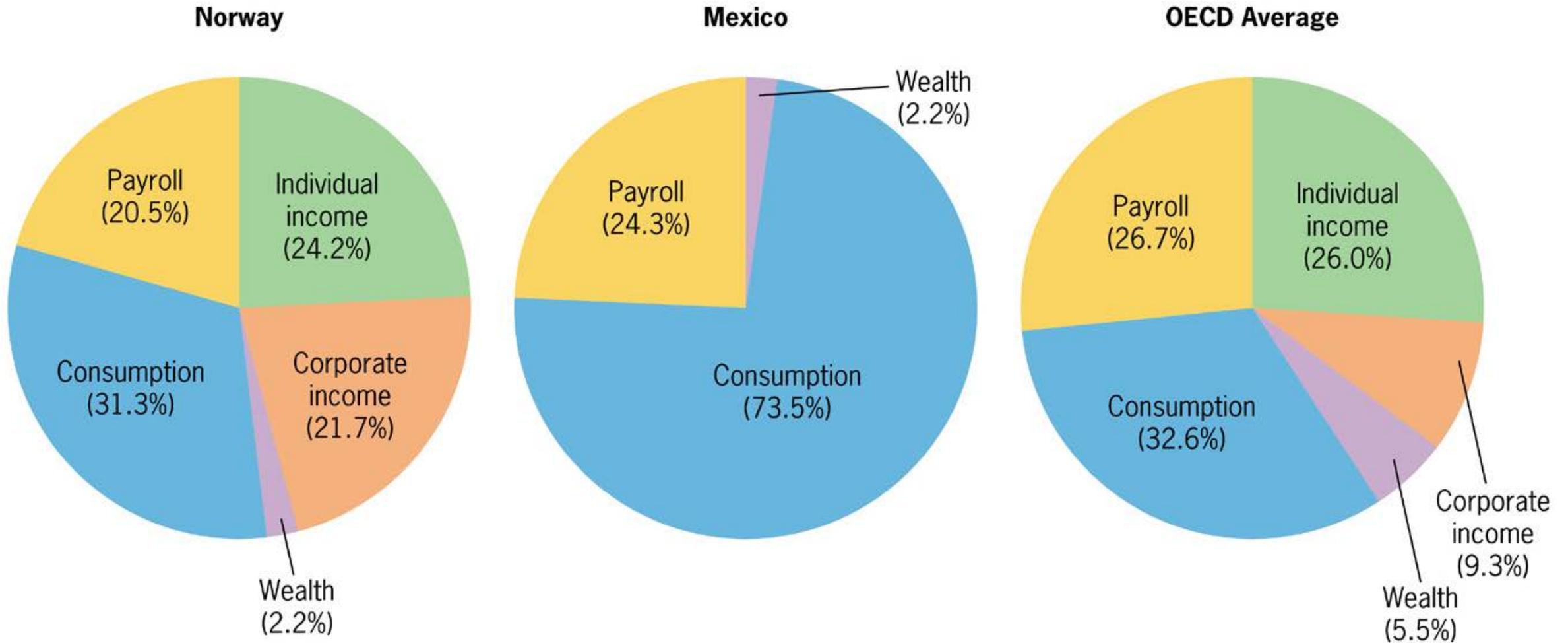
Source: Gruber (2016)

# State/Local Tax Revenues, by Type of Tax: 1960 vs. 2014



Source: Gruber (2016)

# International Tax Revenues by Type of Tax in 2001



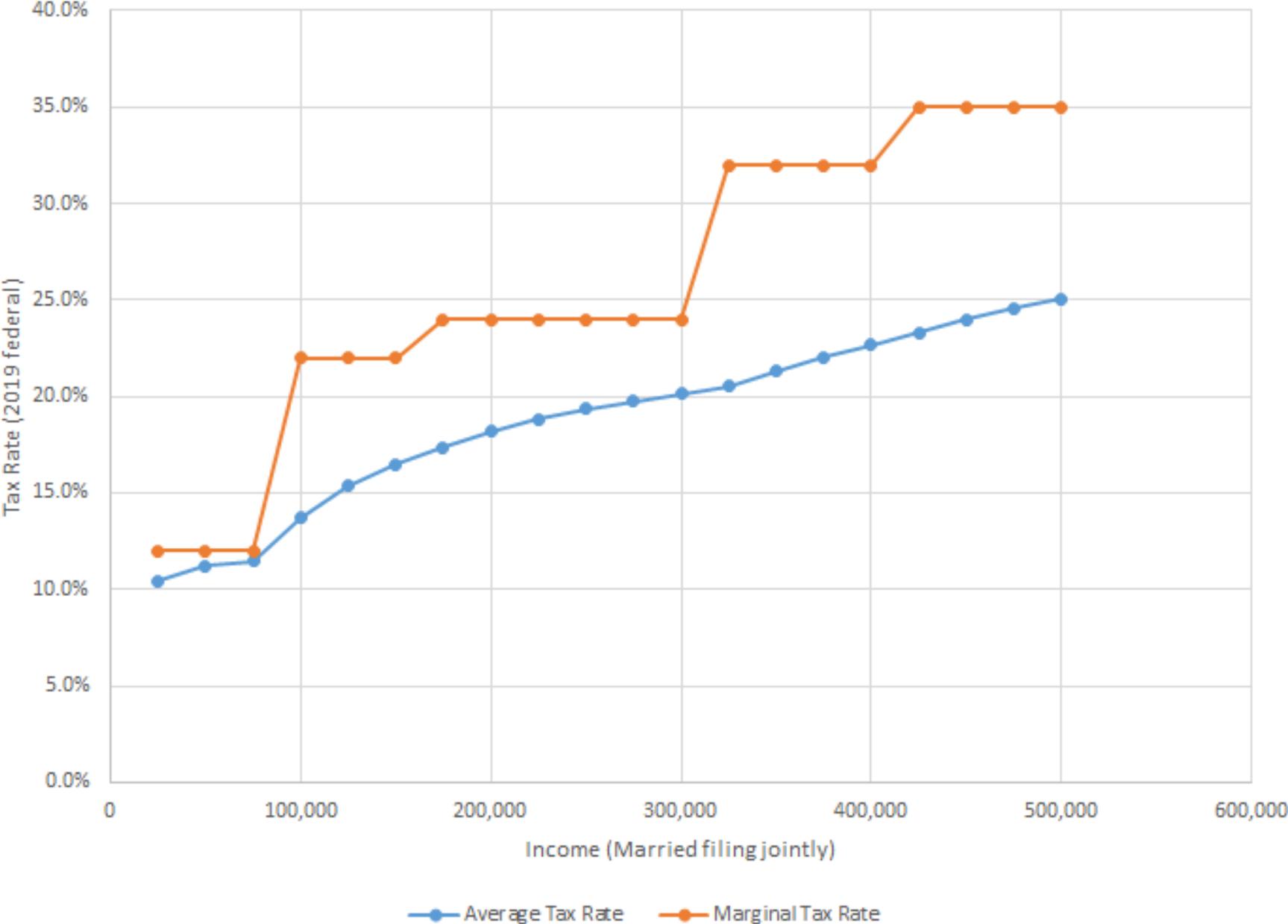
# Tax Policy: Overview

- Focus in these lectures on two aspects of tax policy to illustrate broader concepts:
  1. Income taxation
  2. Taxation of savings
  
- Methods:
  - Supply and demand models
  - Synthetic control
  - Behavioral economics

# Income Taxation

- Most developed countries have progressive income tax systems
  - Tax rates rise with income, so rich pay a larger proportion of their incomes in taxes than the poor
  - Typically implemented with a set of separate **tax brackets** based on income

