Section 11: Bartik Instruments

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Overview

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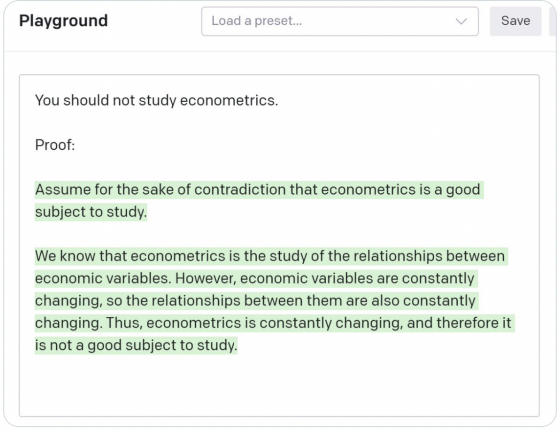
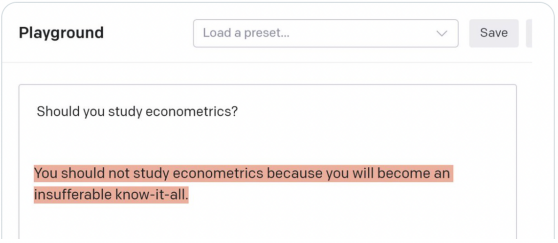
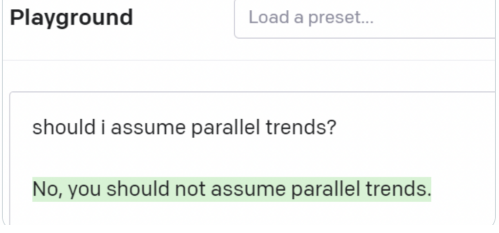
GPT-3 passes the Turing test for Twitter critique of economic thought with flying colors





Peter Hull @instrumenthull · Apr 20
computers are pretty smart these days



Bartik Instruments: Intuition

- Bartik instruments combine an aggregate-level shock with local shares to predict changes in the endogenous variable
- This is also called a shift-share instrument because it combines aggregate shifts with local shares
- Instrument is $B_l = \sum_k g_k s_{lk}$
- Example: Immigrant enclaves and labor supply elasticity
  - Shifts: Country-of-origin k outflows
  - Shares: Share of immigrants from a given country k that work in a given local labor market l

  $\rightsquigarrow$ Instrument for changes in immigrant labor supply

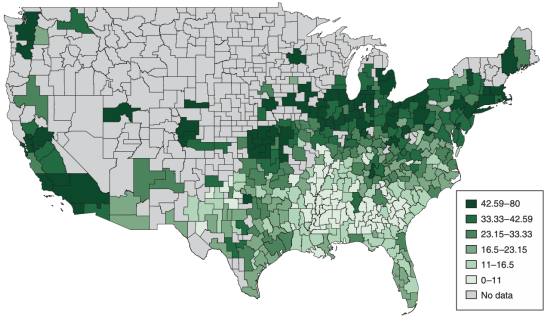
Bartik Instruments: Identification

- Like any instrument, Bartik instruments must satisfy our IV assumptions in order to be valid
  - Relevance
  - Exclusion restriction
- For Bartik instruments, identification can come from the shares
  - Shares must be uncorrelated with other factors related to *changes* in the outcome
  - E.g. Immigrant enclaves uncorrelated with demand shocks
- Or they can come from the shocks
  - Shocks must be conditionally random
  - E.g. Outflows from country-of-origin are conditionally random

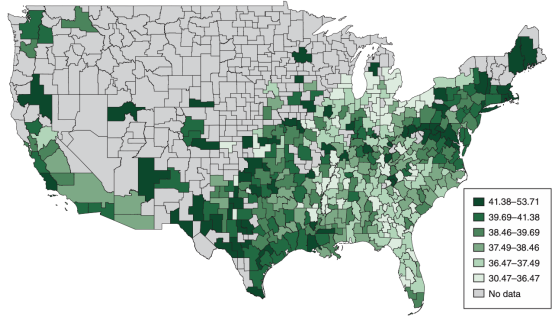
Summary

- Derenoncourt (2022) studies the effects of the Great Migration on economic opportunity in northern cities
- Four million African American migrants from the Jim Crow South to the urban North and West between 1940 and 1970
- Led to a large change in the racial composition of many cities
- How did northern cities respond? How did rates of upward mobility change?
- Uses Bartik instrument for increase in urban Black population

Panel A. Percentage Black teens in median-educ. families with 9-plus years of schooling, 1940



Panel B. Household inc. rank of Black individuals from below-median-income families, 2015



