Quantifying inequality
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Why quantify inequality?

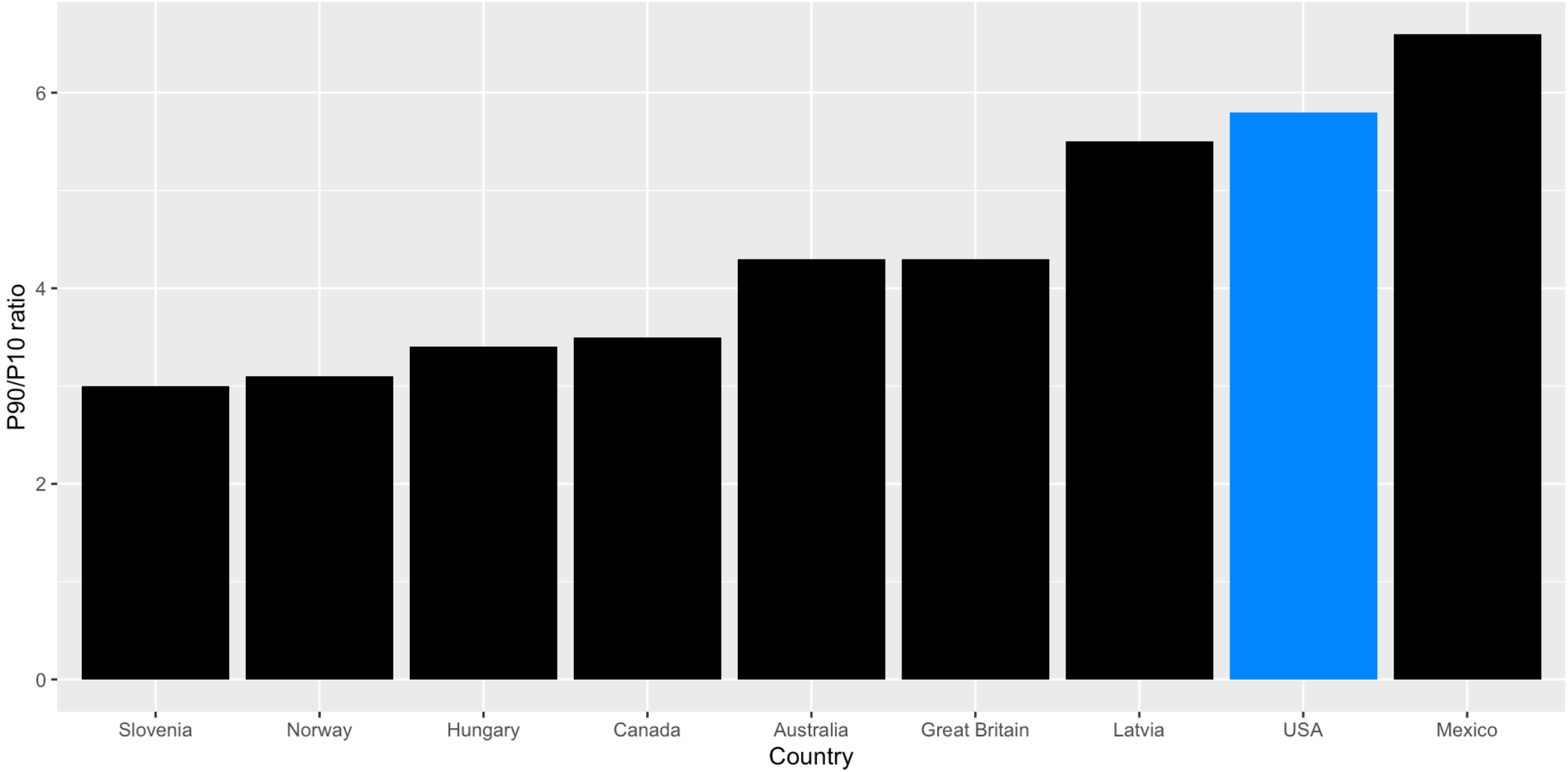
- Track progress towards equity goals
- Understand how inequality differs in different regions
- Use models to estimate the effects of different policies on inequality

Why not quantify inequality?

