Real-Time Inequality

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November 2022

Motivation: Growth vs. Inequality Statistics Timeliness

National Accounts provide timely aggregate macro-economic data

- Estimates of US quarterly GDP are released a month after each quarter
- Estimates of US monthly personal income released a month after each month
- Early estimates are subsequently revised but drive the discussion

In contrast, inequality statistics are annual and lag behind

- Official US Poverty and inequality statistics for 2022 will be published in Sept 2023
- Income Tax Statistics for 2022 to measure top incomes published in Sept 2024

$\Rightarrow$ **Growth stats get a lot more attention than inequality in public debate**

Our goal: produce distributional national accounts in real-time

Goal: Produce real-time inequality data

There is a lot of real-time data relevant for inequality:

- Jobs and earnings data from employers' monthly and quarterly surveys.
- Unemployment, labor force, wage earnings from CPS monthly surveys.
- Components of GDP (e.g. capital vs. labor share)

Our goal: Mobilize all public data to build real-time inequality statistics

- To distribute all national income from national accounts across groups
- High frequency monthly/quarterly but "annualized" like national accounts
- Early estimates subsequently revised when more data available

Prototype: This paper is a first attempt to be further refined/improved

Contribution: Monthly microdata matching macro totals

This project: **prototype real-time monthly distributional national accounts:**

- **Output:** Monthly synthetic microdata which distributes all of national income and wealth (and their components) to individuals, matching macro totals
- Can be used to compute a wide range on inequality and growth statistics
- Following a recession, this can be used to compute "distributional output gaps:" which groups of the population are below their pre-crisis income level or trend
- Incorporate all taxes and government transfers $\rightarrow$ reveal how national income is distributed and redistributed month-to-month

Estimates available on `realtimeinequality.org` within a few hours of the publication of the national accounts:

Our Website realtimeinequality.org
Who Benefited from Growth Last Quarter?

Real income growth per adult in the last quarter (2022-Q3)

Growth rates, gains, and income levels are annualized.

Period: ○ Last Calendar Year ○ Last Quarter

Sort by: Group ↓ Growth (%) Gain ($) Income

Group	Growth (%)	Gain ($)	Avg. Income
Total	1.8%	$1.5k	$89k
Bottom 50%	1.5%	$290	$20k
Middle 40%	1%	$950	$92k
Top 10%	2.4%	$10k	$420k
Top 1%	3.9%	$68k	$1.8M
Top 0.1%	5%	$390k	$8.1M
Top 0.01%	5.7%	$2.0M	$37M

Related Literature: COVID has boosted the real-time inequality agenda

- **Atlanta Fed US Monthly Wage Tracker** based on Daly et al. (2011) uses longitudinal CPS to track wage changes by quartile, gender, education but excludes non-workers, only wages, and cannot capture top 5%
- **Fed Distributional Financial Accounts** based on Batty et al. (2019) interpolates SCF triennal wealth surveys using quarterly financial accounts.
- **US BEA** has explored feasibility of quarterly distribution of personal income (Fixler, Gindelsky, and Kornfeld 2021): conclude that just rescaling macro-aggregate doesn't work well in recessions.
- **Monthly US Poverty Rates** from Parolin et al. (2022) uses monthly CPS and SIPP to produce monthly poverty rates in real-time, focuses only on bottom
- **Outside US:** Many studies trying to follow COVID crisis in real time

Methodology and Validation

Methodological Overview

Starting point: annual tax-based Distributional National Accounts microdata of income and wealth by Piketty, Saez, Zucman (2018) continuously updated/improved:

- One-to-one statistical match with surveys (March CPS, SCF, ACS) to add demographics (gender, race, age)
- Monthly files using moving average of current and adjacent yearly microdata.
- Use 2019 (latest pre-Covid year) file as basis for 2020, 2021, 2022.

How we move to high frequency:

- **Capital income/wealth:** rescaling to macro aggregates. Works because aggregate volatility much bigger than concentration volatility.
- **Labor income:** distribution estimated monthly using the Quarterly Census of Employment and Wages and monthly CPS.