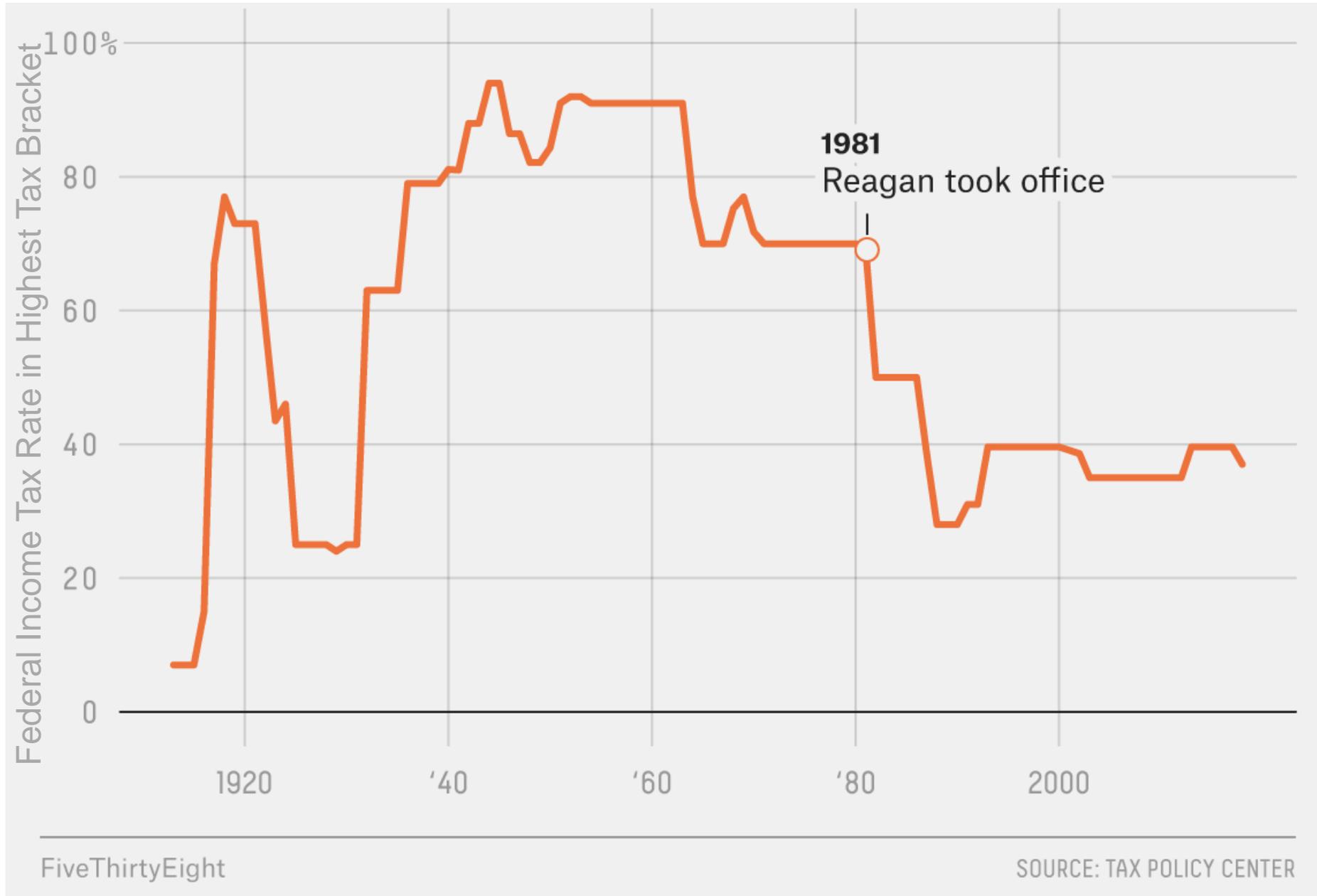
# Marginal Income Tax Rates vs. Average Tax Rates: Illustrative Example



## Top Income Tax Rates

- Particular focus on marginal tax rates on highest income earners (“top income tax rate”)
  - Generates significant revenue given concentration of income at the top of the distribution
- Top income tax rates are heavily debated and have fluctuated significantly over time in the U.S.

# Top Marginal Income Tax Rates in the U.S. Over the Past 100 Years



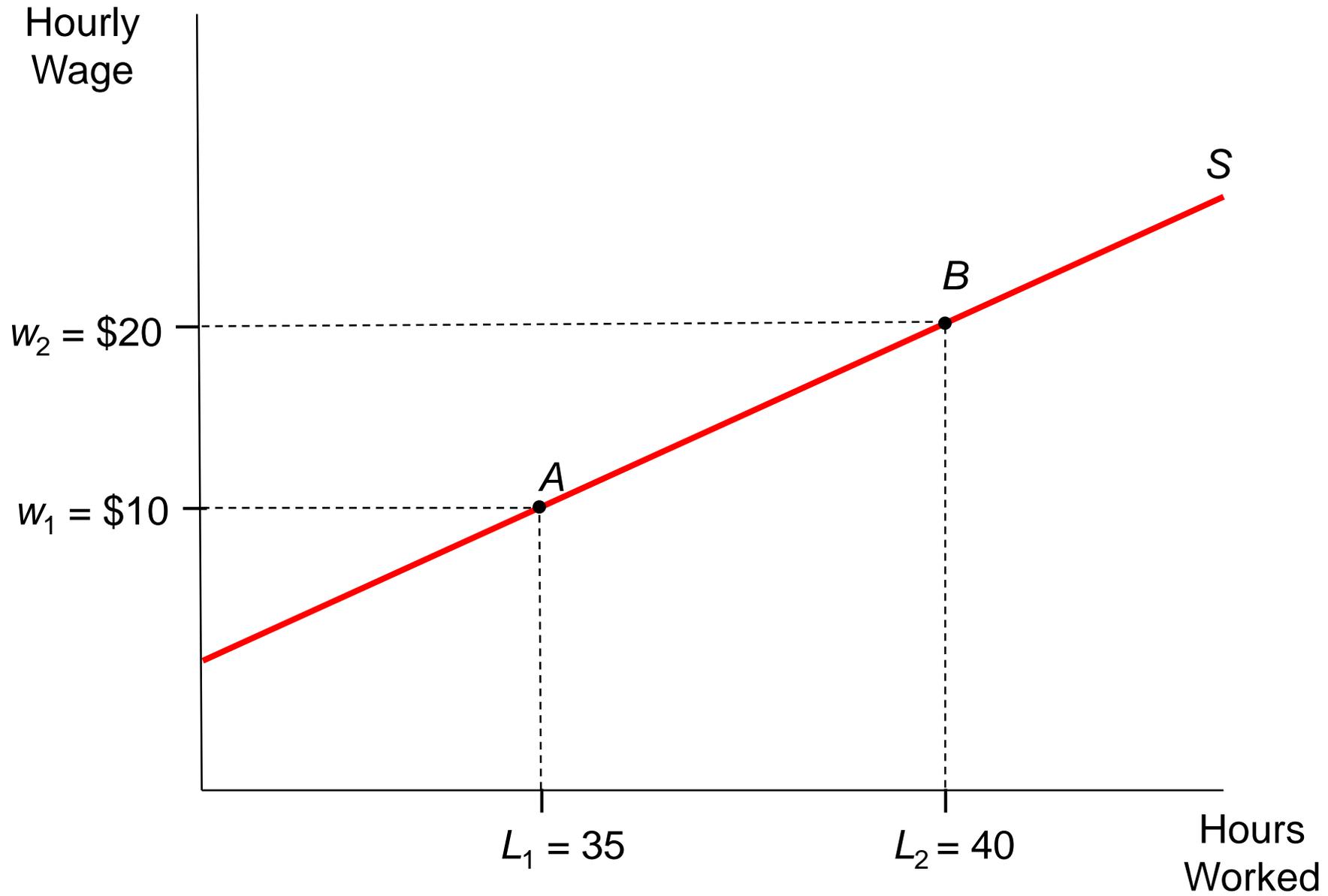
# Economic Approach to Optimal Taxation

- Choice of tax rates is often viewed as a purely political issue
- Economic approach: set tax rates based on tradeoff between **equity vs. efficiency**
- Equity: Additional \$1 of income is worth more in terms of utility (well-being) to a family earning \$10,000 per year than a family earning \$250,000 per year
  - This force pushes towards higher tax rates on high-income earners
- Efficiency: higher tax rates on the rich → less incentive for them to work → less economic innovation, growth, etc.
  - This force pushes towards lower tax rates on high-income earners

# Economic Approach to Optimal Taxation

- Optimal tax system balances gain from equity with efficiency cost
- Gains from equity rely on value judgements: how much more is money worth to low-income households than high-income households?
  - Economists typically leave these judgements to the public/political process
- Efficiency impacts depend upon how much rates of work are affected by changes in tax rates
  - Large literature on estimating **elasticity of labor supply** with respect to tax rate using modern tax data