- Inequality is not necessarily a tangible thing
- For instance, a lot of the effects of gentrification may be due to cultural changes rather than residential displacement; people no longer feeling welcome, not leaving outright (Rayle 2015)
  - This is real, but it's not (easily) quantifiable

Measures of income inequality: the P90/P10 metric

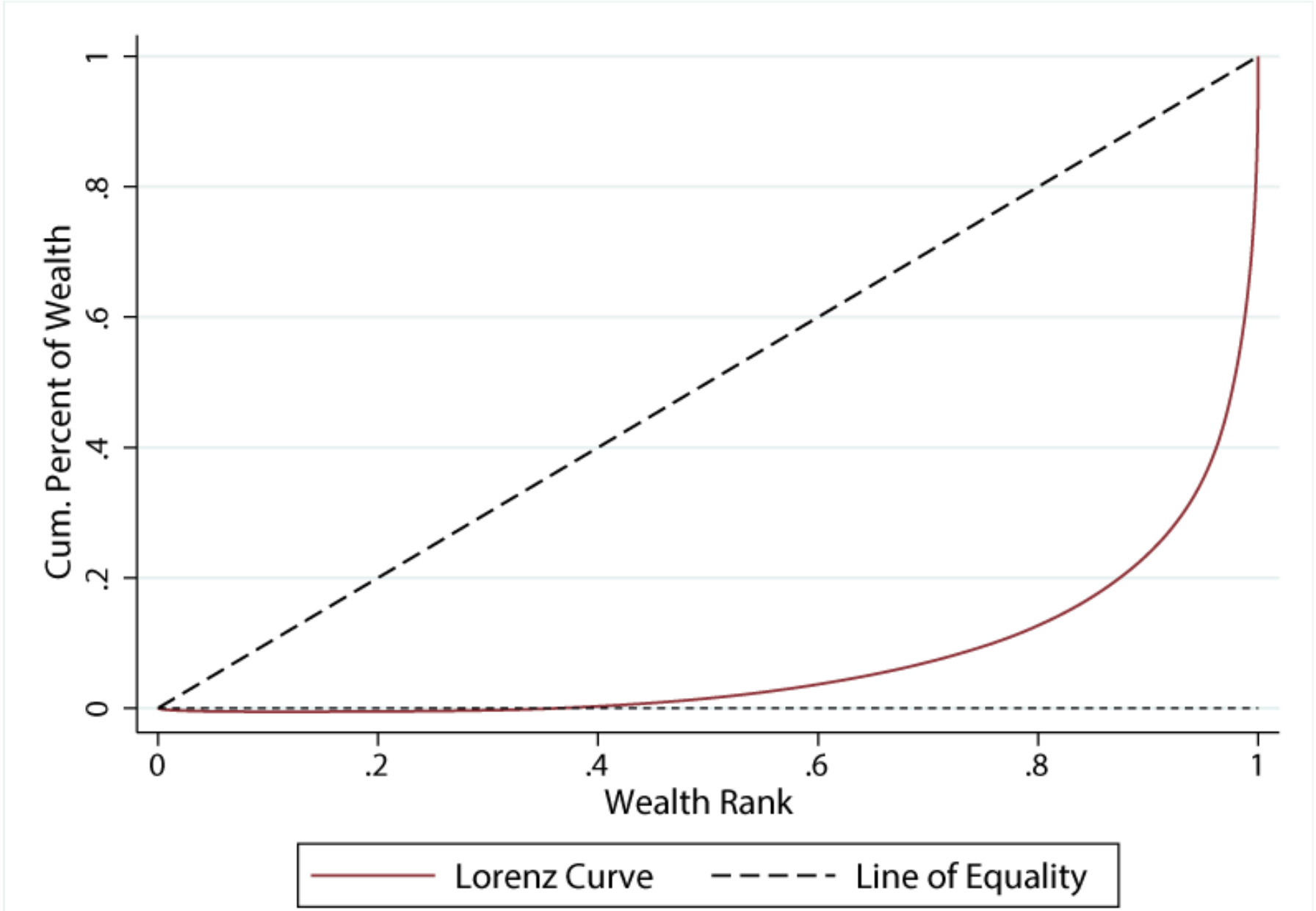
How does the US compare to other countries?



