



# *Correlation v. Causation*

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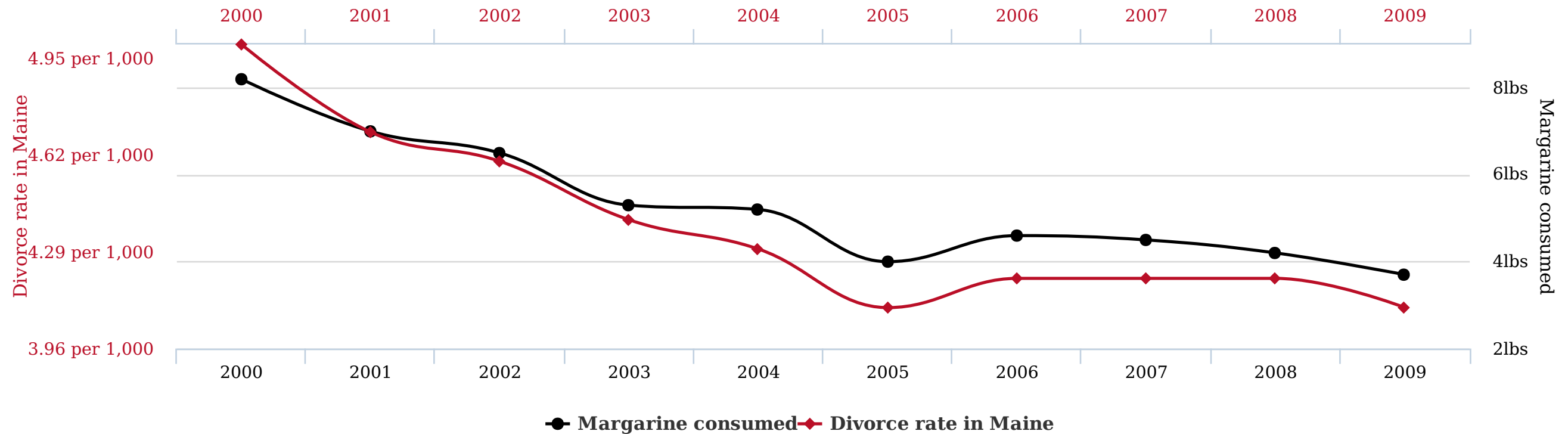
PHI 169 - Spring 2016



What Does It Mean to Say That  
“*Correlation Is NOT Causation*”?

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**Divorce rate in Maine**  
correlates with  
**Per capita consumption of margarine**