# Labor Supply Curve



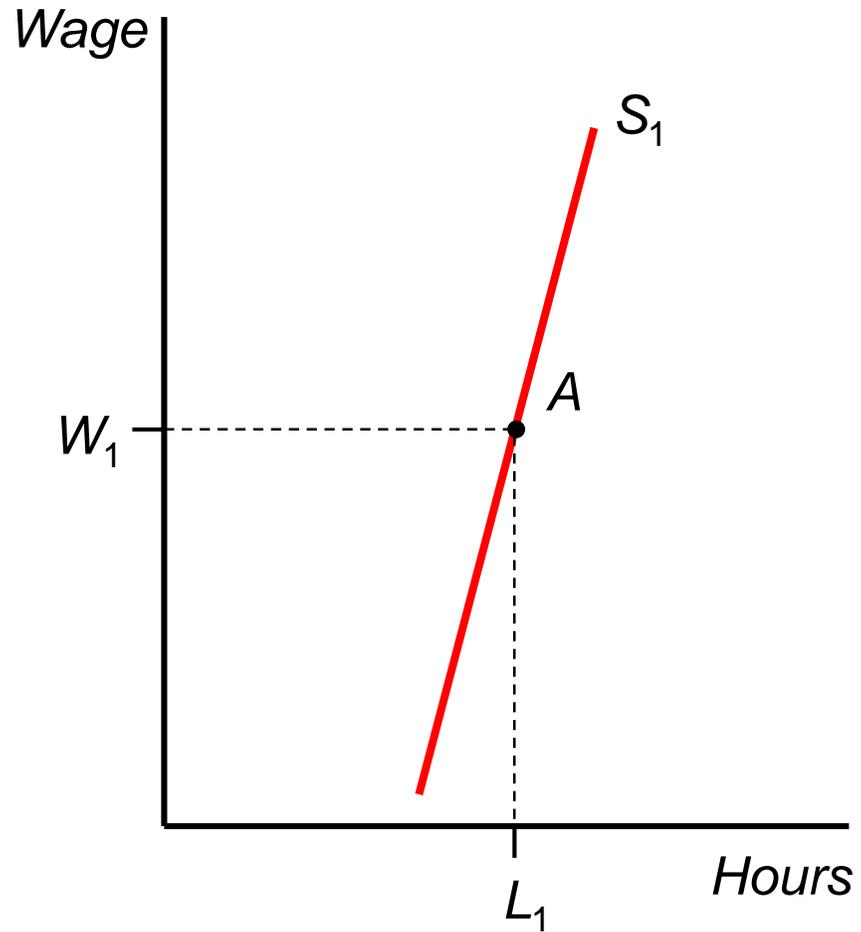
## Elasticity of Labor Supply

- Elasticity: % change in quantity when price changes by 1%
- Widely used measure because elasticities are unit free
- Elasticity of hours with respect to wages measures percentage change in hours worked in response to a 1% change in wage:

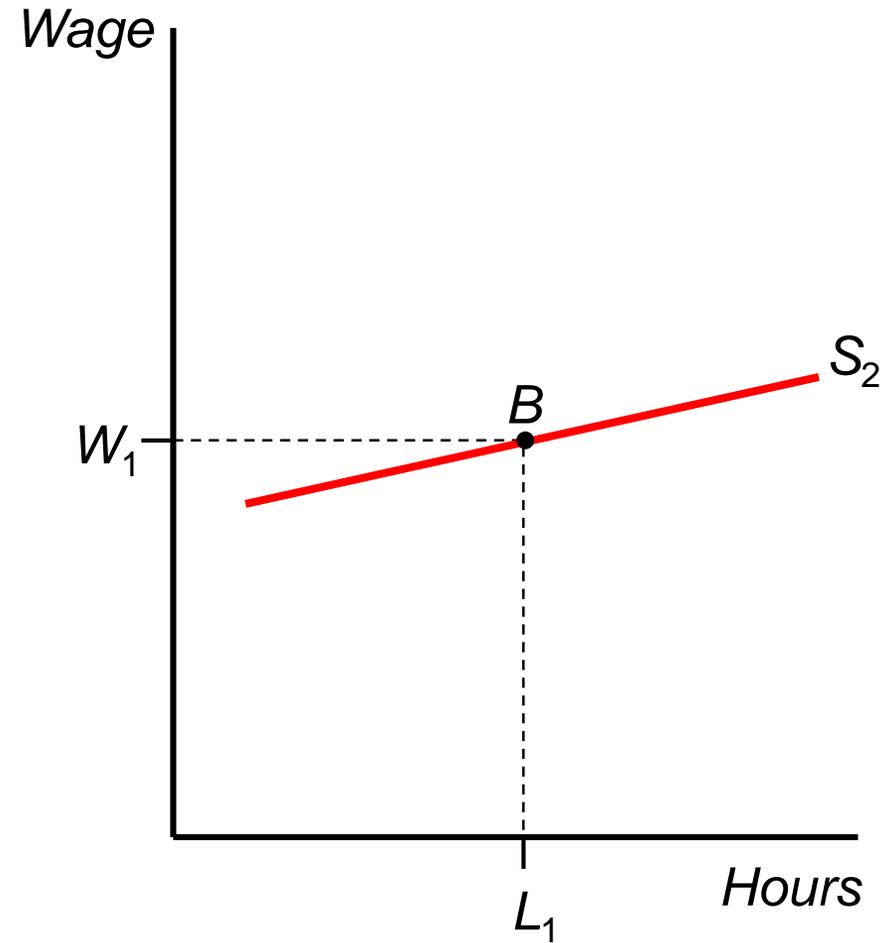
$$\varepsilon_{l,w} = \frac{\Delta l / l}{\Delta w / w}$$