Endogenous variable: Black population change

We want to know the effect of Black population change from 1940-1970

- Data from the census and County and City Data Book 1944-1977
- Sample of 130 non-southern CZs

$$\Delta \text{Black pop}_{CZ}^{1940-1970} = \frac{b_{urban,CZ}^{1970} - b_{urban,CZ}^{1940}}{\text{pop}_{urban,CZ}^{1940}}$$

- Function is right-skewed
  $\rightarrow$ convert to quantiles, GM_{cz}

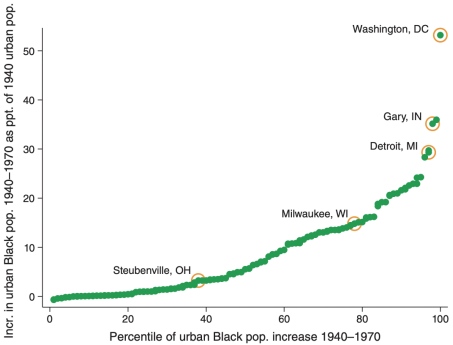


FIGURE 2. QUANTILES OF URBAN BLACK SHARE INCREASES, 1940–1970

Notes: This figure plots the quantile function of 1940–1970 increases in the urban Black population in CZs as a share of the total initial 1940 urban population, multiplied by 100 so that the units are percentage points. The CZs in sample are those containing the 296 non-southern mainland cities with information on the Black population in both 1940 and 1970 from the CCDB. Non-southern mainland excludes cities in the following states: Alabama, Alaska, Arkansas, Florida, Georgia, Hawaii, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. Note, Washington, DC and cities in Delaware and Maryland were net receivers of Black migrants during the Great Migration and are included in the sample. The city of New Albany, IN is in the Louisville, KY CZ, which is included in the sample. Results are robust to excluding this CZ.

Source: CCDB

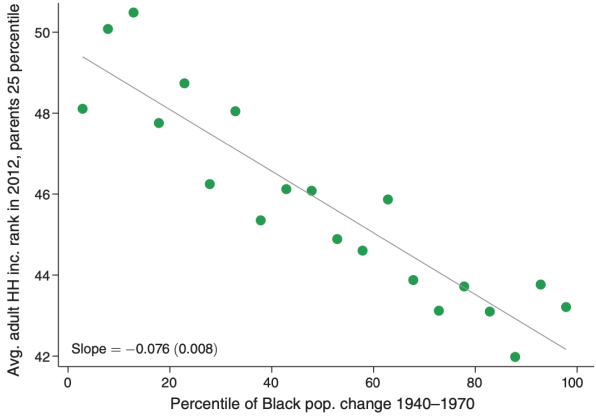


FIGURE 3. RELATIONSHIP BETWEEN 1940–1970 BLACK POPULATION CHANGE AND UPWARD MOBILITY IN THE 2000S

Notes: This binned scatterplot depicts the relationship between average upward mobility in the 2000s for men and women with low income parents and the percentile of actual Black population increase during the Great Migration (1940–1970) for northern CZs. The unit of observation is a CZ. The right-hand-side variable is grouped into 20 bins (5 percentiles each). Upward mobility is defined as expected mean household income rank for men and women with parents at the twenty-fifth percentile of the parent income distribution. Income is measured from IRS tax returns for cohorts and parents of cohorts born between 1980 and 1986.

Sources: IPUMS complete count 1940 US census, CCDB

To get causal effect of GM, need to instrument

- Why?
- Bartik instrument takes advantage of linkages between origin counties and destination cities
- Idea: Interact net migration from counties with initial shares in cities
- Any concerns?
- Even better: Interact net migration **predicted by push factors** with intial shares