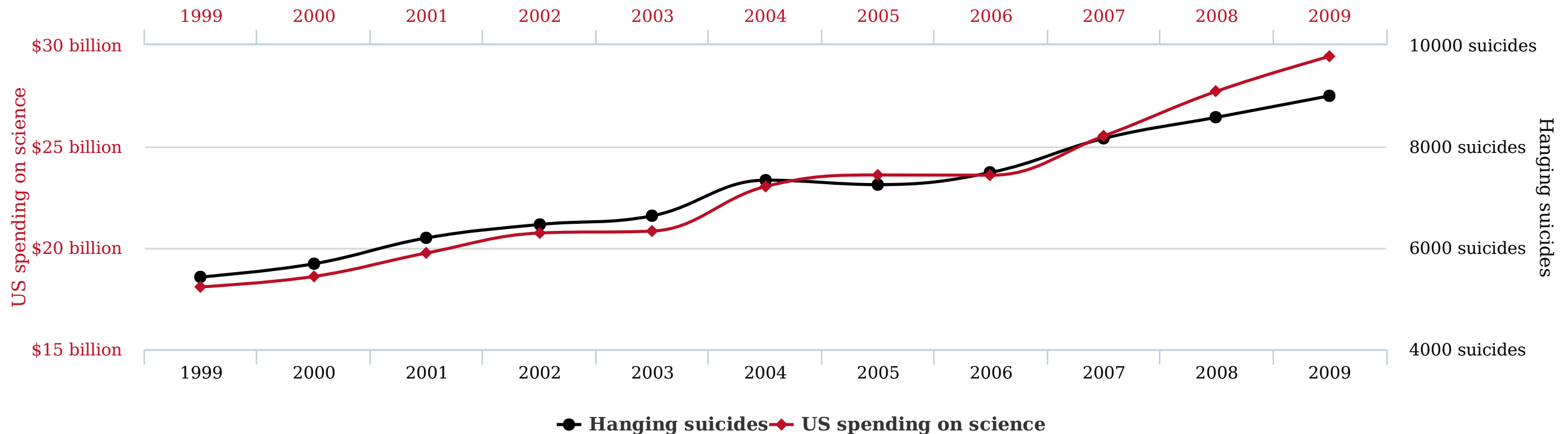


tylervigen.com

<http://tylervigen.com/spurious-correlations>



# US spending on science, space, and technology correlates with Suicides by hanging, strangulation and suffocation



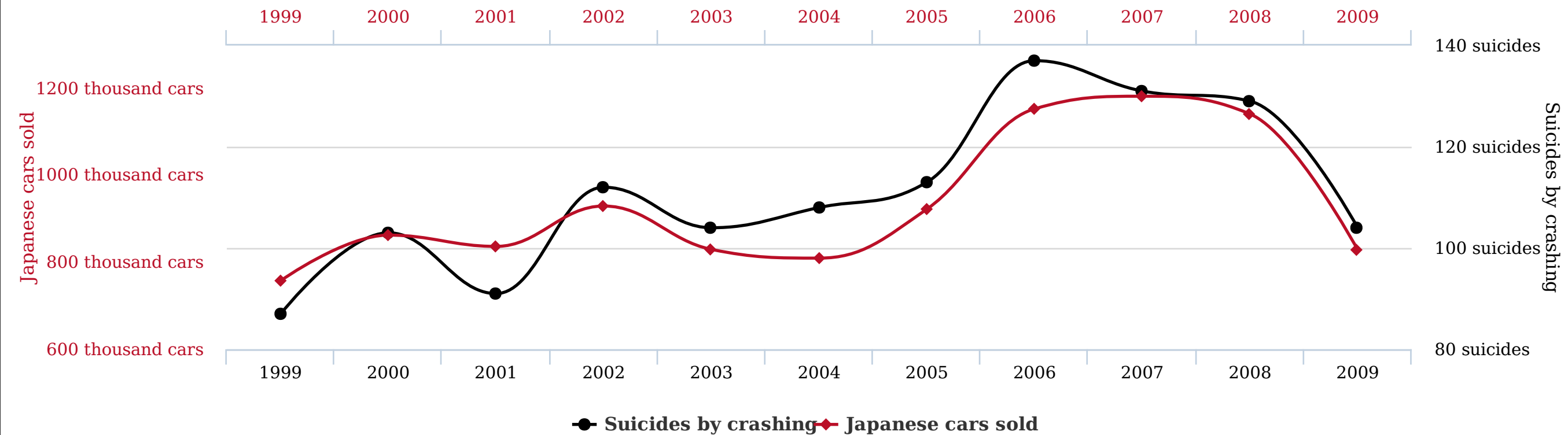
tylervigen.com

<http://tylervigen.com/spurious-correlations>

# Japanese passenger cars sold in the US

correlates with

## Suicides by crashing of motor vehicle



tylervigen.com

<http://tylervigen.com/spurious-correlations>



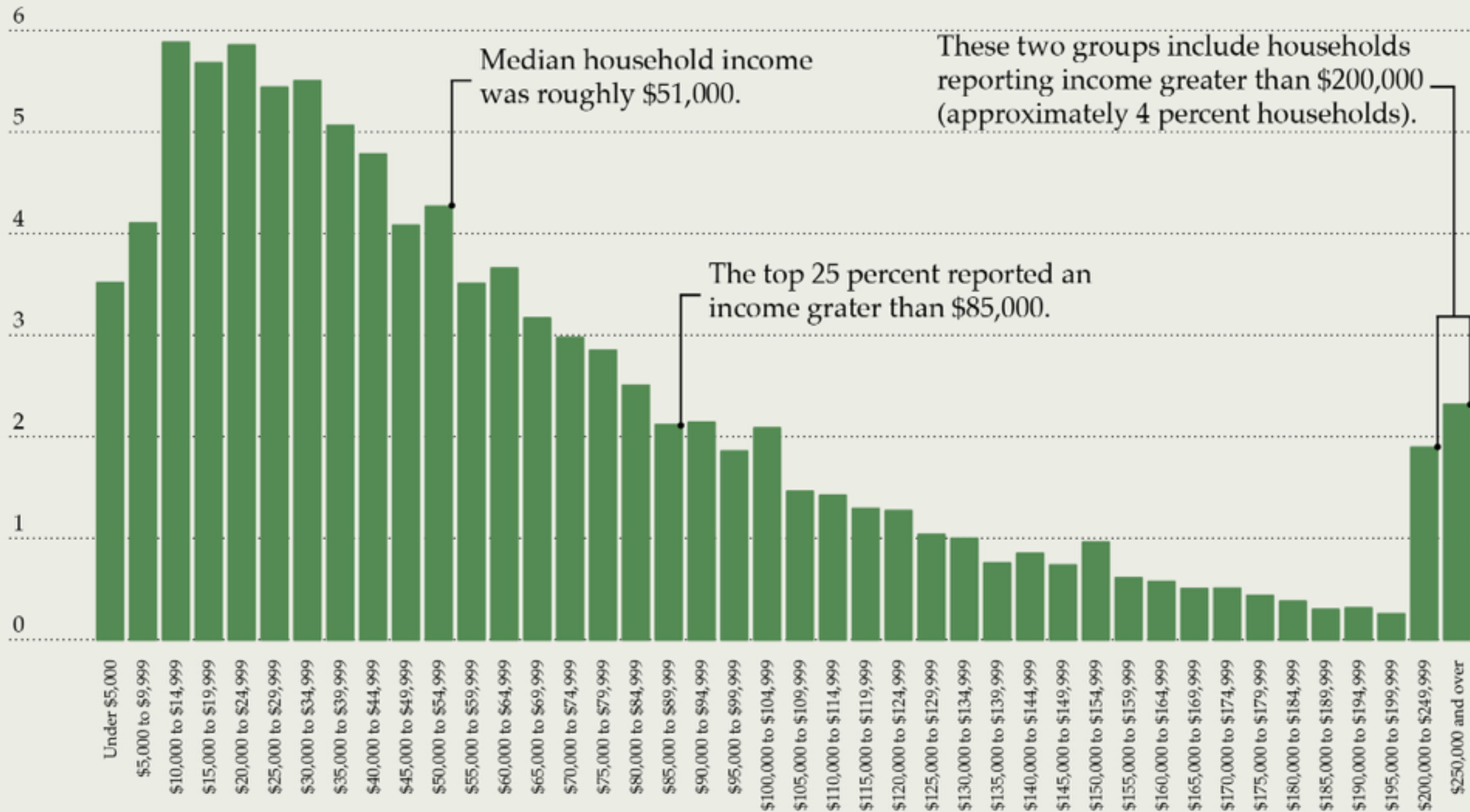
# Correlations Can Still Be Useful to Investigate Causal Relationships

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# Distribution of annual household income in the United States

(2012 estimate)