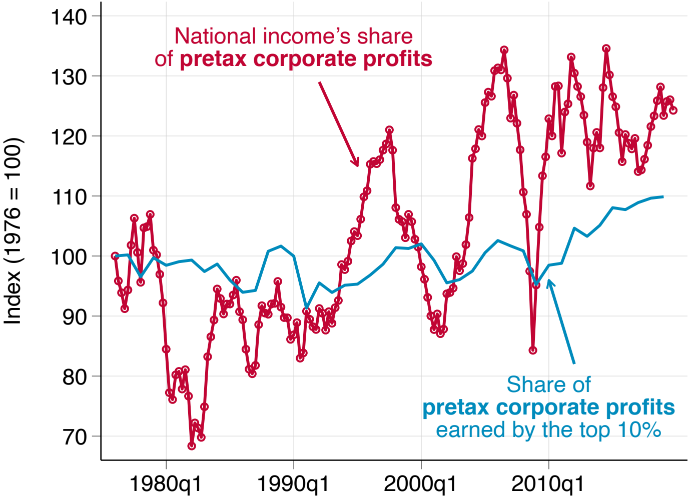
Statistical Matching Using Optimal Transport

Statistical matching between the public use tax micro data, the annual Current Population Survey (CPS), the American Community Survey (ACS), and the Survey of Consumer Finances (SCF) to add demographics

- **Optimal transport** to match observations "one-to-one" using common variables.
- Resulting micro dataset respects joint distribution of all variables from each dataset.
- Much better than one sided matching or matching without replacement.
- Much more computationally demanding but doable today.
- Obviously not as good as comprehensive admin socio-economic (confidential) data: cannot provide reliable joint variable distributions unless variables are jointly included in one of original database

Capital Incomes: We Simply Rescale to Macroeconomic Aggregates

This Works Because Aggregate Profits Are Volatile, Their Concentration is Not



“Annualized” Monthly and Quarterly Micro-Data

- Our monthly/quarterly data are directly comparable to **annual** data in both levels and distribution
- National Accounts also present monthly and quarterly data on an annualized basis
- True monthly/quarterly data have more inequality that gets smoothed out at annual frequency
- Our method bypasses this issue which is good for 2 reasons:
  - Limited longitudinal high frequency data
  - Our monthly, quarterly, and annual data are all directly comparable
- Our monthly statistics tell us how annual statistics would look like if monthly distributions stayed the same for 1 year

Data for Estimating High Frequency Wage Inequality

- **Quarterly Census of Employment:** QCEW is an exhaustive administrative dataset (nearly all wage earners covered).
  - Published quarterly with monthly data.
  - Data by (6-digit NAICS industry code) $\times$ (county) $\times$ (ownership sector).
  - $\approx$ 1,000,000 observations each month.
  - Can be used to infer complete wage distribution including top 1% (Lee, 2020).

- **Current Employment Statistics:** For most recent months, we use the less detailed but timely monthly CES

- **Monthly Current Population Survey:** Monthly CPS is an individual survey on labor force, unemployment, weekly wage earnings, captures well the bottom 95%

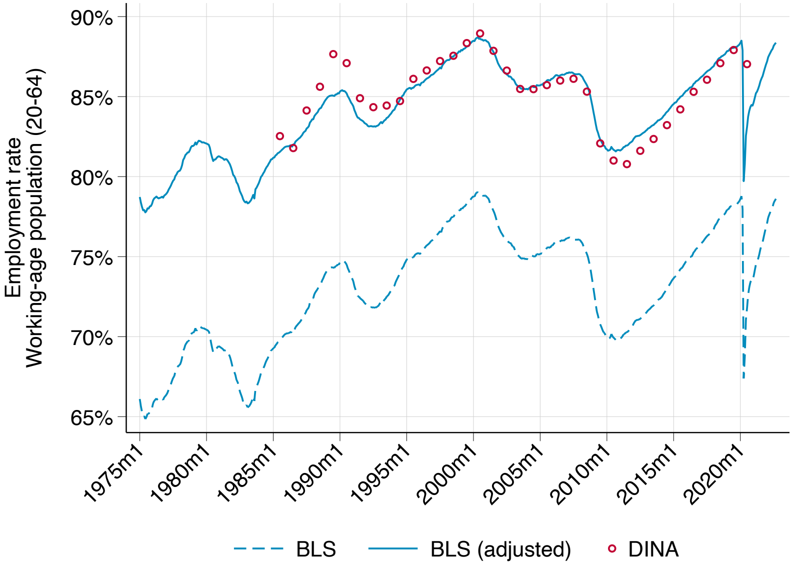
Adjusting Wage Earnings at Monthly Frequency