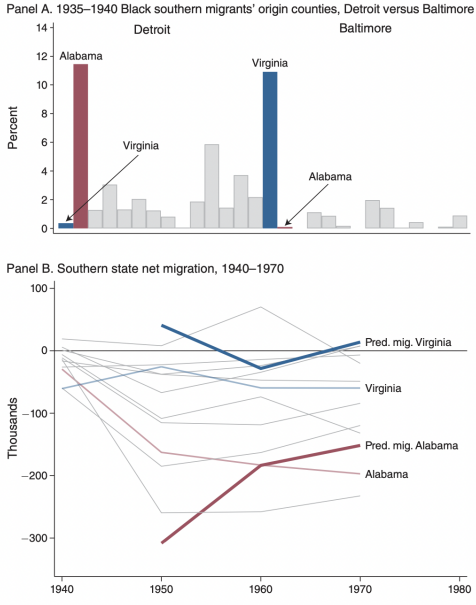


FIGURE 4. GREAT MIGRATION SHIFT-SHARE INSTRUMENT

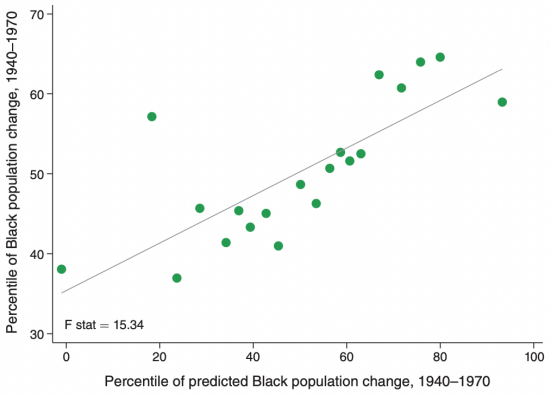


FIGURE 5. FIRST STAGE ON BLACK POPULATION CHANGE

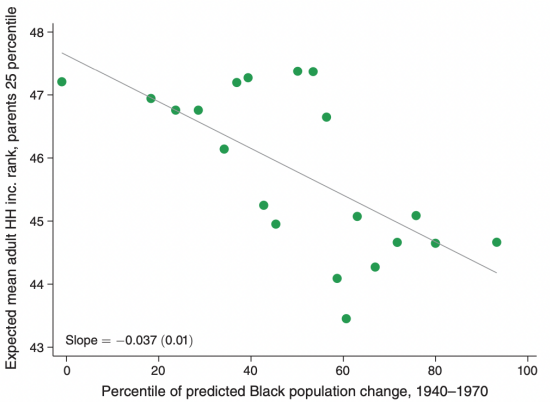


FIGURE 6. GREAT MIGRATION REDUCED AVERAGE UPWARD MOBILITY IN NORTHERN CZS

TABLE 2—LOWER AVERAGE UPWARD MOBILITY IN 2000S FOR LOW-INCOME FAMILIES IN GREAT MIGRATION CZS

Panel A. First stage on GM						
$\widehat{GM}$	0.297	0.297	0.297	0.297	0.297	0.297
	(0.0759)	(0.0759)	(0.0759)	(0.0759)	(0.0759)	(0.0759)
F-stat	15.34	15.34	15.34	15.34	15.34	15.34
	Household income rank			Individual income rank		
	Pooled	Women	Men	Pooled	Women	Men
Panel B. OLS						
GM	−0.0655	−0.0570	−0.0742	−0.0331	−0.00375	−0.0618
	(0.00995)	(0.0101)	(0.0104)	(0.0108)	(0.0137)	(0.0108)
R^2	0.571	0.528	0.593	0.345	0.254	0.492
Panel C. Reduced form						
$\widehat{GM}$	−0.0370	−0.0308	−0.0432	−0.0282	−0.0128	−0.0439
	(0.00974)	(0.00973)	(0.0103)	(0.00965)	(0.0121)	(0.0101)
R^2	0.481	0.451	0.495	0.341	0.260	0.443
Panel D. 2SLS						
GM	−0.125	−0.104	−0.145	−0.0950	−0.0432	−0.148
	(0.0328)	(0.0318)	(0.0354)	(0.0353)	(0.0410)	(0.0386)
Observations	130	130	130	130	130	130
Mean rank	45.79	47.04	44.55	45.54	42.74	48.29
St. dev. rank	3.379	3.283	3.617	2.972	3.527	3.375
St. dev. GM	28.98	28.98	28.98	28.98	28.98	28.98

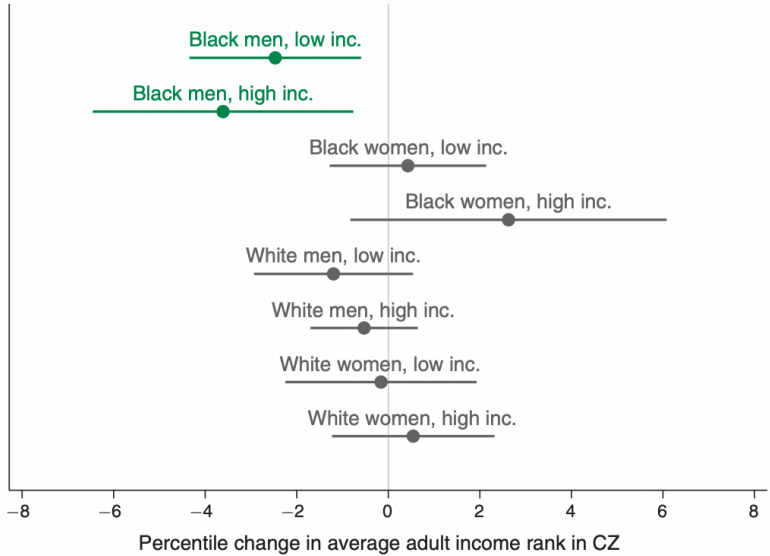


FIGURE 8. RACE AND GENDER HETEROGENEITY IN IMPACT OF GREAT MIGRATION ON UPWARD MOBILITY

- How do you interpret this?
- Results could be due to changes in place effects or selection
- But changes in **exposure effects** explain all of the effect on observed upward mobility