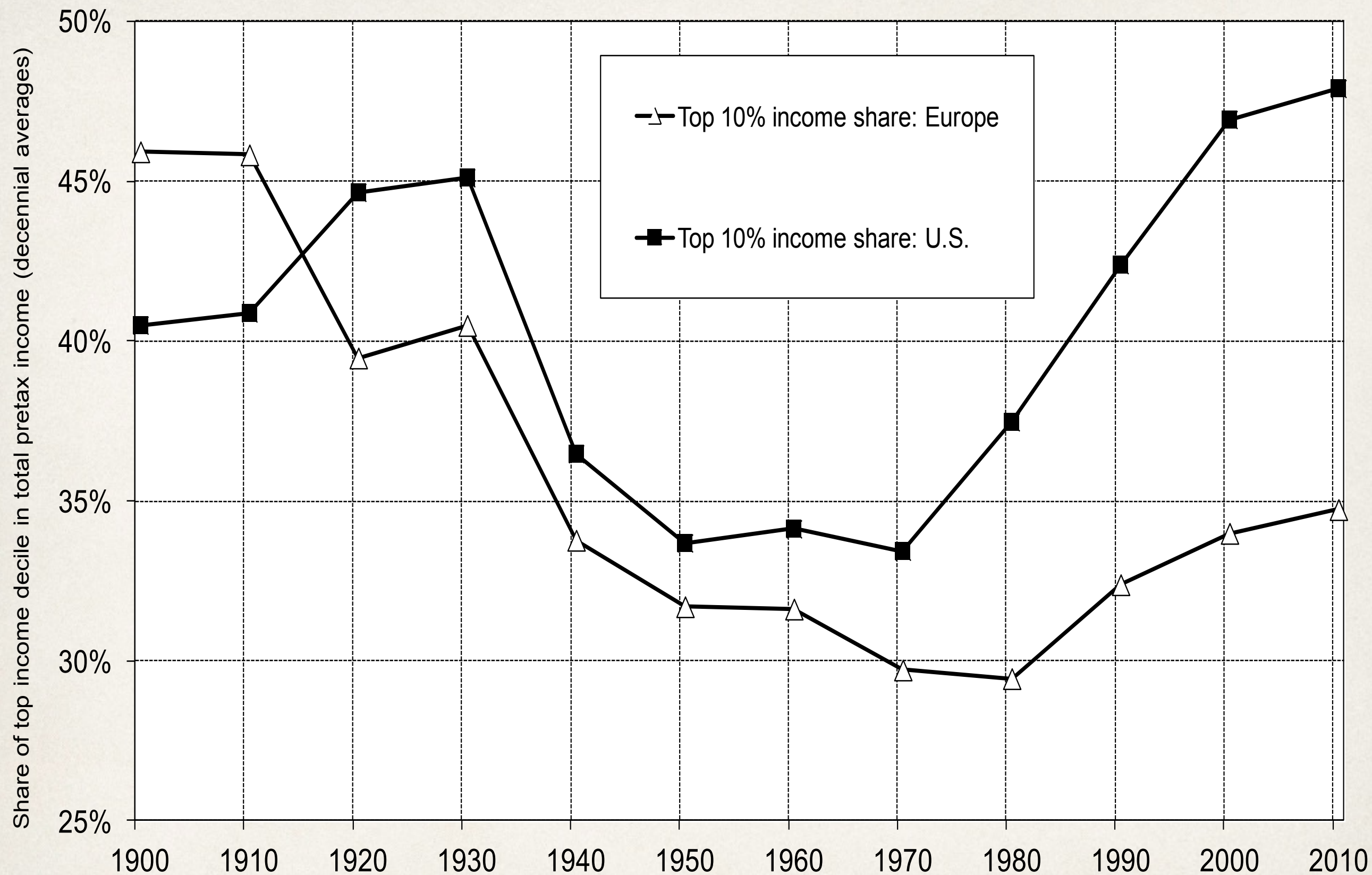
percent of households



Source: U.S. Census Bureau, Current Population Survey, 2012 Annual Social and Economic Supplement