Extensive margin: Adjust employment rates by race$\times$education$\times$gender$\times$age cells using monthly CPS and convert into "annualized employment rates"

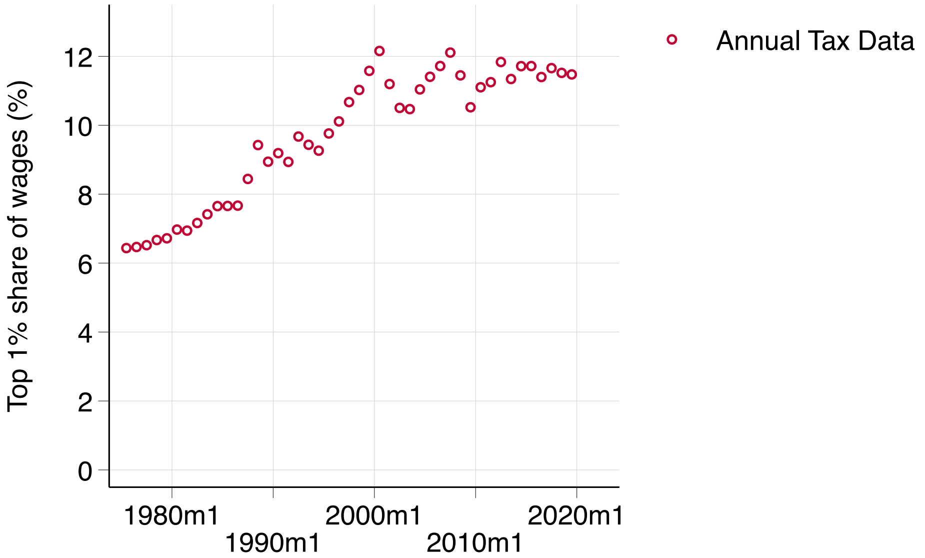
Intensive margin:

- Remove seasonality from monthly QCEW
- Adjust each QCEW wage percentile to match annual tax data wage percentile (using a time invariant linear regression for each percentile)
- For most recent months, use CES to predict QCEW (that lags 1-2 quarters)
- Use similar methodology with monthly CPS
- Take average of CPS and QCEW for each percentile below 95th and only QCEW for top 5 percentiles

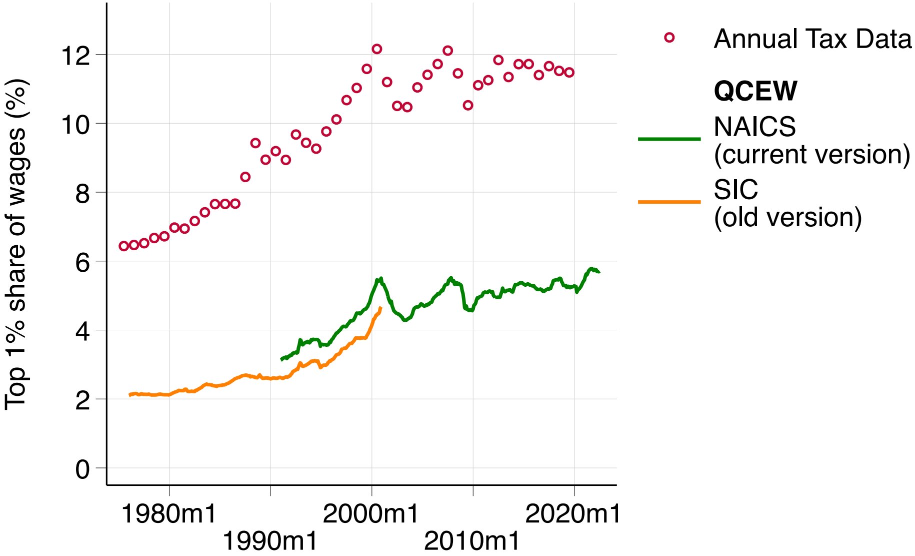
Adjusting Monthly Employment Rates to "Annualized" Employment Rates