# Labor Supply Elasticities

(a) Less elastic labor supply



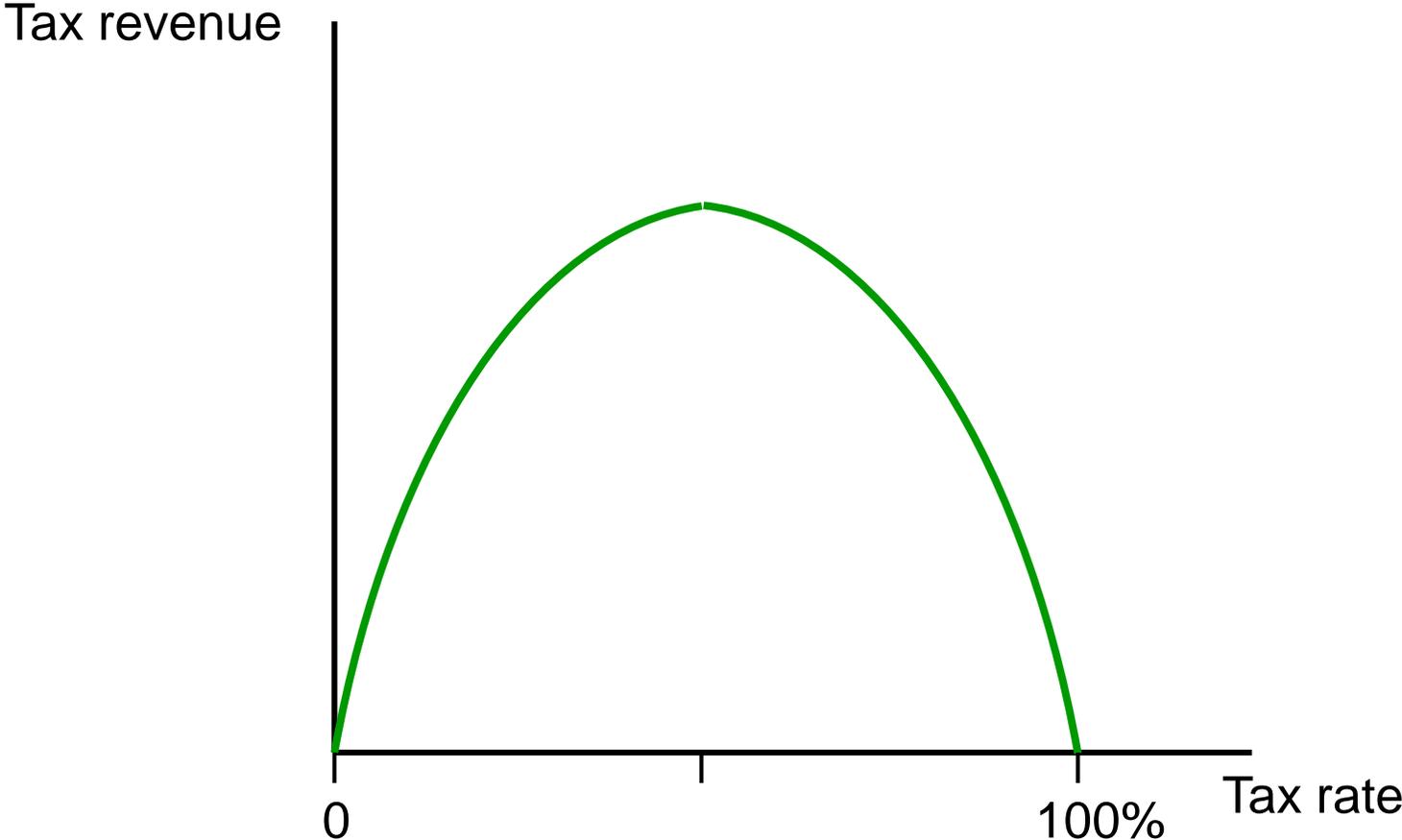
(b) More elastic labor supply



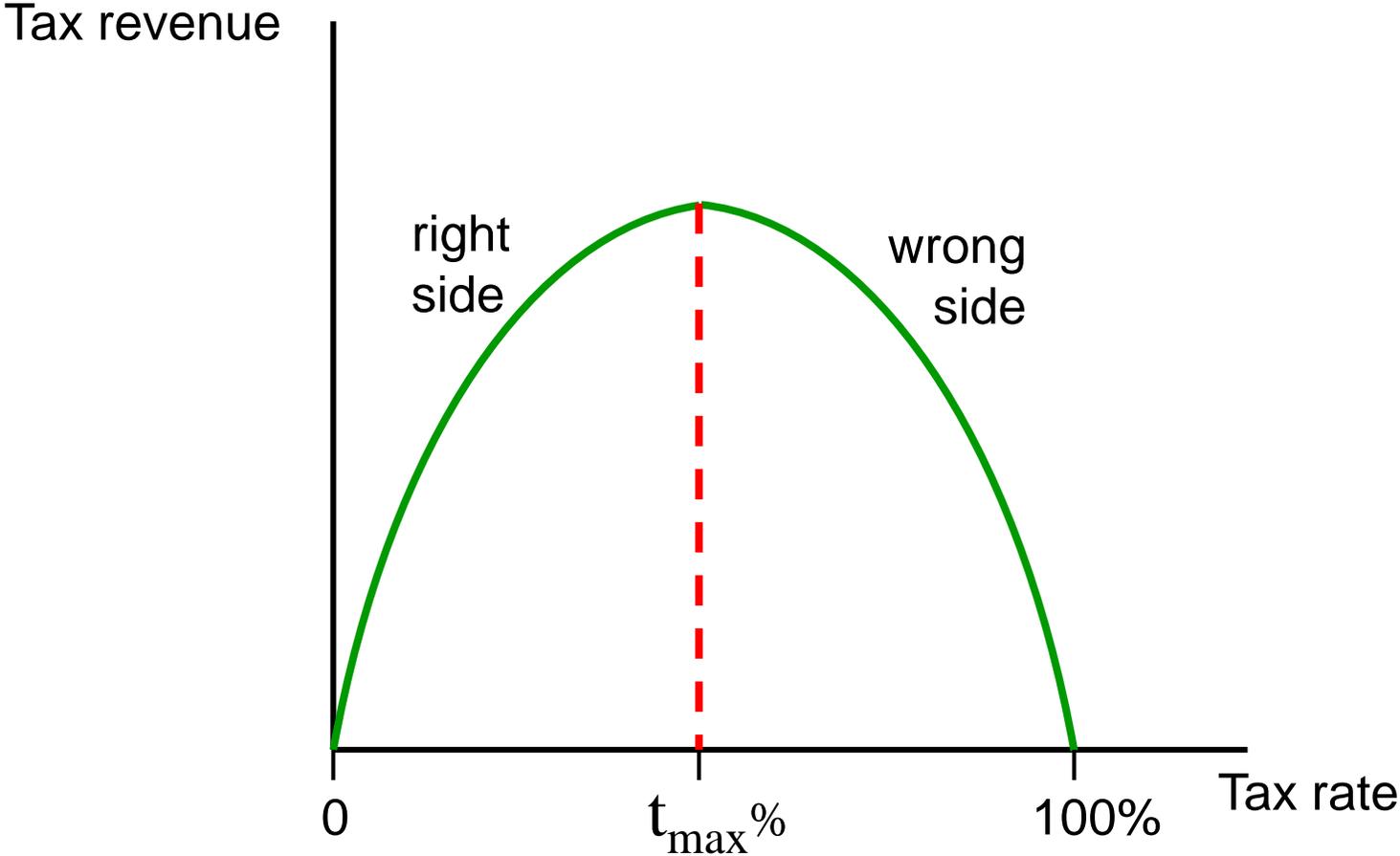
## Revenue-Maximizing Tax Rate: The Laffer Curve

- Consider extreme scenario where we place zero social value on additional income for individuals in top 1%
- Even in this case, optimal tax rate in top bracket is not 100%
- Why? Laffer Curve

# The Laffer Curve



# The Laffer Curve



# Revenue-Maximizing Tax Rate

- With a flat (constant) tax at rate  $t$ , tax revenue is  $R(t) = t \times w \times L(t)$
- $R(t = 0) = 0$  because  $t = 0$ ;  $R(t = 100\%) = 0$  because  $L(t = 100\%) = 0$
- Rate at which tax revenue is maximized is

$$t_{max} = \frac{1}{1 + \varepsilon_{l,w}}$$

- Examples:
  - Elasticity = 0  $\rightarrow$  revenue-maximizing tax rate is 100%
  - Elasticity = 0.25  $\rightarrow$  revenue-maximizing tax rate is 80%
  - Elasticity = 1  $\rightarrow$  revenue-maximizing tax rate is 50%

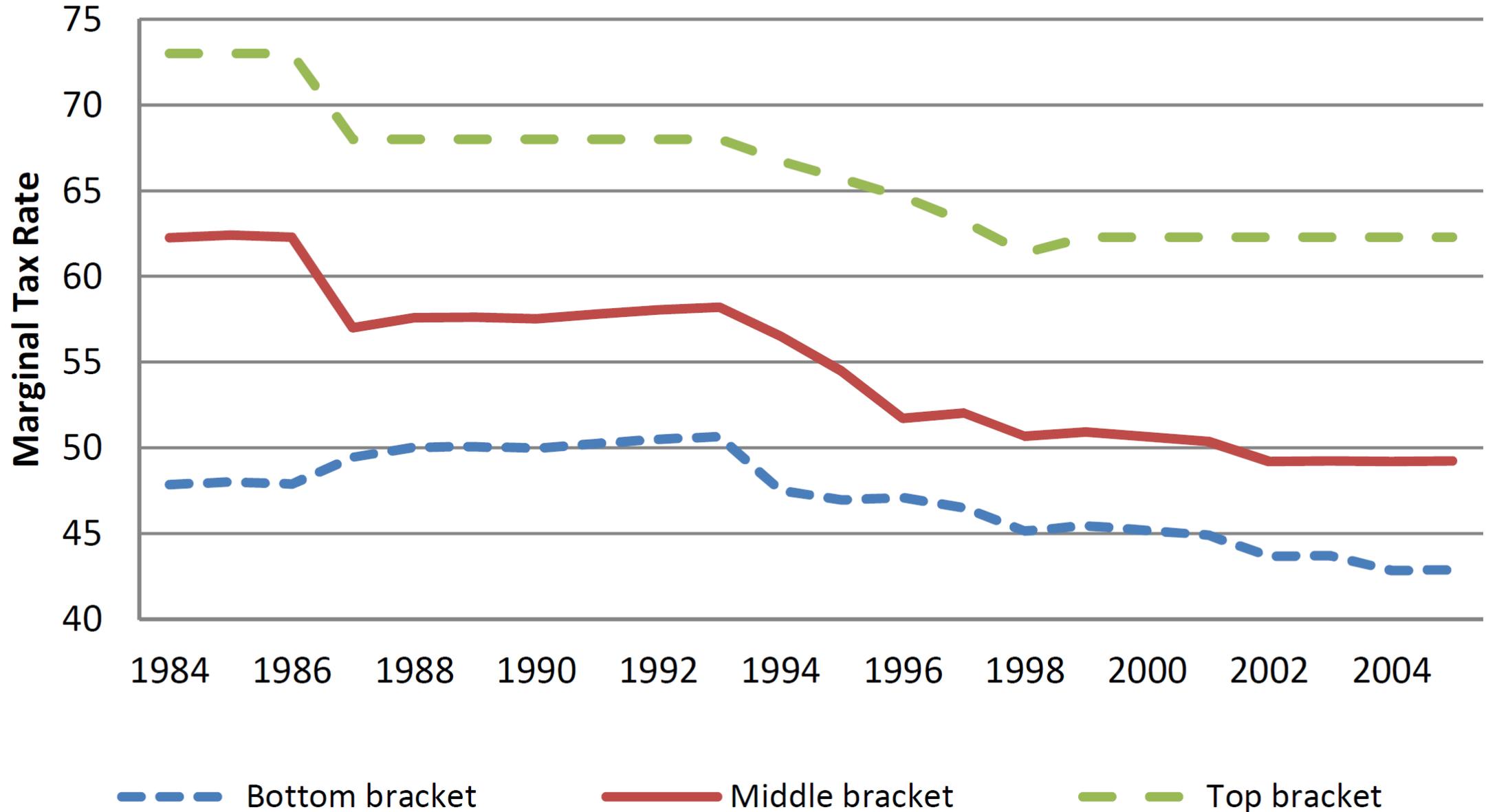
## The Laffer Curve and “Supply Side Economics”

- Arthur Laffer argued that we were on the wrong side of the Laffer curve in the 1980s
  - Argued that cutting taxes would **both** increase tax revenue and stimulate economic growth
- Motivated large top income tax cuts enacted by Reagan
- Is this argument correct empirically?