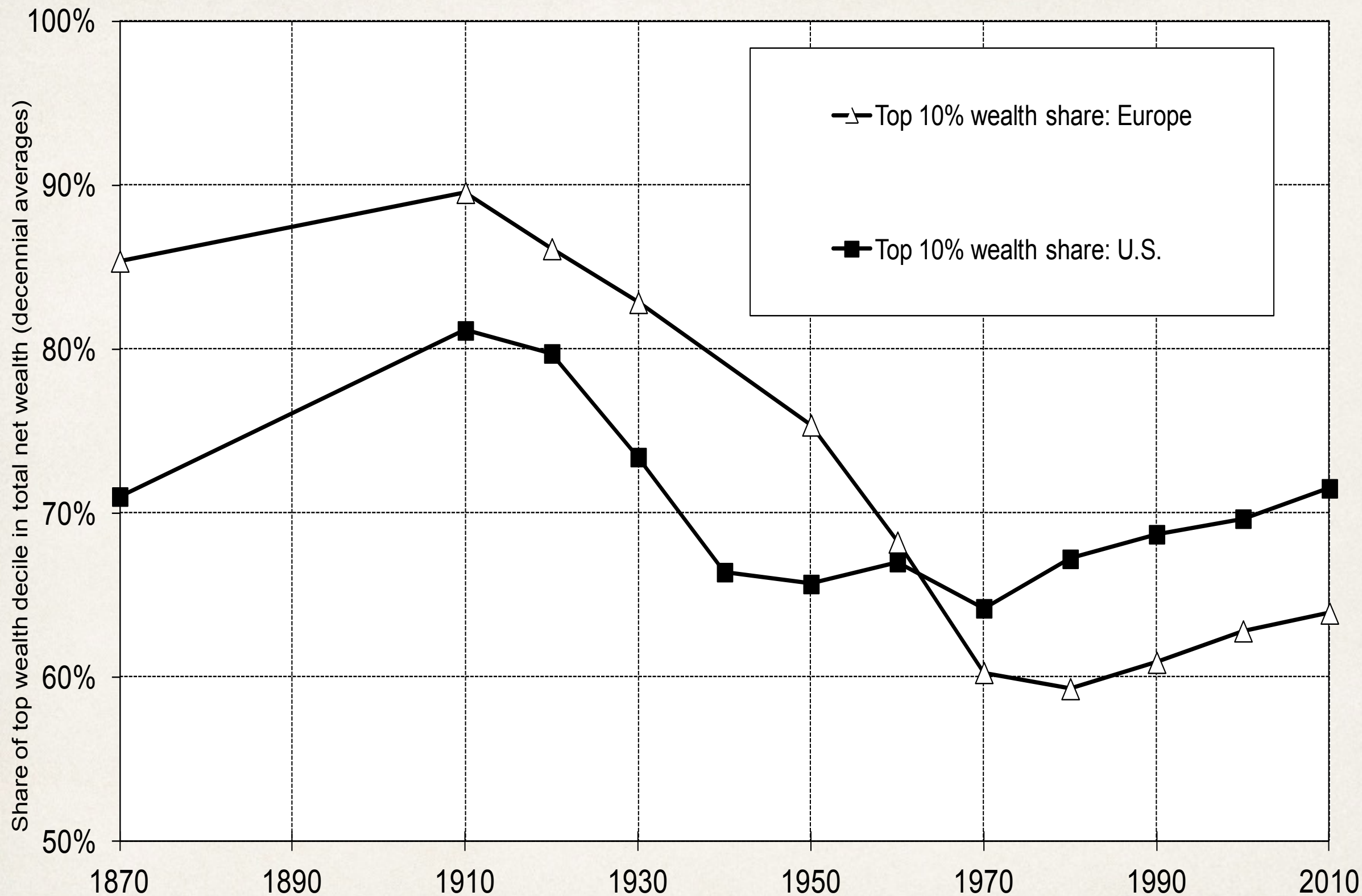
**Figure 1. Income inequality: Europe and the U.S., 1900-2010**



The share of total income accruing to top decile income holders was higher in Europe than in the U.S. around 1900-1910; it is a lot higher in the U.S. than in Europe around 2000-2010. Sources and series: see [piketty.pse.ens.fr/capital21c](http://piketty.pse.ens.fr/capital21c)



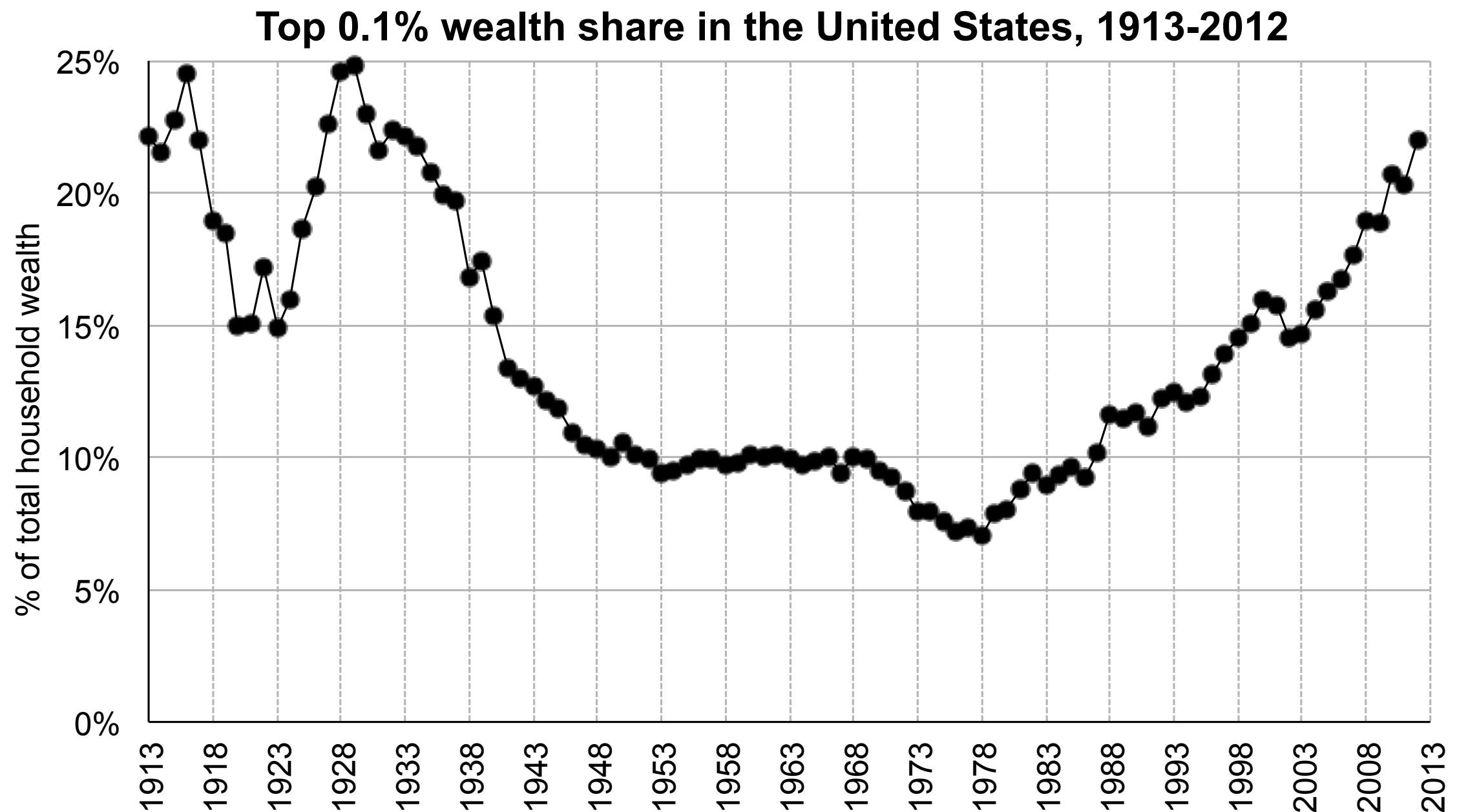
**Figure 2. Wealth inequality: Europe and the U.S., 1870-2010**



The share of total net wealth belonging to top decile wealth holders has become higher in the US than in Europe over the course of the 20<sup>th</sup> century. But it is still smaller than what it was in Europe before World War 1.