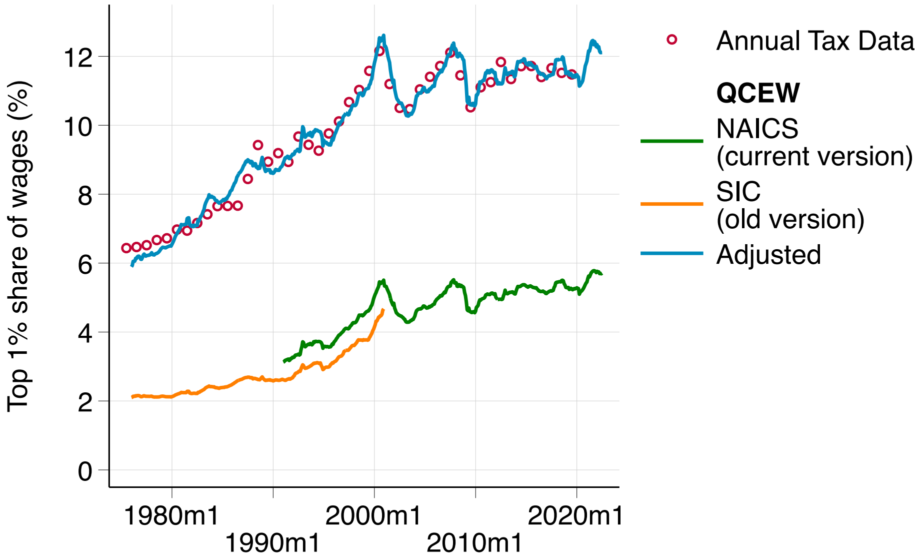
Rise of Top 1% Wage Income Share (among workers) in Tax Data



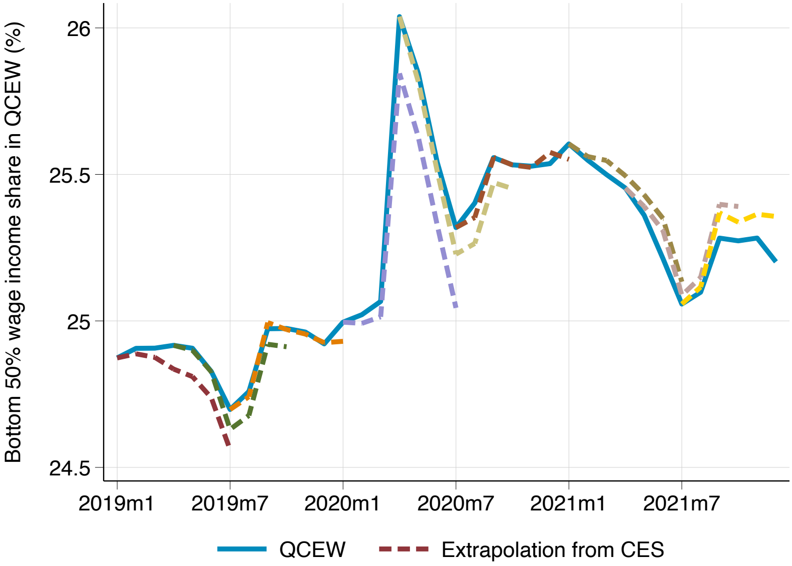
Top 1% Wage Income Share in QCEW parallels Tax Data series