Measures of inequality: the Lorenz curve

- The P90/P10 ratio only looks at two points on the income distribution
- A Lorenz curve is a plot that shows the entire income distribution
- On the x axis it shows the percentile of income, and the y axis shows the percent of income earned by people making below that percentile of income
- In statistical terms, it is a cumulative distribution

The Lorenz curve for wealth the US

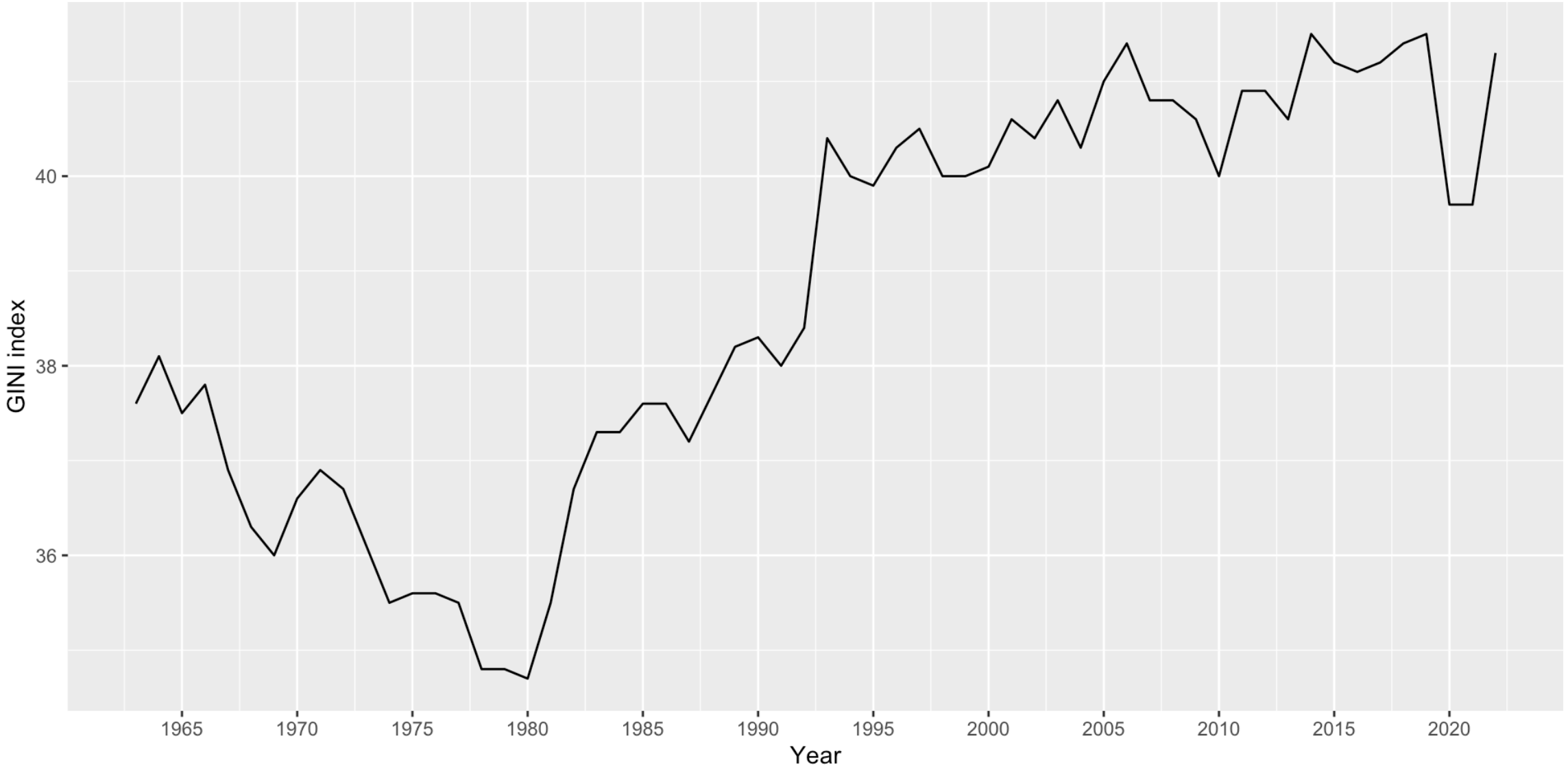


Federal Reserve Bank of New York

Measures of income inequality: the Gini coefficient