Sources and series: see piketty.ps

# U-Shaped Wealth Concentration



This figure depicts the share of total household wealth held by the 0.1% richest families, as estimated by capitalizing income tax returns. In 2012, the top 0.1% includes about 160,000 families with net wealth above \$20.6 million. Source: Appendix Table B1.

**Data are from Saez & Zucman (2014)**

[gabriel-zucman.eu/files/SaezZucman2014Slides.pdf](http://gabriel-zucman.eu/files/SaezZucman2014Slides.pdf)



# What is the Cause for the Rising Inequalities in the US?

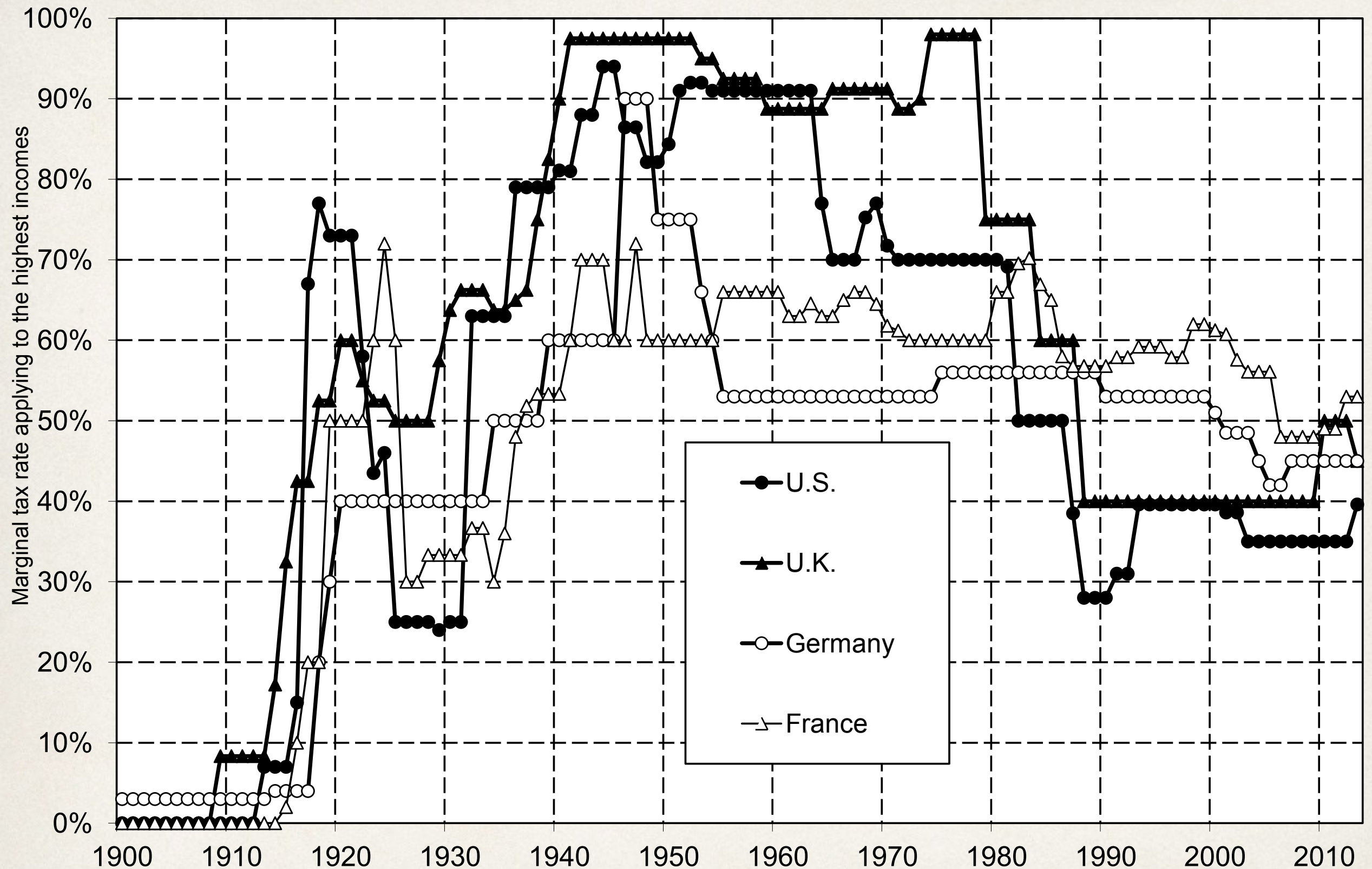
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# Is a Decline in Tax Rates the Cause of Rising Inequalities in the US?

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**Figure 6. Top income tax rates, 1900-2013**



The top marginal tax rate of the income tax (applying to the highest incomes) has been higher historically in Anglo-saxon countries than in Continental Europe. In the U.S. it dropped from 70% in 1980 to 28% in 1988.