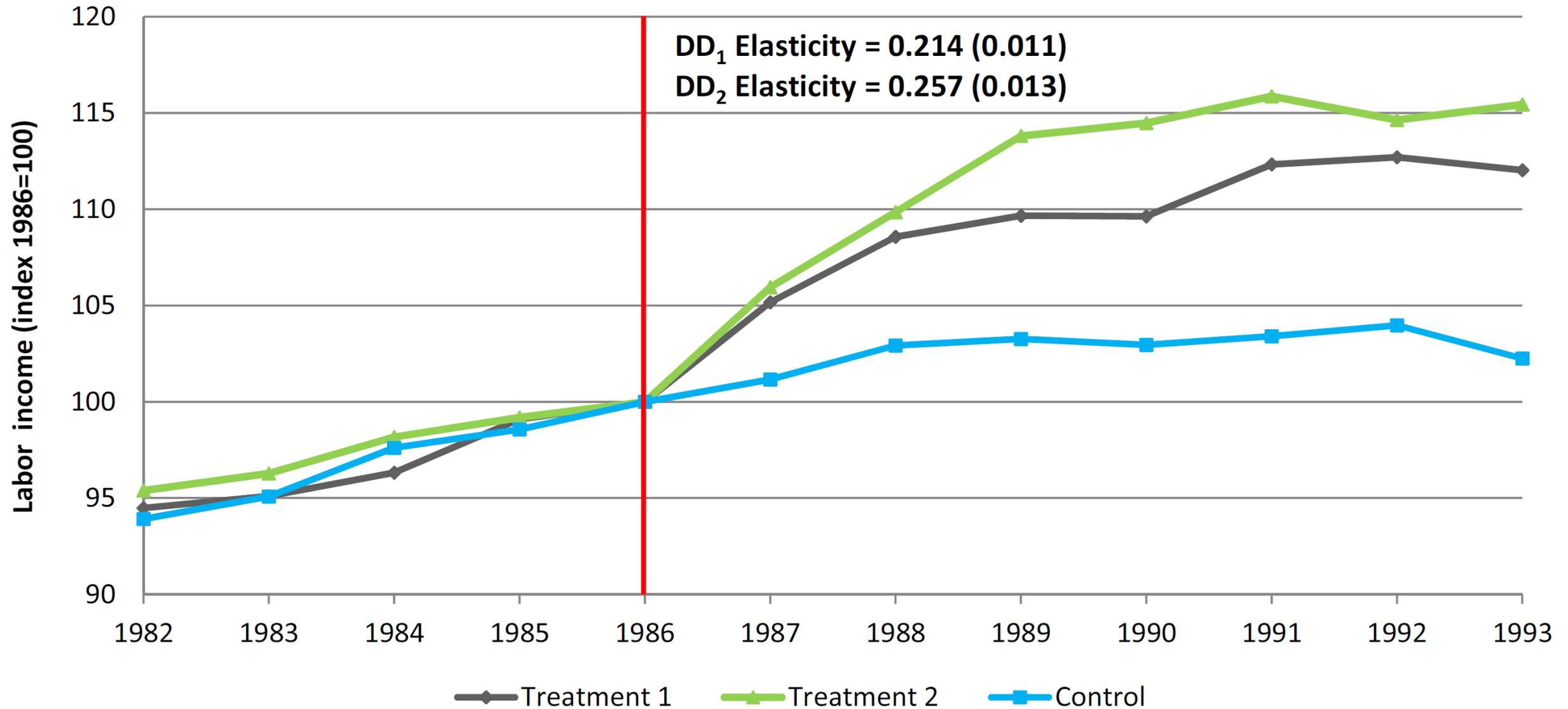
## Estimating Labor Supply Elasticities

- Several modern studies use difference-in-difference methods to estimate effects of taxation on how much people work
- Typical approach: analyze impacts of a change in tax rates for one group (e.g., top income earners)
  - Use other income groups as a control

# Marginal Tax Rates on Labor Income in Denmark, 1984-2005



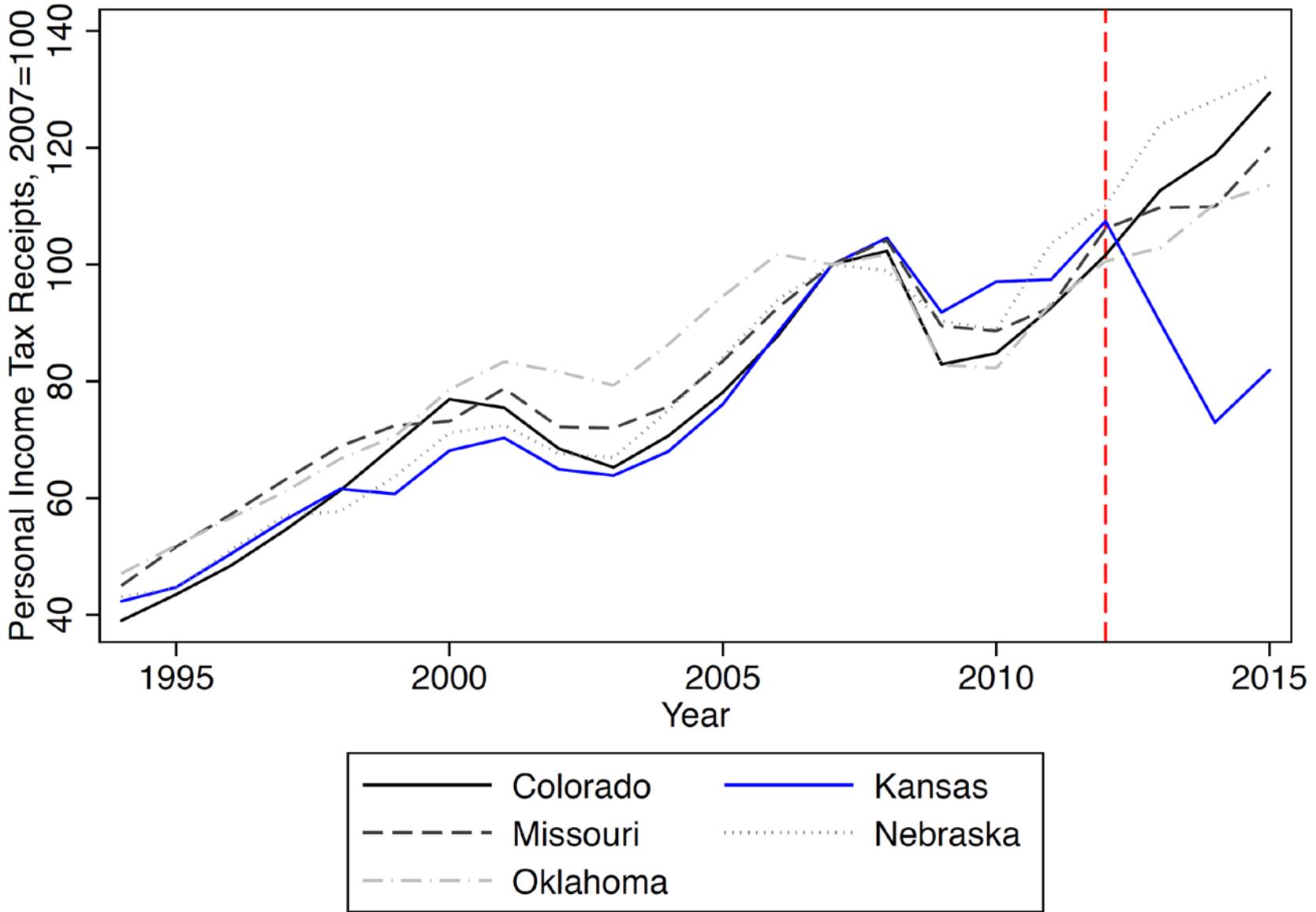
# Effects of the 1987 Danish Tax Cut on Taxable Labor Income



# Estimating Effects of Income Tax Changes

- Another approach: use state-level tax variation as a natural experiment
- In 2012, Kansas enacted sharp tax cuts on top incomes
  - Top income tax rates reduced from 6.45% to 4.9%
  - Business income taxes reduced sharply to zero on some forms of income
- Governor Sam Brownback: plan would deliver a “shot of adrenaline” to Kansas economy and tax cuts would pay for themselves
  - Is this what happened? Recent studies evaluate this using tax data

# Personal Income Tax Revenue, Kansas vs. Surrounding States, 1994-2015



Source: DeBacker, Heim, Ramnath, Ross (2017)