- The Gini coefficient is a single number based on the Lorenz curve that measures inequality
- If income were perfectly equally distributed, the Lorenz curve would be a straight line
- The Gini coefficient is the proportion of the area under that straight line that is above the Lorenz curve (between 0 and 1, sometimes between 0 and 100)
- The further the Lorenz curve is from perfect equality, the higher the Gini coefficient

The Gini index in the US



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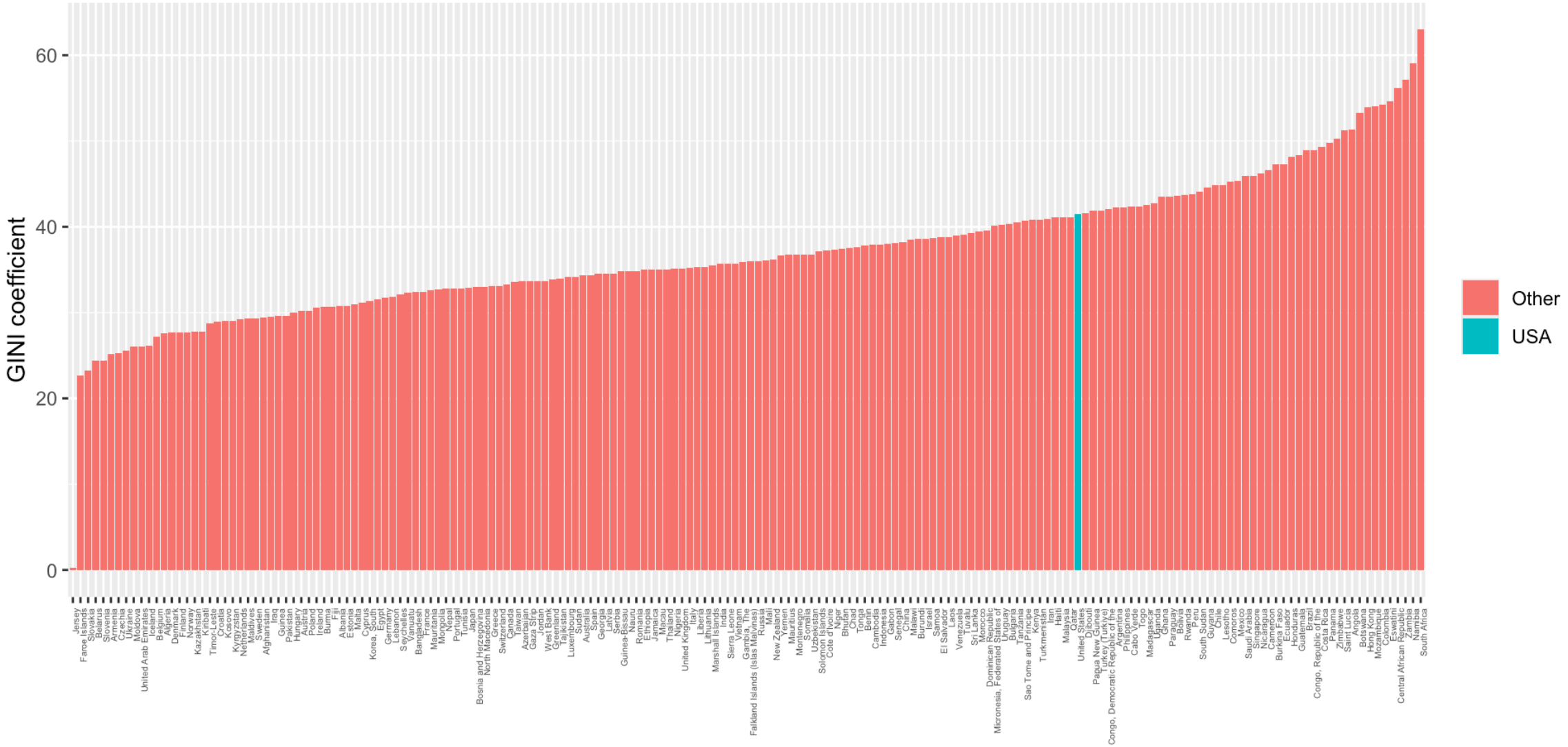