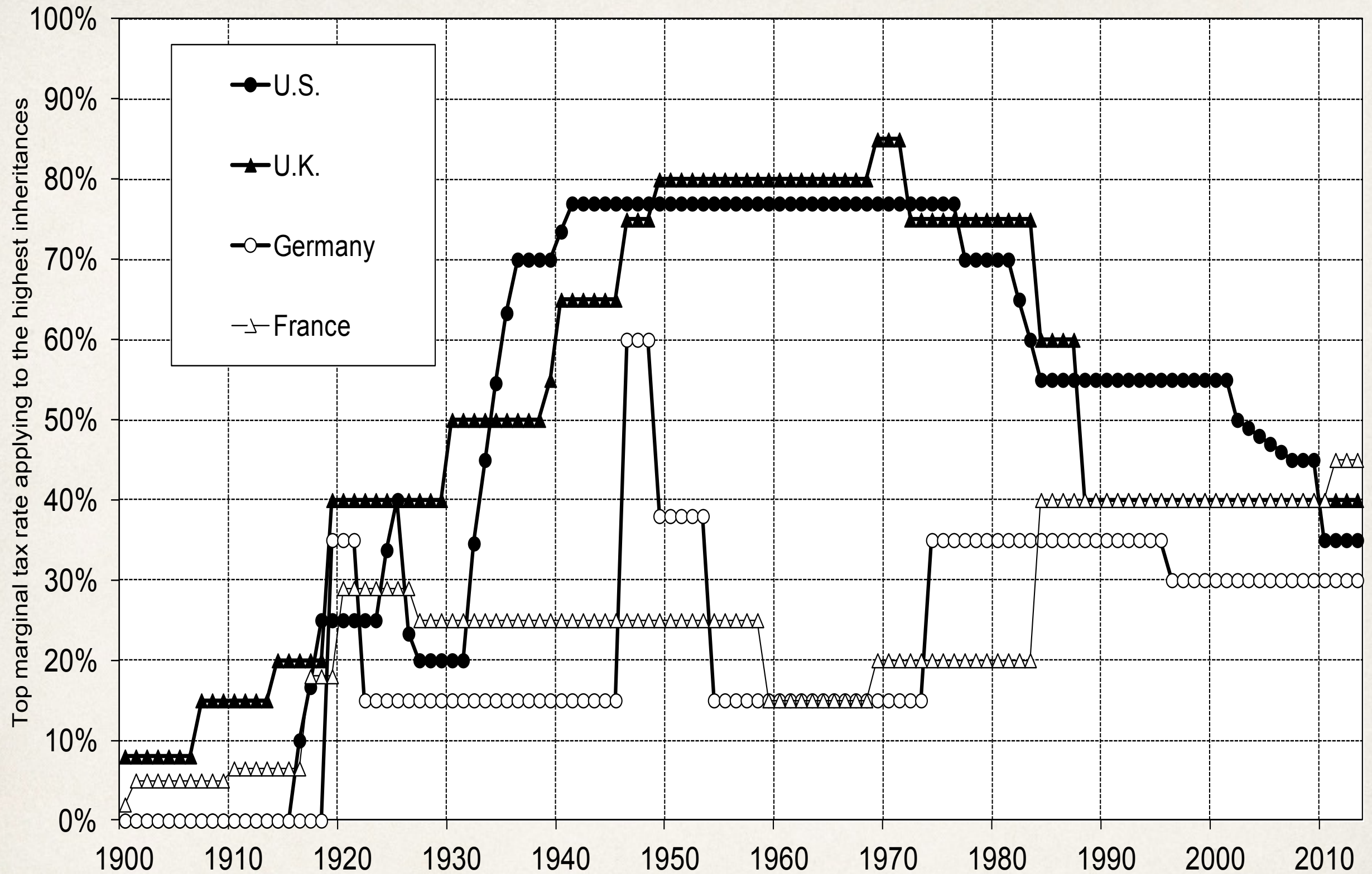
Sources and series: see [piketty.pse.ens](http://piketty.pse.ens).

# Is Inherited Wealth the Cause of Rising Inequalities in the US?

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**Figure 7. Top inheritance tax rates, 1900-2013**