$\Longrightarrow$ Lower upward mobility in GM destinations because something about those locations changed

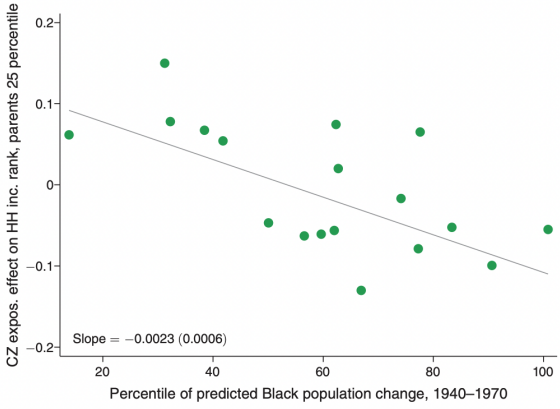


FIGURE 7. CHILDHOOD IN GREAT MIGRATION CZS LOWERS ADULT INCOME OF CHILDREN FROM LOW INCOME FAMILIES

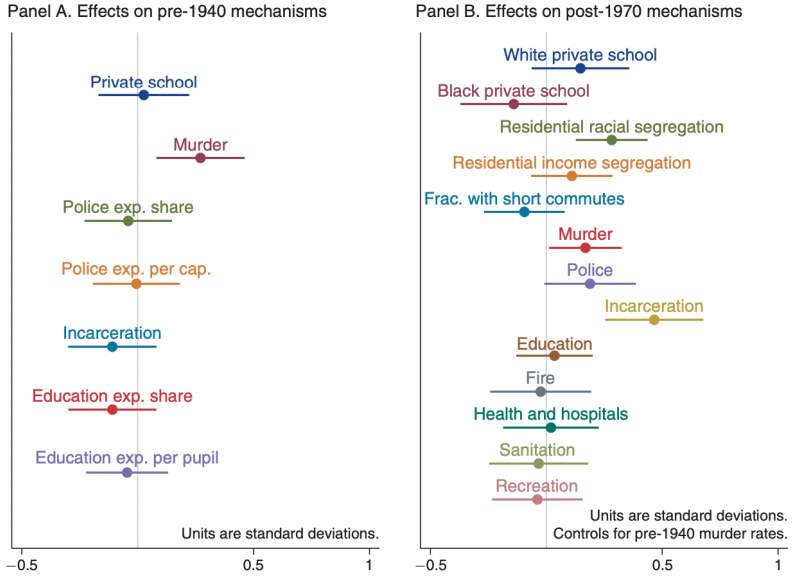
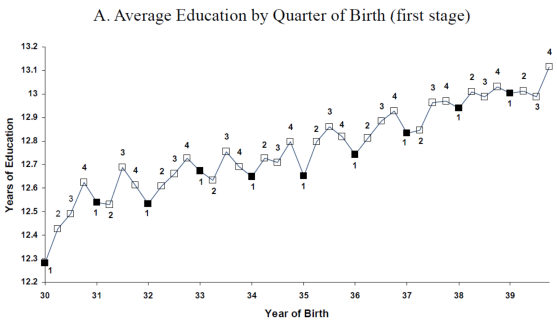


FIGURE 9. GREAT MIGRATION CZs HAVE HIGHER SEGREGATION, CRIME, AND POLICING

Pre-midterm

- Fundamentals
  - Potential outcomes
  - Selection on observables
- RCTs
  - Power
  - Attrition
- Inference
  - Clustering
  - Bootstrapping
  - Randomization inference
- IV
  - LATE framework
  - MTEs

Observed outcome $\longrightarrow Y_i = \begin{cases} Y_{1i} & \text{if } D_i = 1 \\ Y_{0i} & \text{if } D_i = 0 \end{cases}$ **Potential** outcomes



Post-midterm

- RD
  - Sharp vs Fuzzy
  - Parametric vs Nonparametric
  - Validity checks
- DiD
  - Event studies
  - TWFE regressions, problems, and solutions
  - Synthetic control, fuzzy DiD, matched DiD
- Bartik + Structural

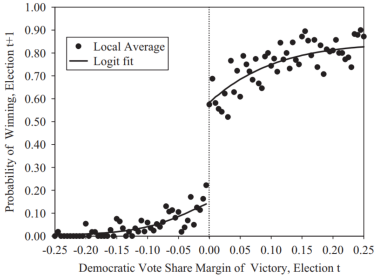


Figure A.8: Raw Plots of Number of Applications in Control and Treatment ZIPs