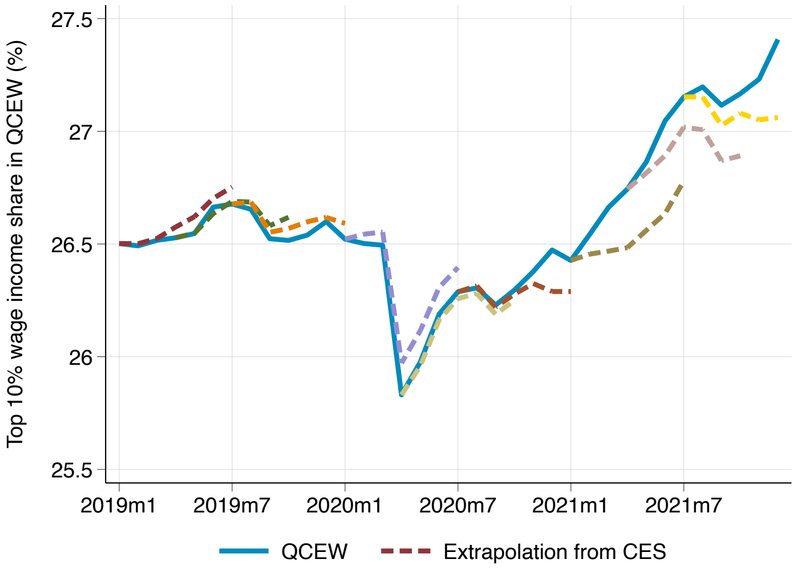
Linearly Adjusted QCEW Captures This Rise Remarkably Well



Timely CES predicts QCEW Results Well for Bottom 50%

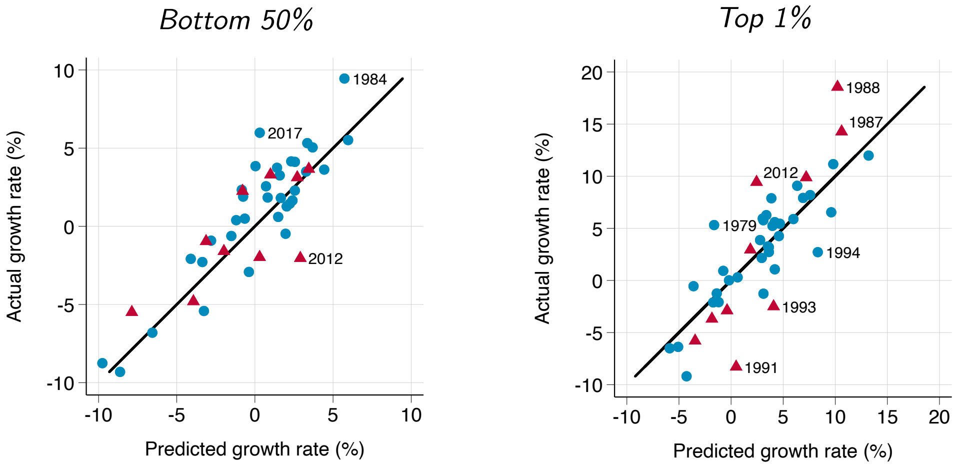


Timely CES predicts QCEW Results Decently for Top 10%



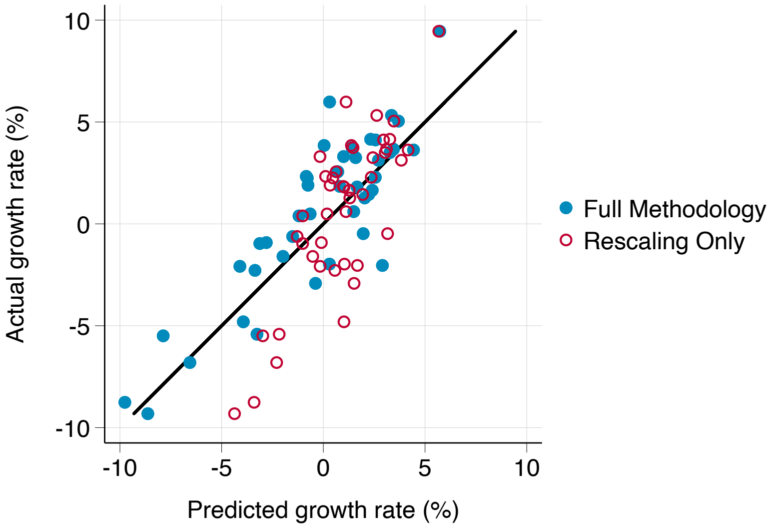
We Validate Our Methodology by Applying It Retrospectively