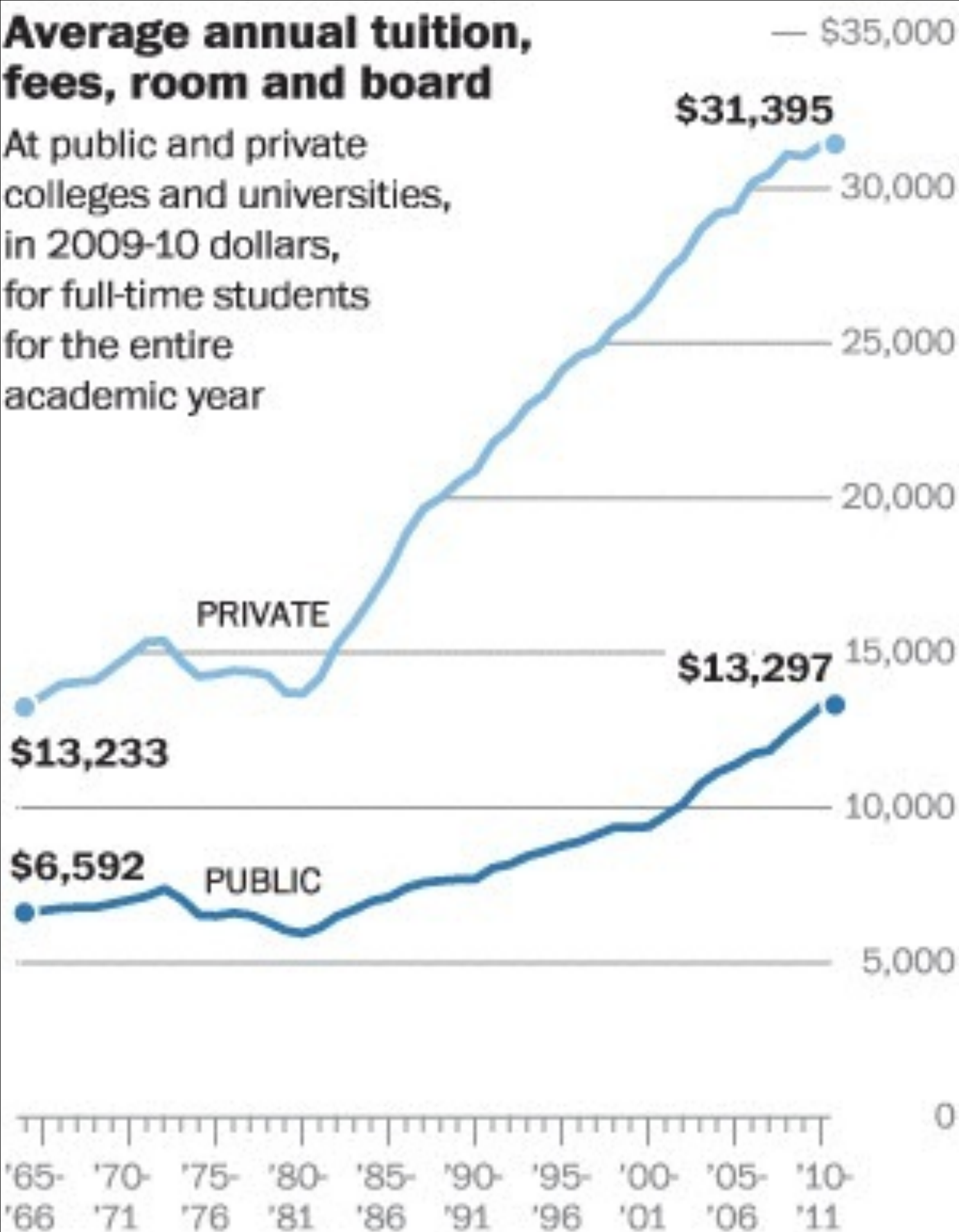
The top marginal tax rate of the inheritance tax (applying to the highest inheritances) has been higher historically in Anglo-saxon countries than in Continental Europe. In the U.S. it dropped from 70% in 1980 to 35% in 2013.

Sources and series: see pike

# Are College Tuitions Hikes the Cause of Rising Inequalities in the US?

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Detailed historical data are available on the the website of the *National Center of Education Statistics*

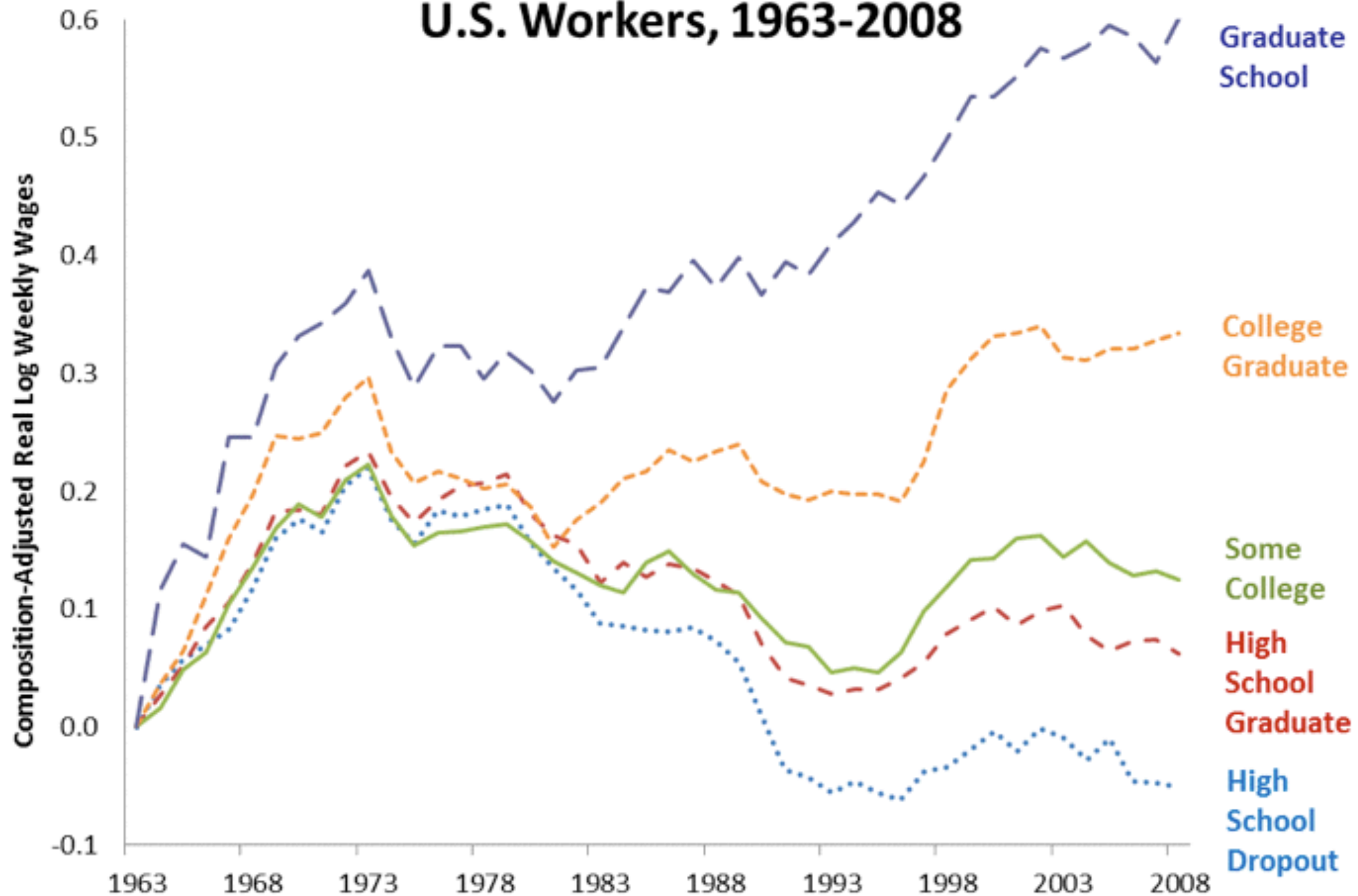
[http://nces.ed.gov/programs/digest/d13/tables/dt13\\_330.10.asp](http://nces.ed.gov/programs/digest/d13/tables/dt13_330.10.asp)