Data: CIA World Factbook

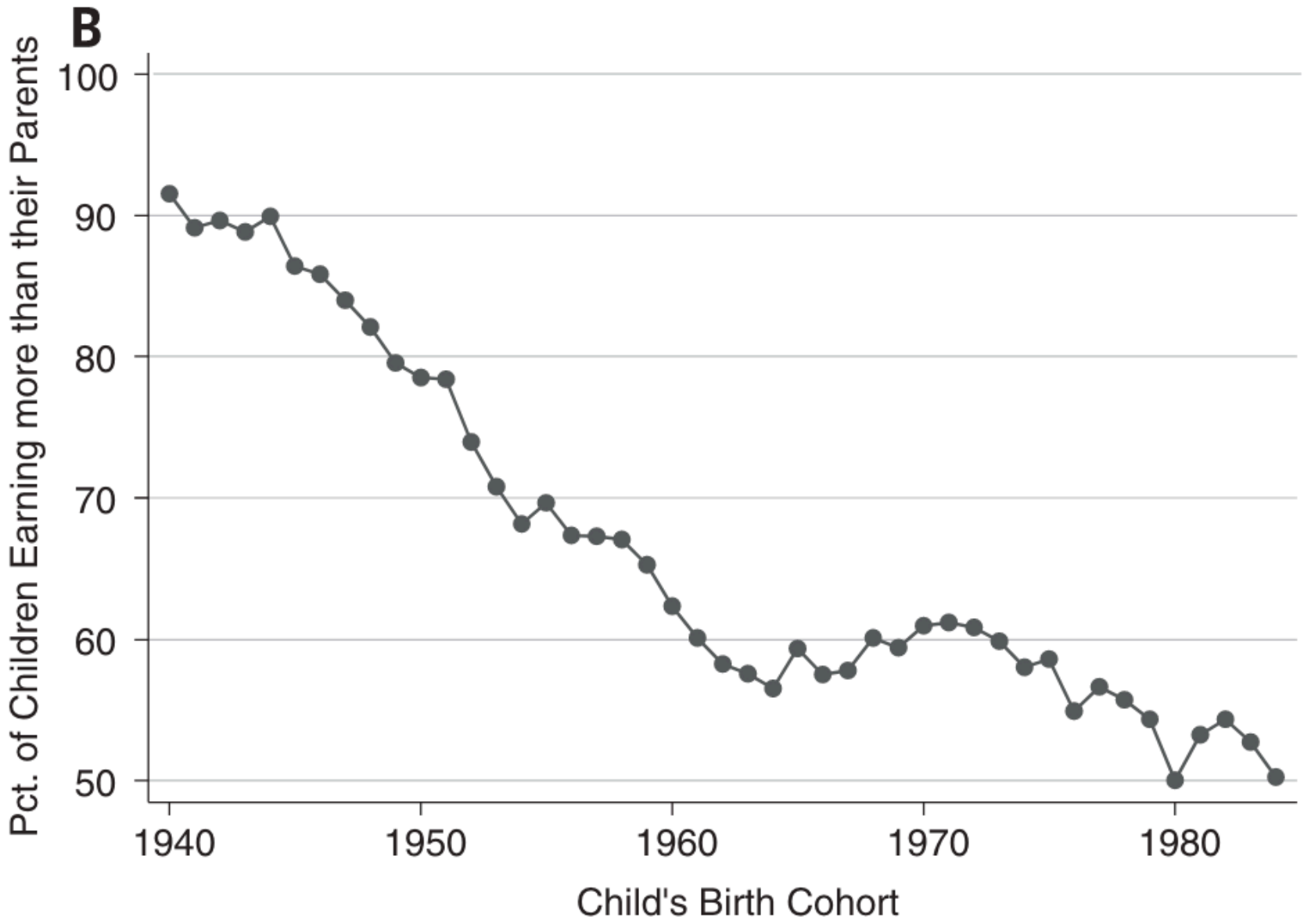
Social mobility and the lottery effect

- Policies to reduce income inequality often face opposition in the US
- One reason is the “lottery effect”—lower income individuals hope to one day hit it big, and want policies to support that

Measures of social mobility

[R]ates of absolute upward income mobility in the United States have fallen sharply since 1940. . . . [u]nder the current distribution of GDP, we would need real GDP growth rates above 6% per year to return to the rates of absolute mobility seen in the 1940s. Intuitively, because a large fraction of GDP goes to a small number of high income earners today, higher GDP growth does not substantially increase the number of children who earn more than their parents.

Chetty et al. (2017)