Our Methodology Successfully Predicts Annual Growth Rates



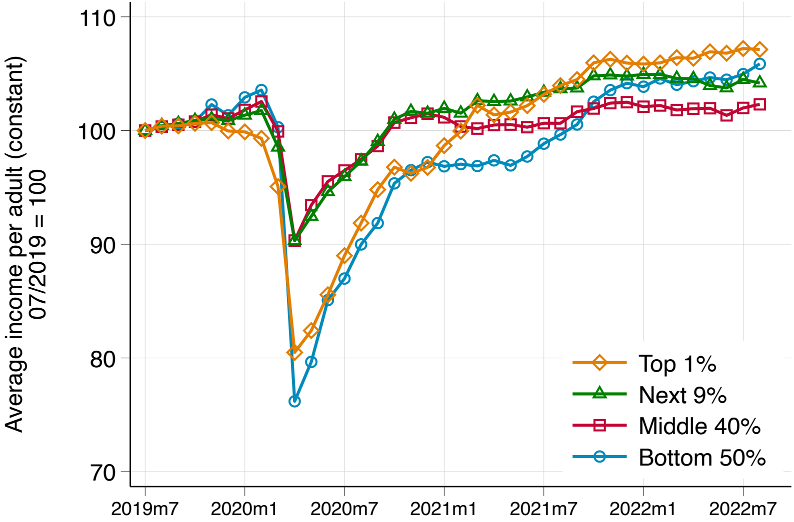
Shares

Just rescaling on macro-aggregates does not work nearly as well



The Distribution and Redistribution of National Income During Covid

COVID: All Groups Recover their Pre-tax Income Within 20 Months

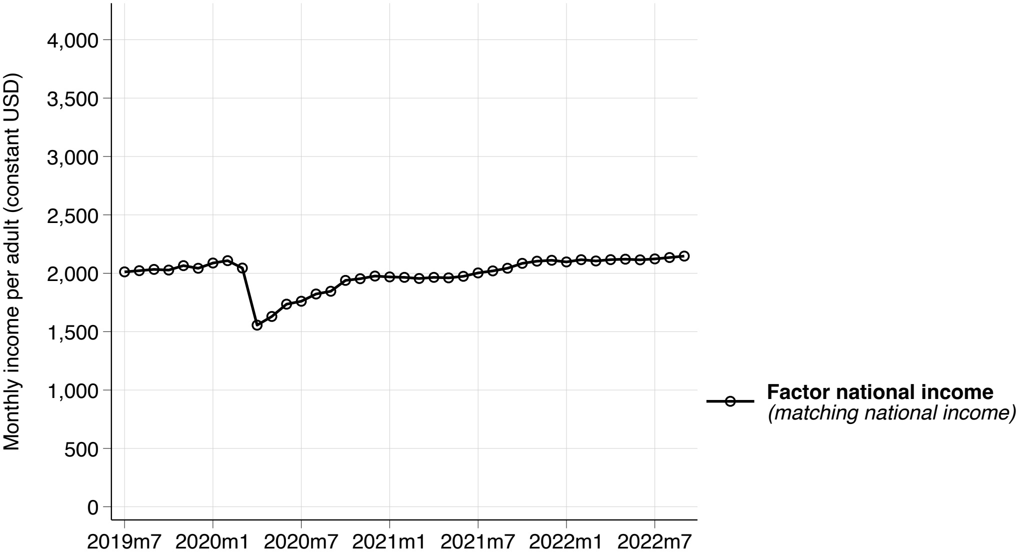


Role of Government Transfers: COVID-specific programs

Microdata makes is easy to model new government programs

- Paycheck Protection Program (PPP): loans to keep businesses afloat (70% went to owners, 30% to workers according to Autor et al. 2022)
- Extra Unemployment benefits:
  - Extended duration
  - Extra $600 per week from March 2020 to July 2020
  - Extra $300 per week from January to September 2021
- More generous Child Tax Credit and Earned Income Tax Credit in 2021 only
- Stimulus checks of $1200 in April 2020, $600 in January 2021, $1400 in March 2021 for bottom 90%