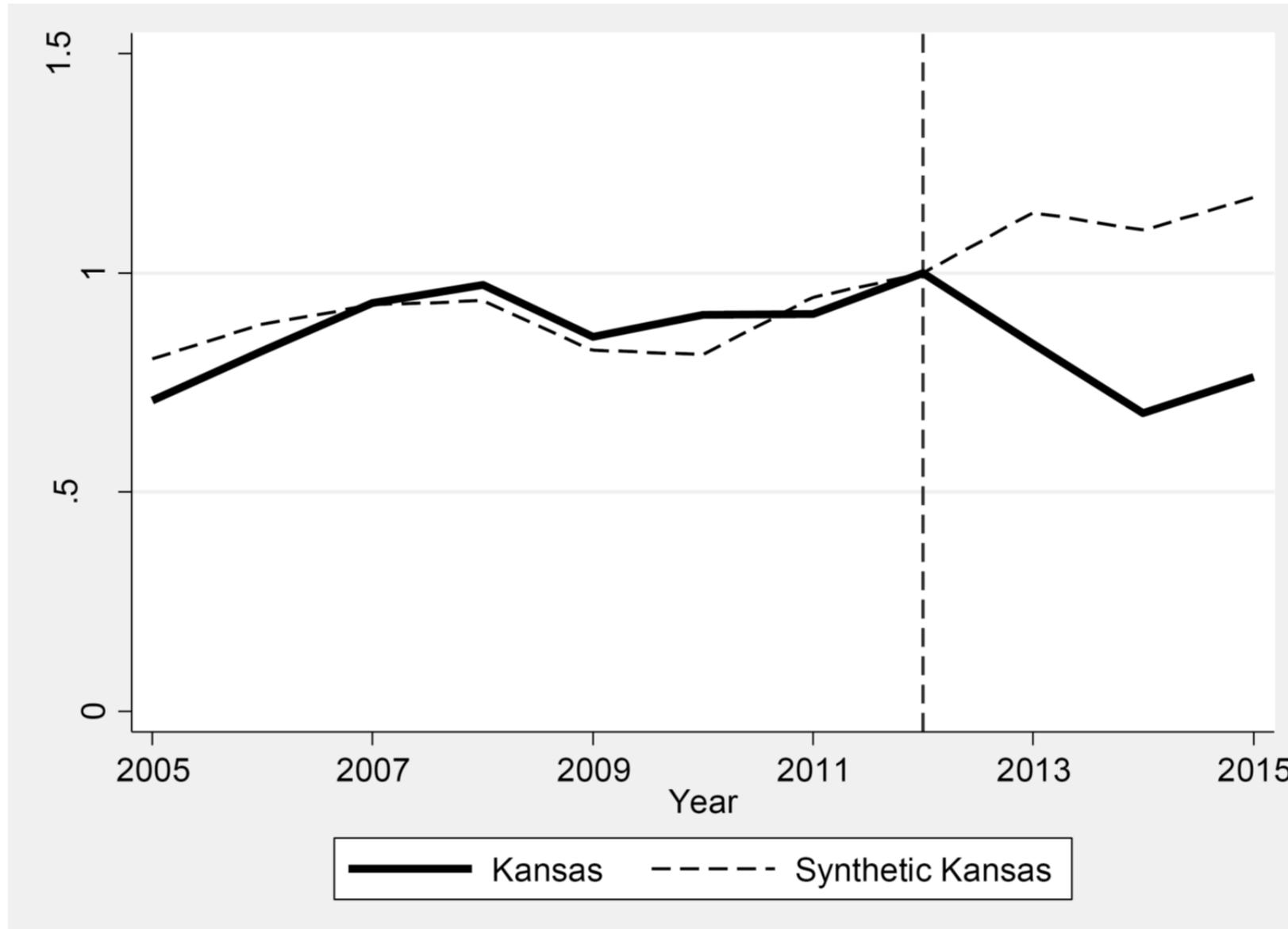
# Synthetic Control

- No one state is a perfect control for Kansas by itself
- But we can form a “synthetic” Kansas by constructing a composite average of other states that mirror its trends prior to the reform
- Synthetic control: form a control group by choosing a set of weights on other observations to match treated group [Abadie et al. 2010]
- Commonly used to construct a control group in difference-in-differences designs

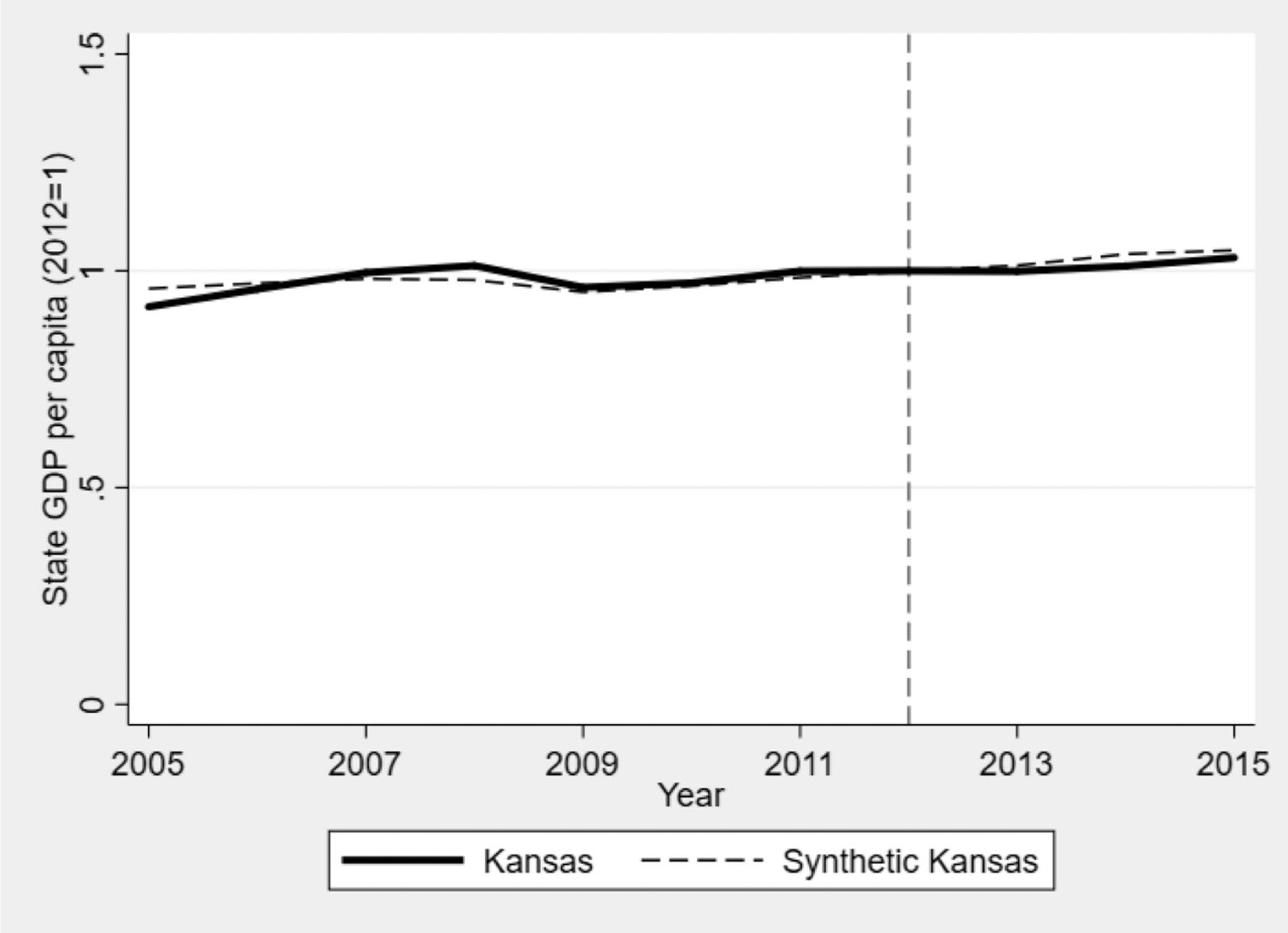
## Weights Assigned to States by Synthetic Control Method Analysis

State Name	Personal Income Tax Revenue
Colorado	0
Connecticut	0
Georgia	0
Illinois	0.002
Iowa	0.086
Minnesota	0.212
Mississippi	0
Nebraska	0
New Jersey	0.001
New Mexico	0.051
North Dakota	0.122
Oklahoma	0.187
South Carolina	0
Utah	0.065
Virginia	0.038
Wisconsin	0.236
Total	1.000

## Personal Income Tax Revenue: Kansas versus Synthetic Kansas



# GDP Per Capita: Kansas versus Synthetic Kansas



Source: Hayes (2017)

## Effects of Taxation on Labor Supply: Summary

- Literature generally suggests that elasticity of labor income with respect to wage rates is modest, around 0.3
- If one places much less social value on incomes of top earners than lower income families, suggests that optimal tax rates are high

OPINION WSJ

# *Diamond and Saez: High Tax Rates Won't Slow Growth*

We're not close to the top of the Laffer Curve. Raising tax rates is part of a sensible deficit reduction strategy.