Is the Gap Between Skilled and Unskilled Labor  
the Cause of Rising Inequalities in the US?

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# Changes in Wages for Full-Time, Full-Year Male U.S. Workers, 1963-2008



**Figure 3.5: Wages have increased for those with the most education, while falling for those with the least.** Source: [Acemoglu and Autor](#) analysis of the Current Population Survey for 1963-2008.

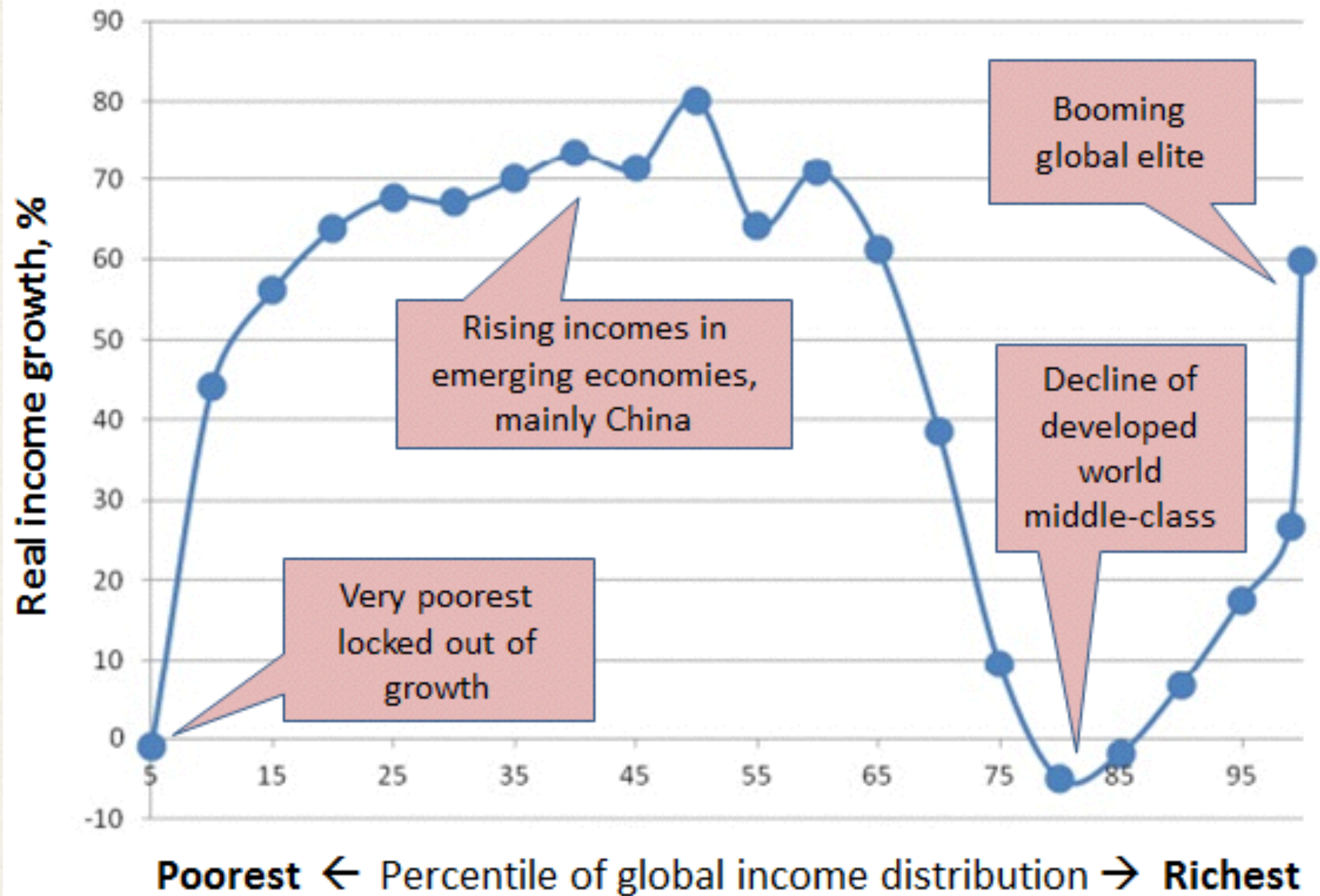
Acemoglu & Autor (2010), *Skills, Task and Technology: The Implications for Employment and Earnings*, NBER Working Paper Series

# Are Emerging Countries the Cause of Rising Inequalities in the US?

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# Global income growth from 1988 to 2008



Data from Branko Milanovic,

former lead economist at the World Bank, now senior scholar at CUNY

# There are Correlations Between...

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- ... more tax cuts for top incomes and rising inequalities
- ... lower inheritance tax rates and rising inequalities
- ... higher college tuitions and rising inequalities
- ... higher level of education and higher income
- ... income increase for middle class in developing economies and income stagnation for US middle class



...But Remember — Proof of *Correlation*  
Is **NOT** by Itself Proof of *Causation*

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