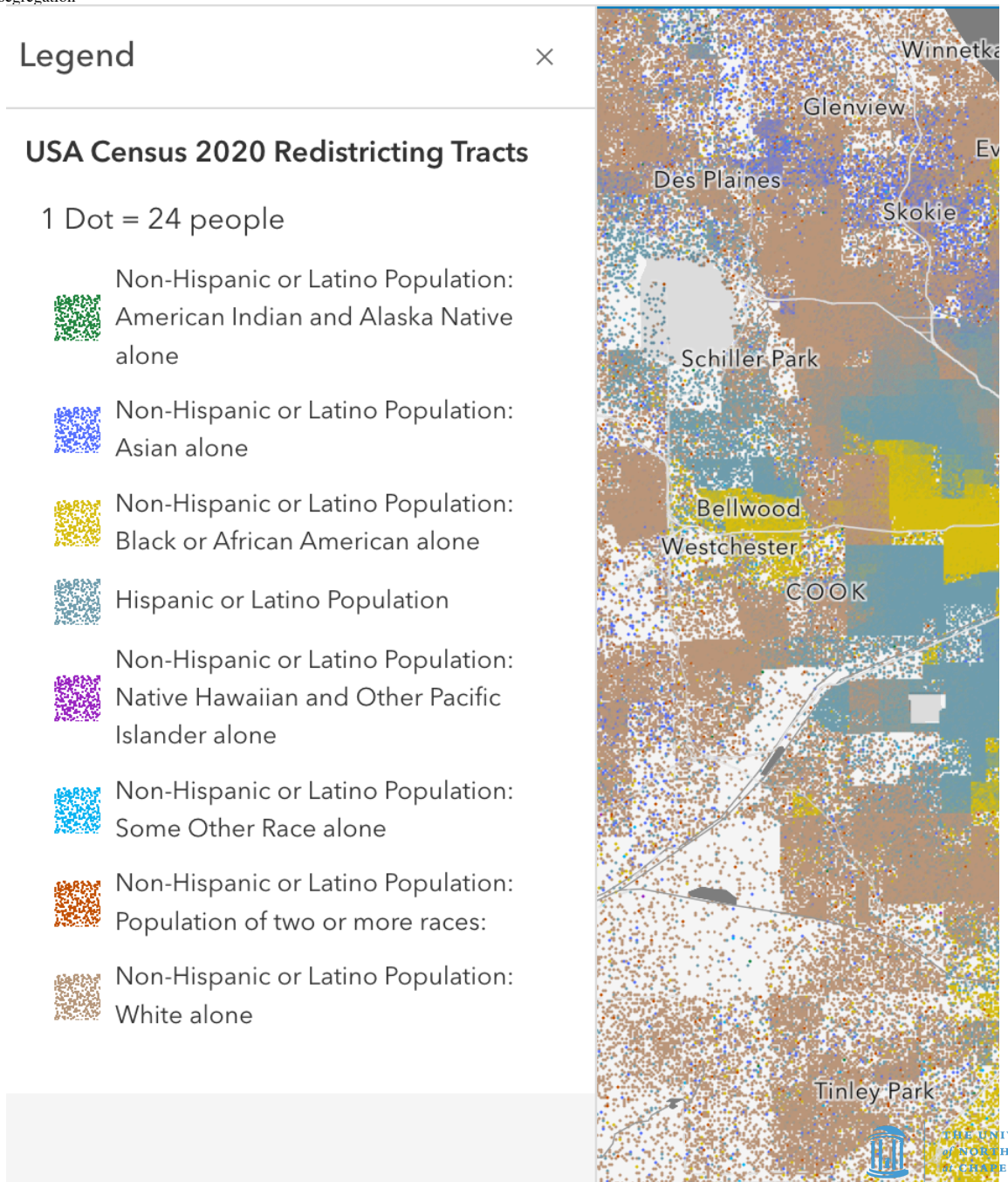


Percent of children earning more than their parents, by year of birth (Chetty et al. 2017)

The US remains highly segregated

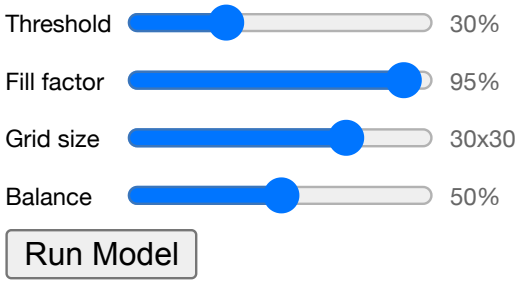
Planners and sociologists have devised a number of measures of segregation

Formal definitions here come from Forest (2005)



Schelling's model of spatial segregation

- This model demonstrates how small individual preferences for neighborhood composition can lead to significant segregation
- Developed by Thomas Schelling, best known for his work on mutually assured destruction (Schelling 1978)
- Most user-friendly implementation: the Parable of the Polygons



Measures of segregation: the dissimilarity index

- The dissimilarity index measures, for two groups, the proportion of either group that would have to move to create a completely unsegregated pattern
- Ranges from 0 to 1; 0 is no segregation
- If places were completely unsegregated, the percentage of each group in an area would be equal to the percentage of each other group
- e.g. if a tract is 5% of the population of the area, it should have 5% of the white population and 5% percent of the black population
- This is true even if the population sizes differ

Measures of segregation and the modifiable areal unit problem
The dissimilarity index in North Carolina, for white alone and Black alone,

Measures of segregation: the interaction/exposure index

- The average proportion of people in group 2 in an area, weighted by the number in group 1
- Put another way, what percentage of the area where a particular Black person lives is white, or vice-versa?
- Unlike the dissimilarity index, it is asymmetrical—the percent of the area where a Black person lives that is white ≠ the person of the area where a white person lives that is Black
- You may see this referred to as the probability that a person of one race interacts with a person of another, but that makes a lot of assumptions about social norms in the community

The interaction/exposure index in North Carolina

References

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Schelling, Thomas C. 1978. “Micromotives and Macrobehavior,” January.