According to our analysis of current tax rates and their elasticity, the revenue-maximizing top federal marginal income tax rate would be in or near the range of 50%-70% (taking into account that individuals face additional taxes from Medicare and state and local taxes). Thus we conclude that raising the top tax rate is very likely to result in revenue increases at least until we reach the 50% rate that held during the first Reagan administration, and possibly until the 70% rate of the 1970s.

Source: Wall Street Journal (2012)

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## **Ocasio-Cortez suggests 70% tax for wealthy to fund climate change plan**



"Once you get to the tippie-tops, on your \$10 millionth dollar, sometimes you see tax rates as high as 60% or 70%. That doesn't mean all \$10 million dollars are taxed at an extremely high rate. But it means that as you climb up this ladder, you should be contributing more," Ocasio-Cortez said.

Source: CNN (2019)

## Is the “Optimal” Top Income Tax Rate 70%?

- Impacts of tax rates on labor supply are sufficiently small (elasticity = 0.3) that revenue-maximizing top income tax rate may be as high as 70%
- Does this mean that the “correct” tax rate on high income families is 70%?
- Not necessarily, for two reasons:
  1. Revenue-maximizing calculation puts zero weight on the marginal value of income for high-income families
  2. Not clear that the average American places a very high value on equity of incomes

## Measuring Public Preferences for Redistribution

- Kuziemko et al. (2015) measure preferences for redistribution using online surveys of about 4,000 Americans
  - Conducted online using Amazon's mTurk platform
- Asked people about their preferred tax rate for the top 1%
- Then evaluated impacts of providing information about inequality on preferences for redistribution using a randomized experiment
  - 2,000 people randomly selected to receive information about trends in inequality and effects of taxes on economic growth

## Where are you in the income distribution?

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

\$

**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**.

## 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.



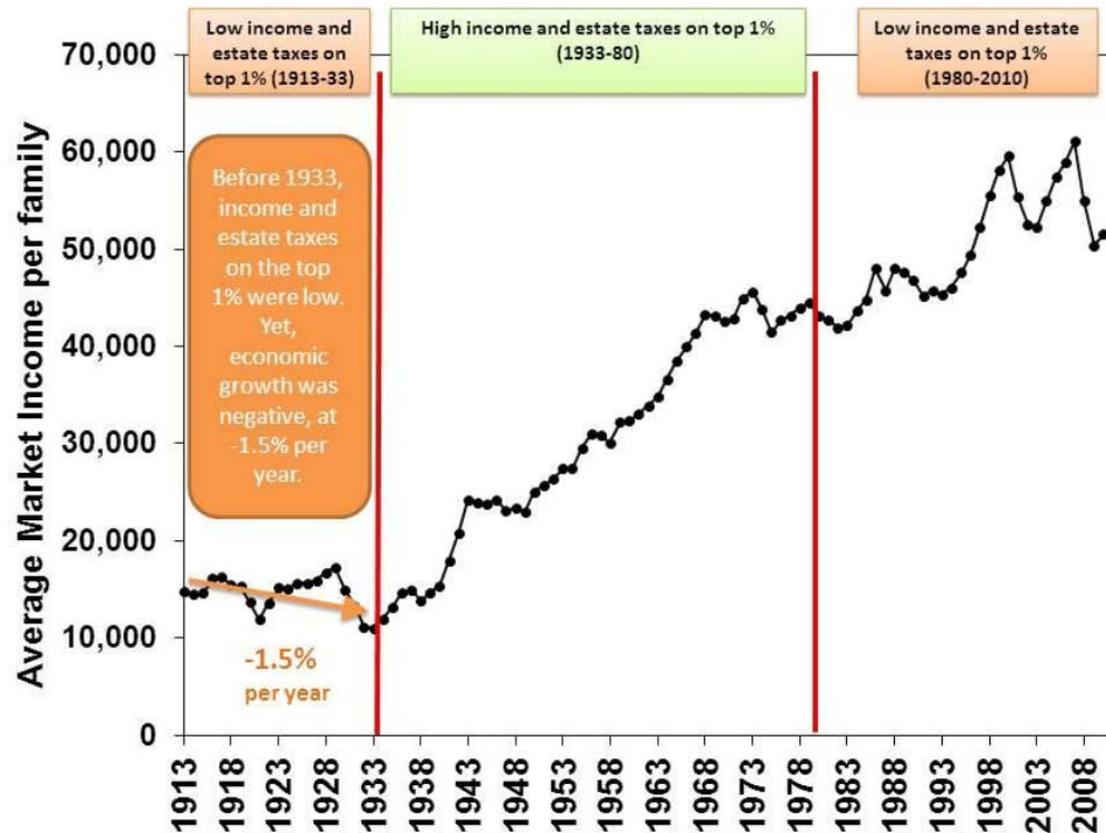
A household making **\$25,800** today would instead be making **\$35,200** if inequality had not changed since 1980.

In other words, if growth had been evenly shared, this household would have earned **37% more.**

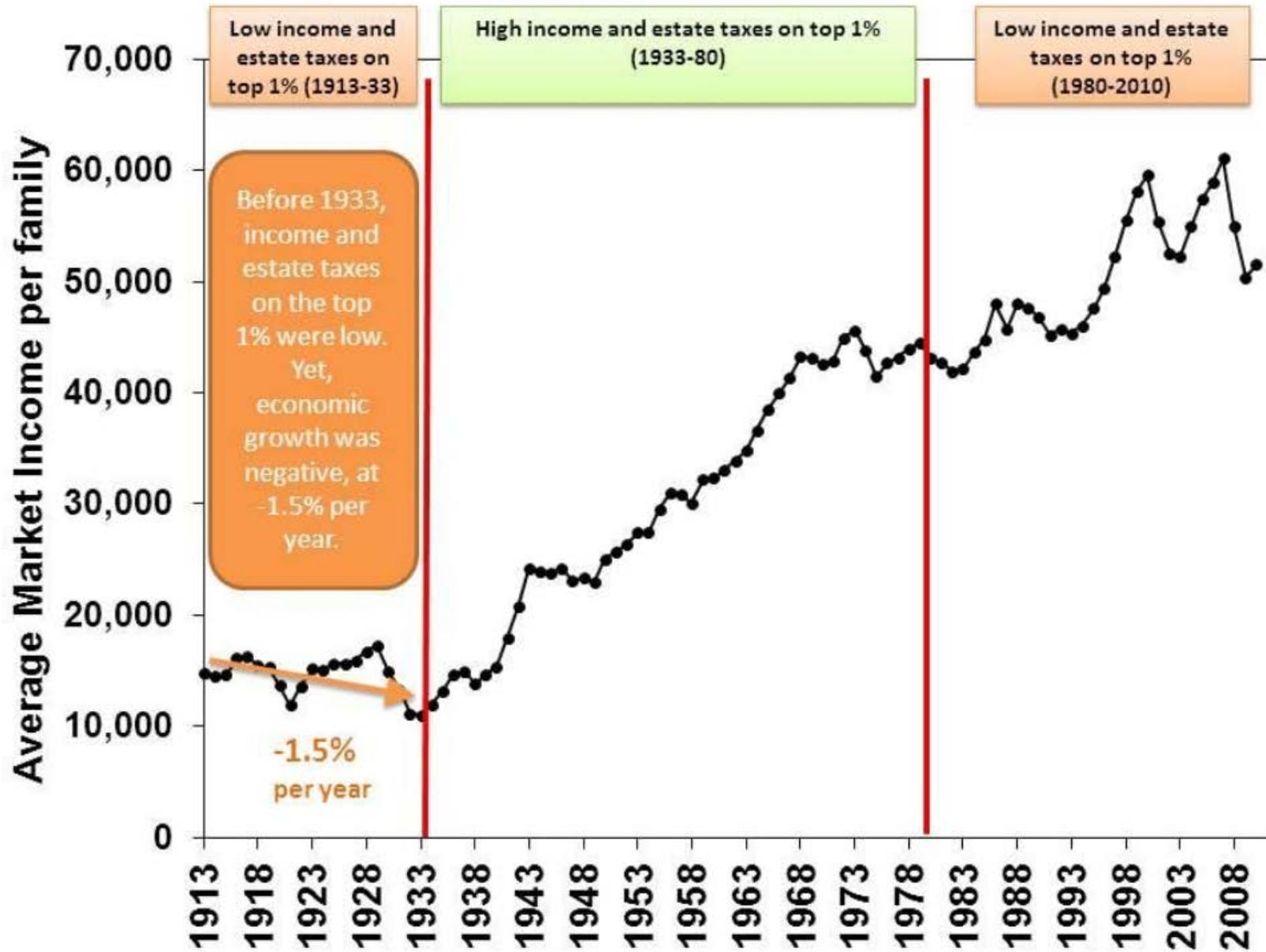
# The Correlation Between Taxes and Economic Growth

Increasing the federal income tax rate and the estate tax rate on very high incomes can raise tax revenue without hurting economic growth.

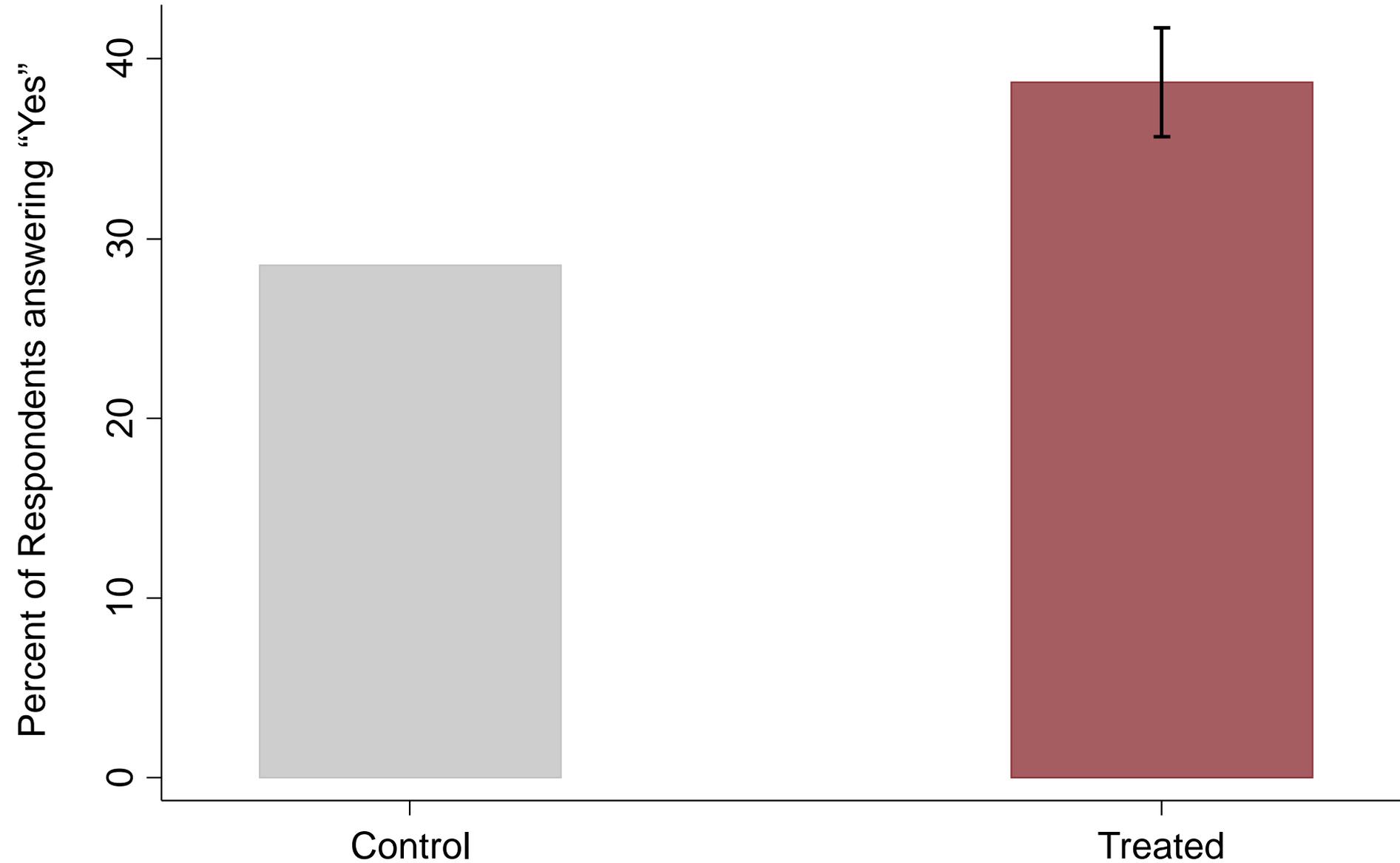
The following slides describe both income and estate taxes on high incomes and economic growth over three historical periods: (1) Before the New Deal of 1933, (2) Between 1933 and 1980, (3) Since 1980. Economic growth is measured as the growth in the average family market income.



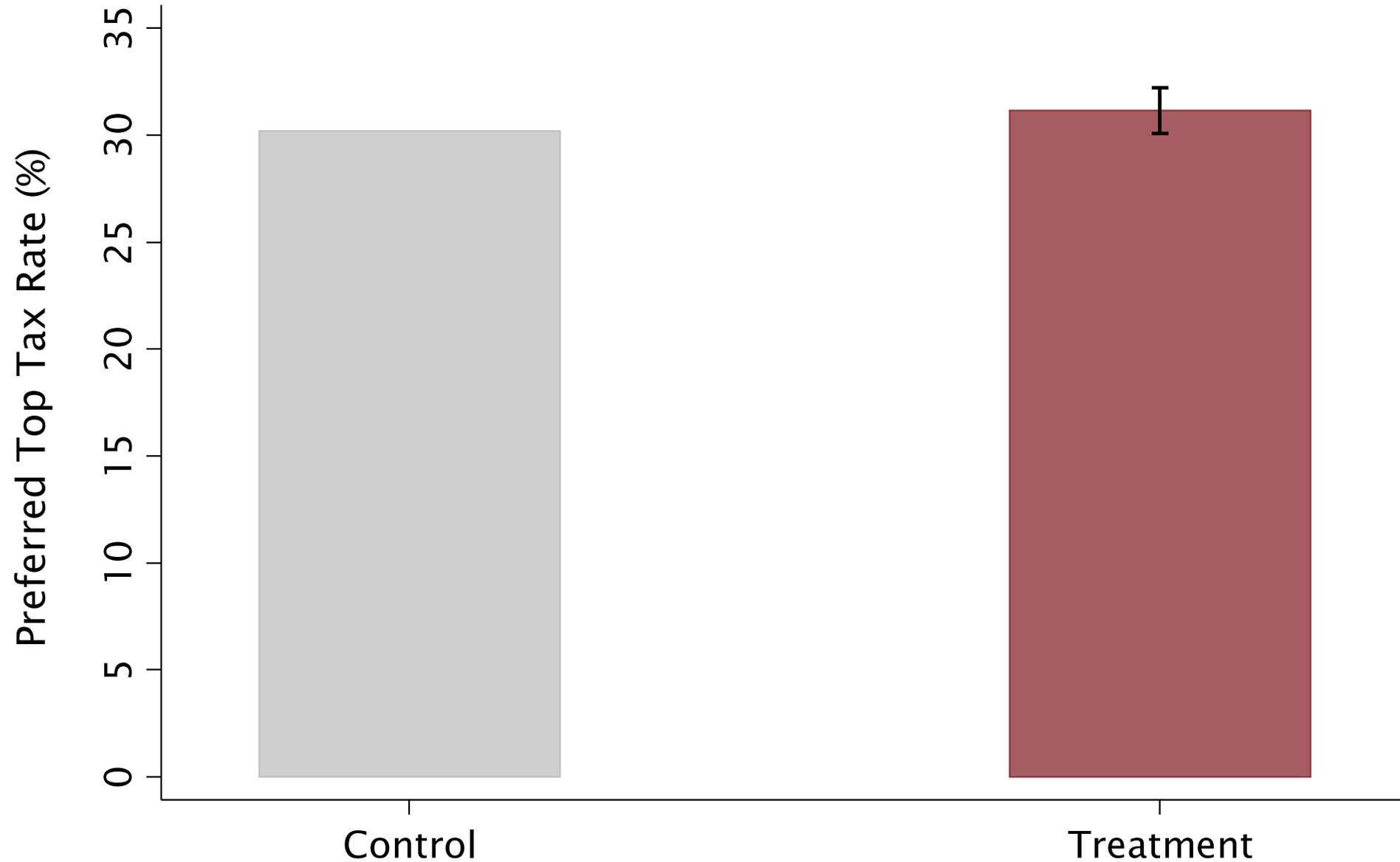
# The Correlation Between Taxes and Economic Growth



# Effect of Informational Intervention on Respondents' Perceptions of Inequality: Is Inequality is "a very serious problem"?



# Effect of Information on Respondents' Preferred Tax Rate on Top 1% Households



## Income Taxation: Summary

- Recall that economic framework to evaluate tax policy weighs benefits of greater equity from higher tax rates on the rich against efficiency costs
- Modern empirical evidence shows that efficiency costs of taxes are modest
  - Taxes on the top 1% can be increased from current levels without a risk of dramatic reductions in economic activity
- But whether this means we should have high top income tax rates depends upon value judgements about the importance of equity
  - There may be broader public support, especially in the U.S., for equality of **opportunity**, than equality of outcomes (earnings)