Bottom 50% Incomes (aged 20-64): The Role of Government Transfers



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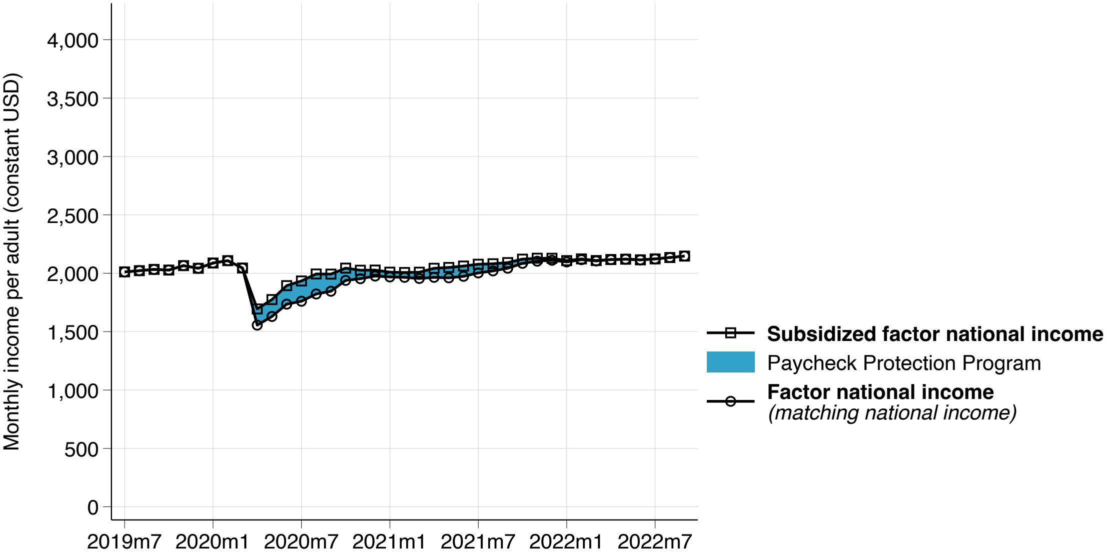

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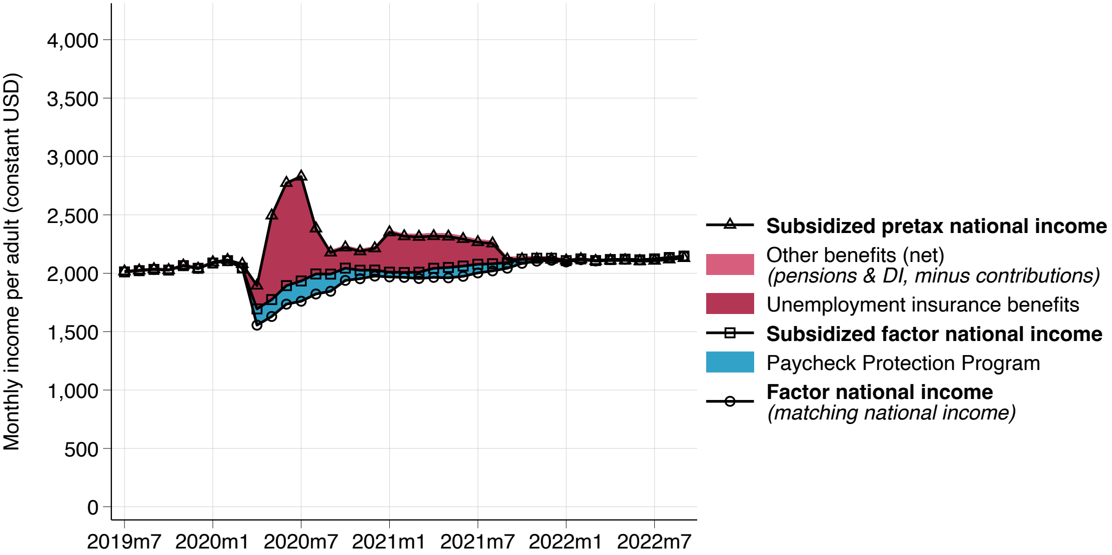

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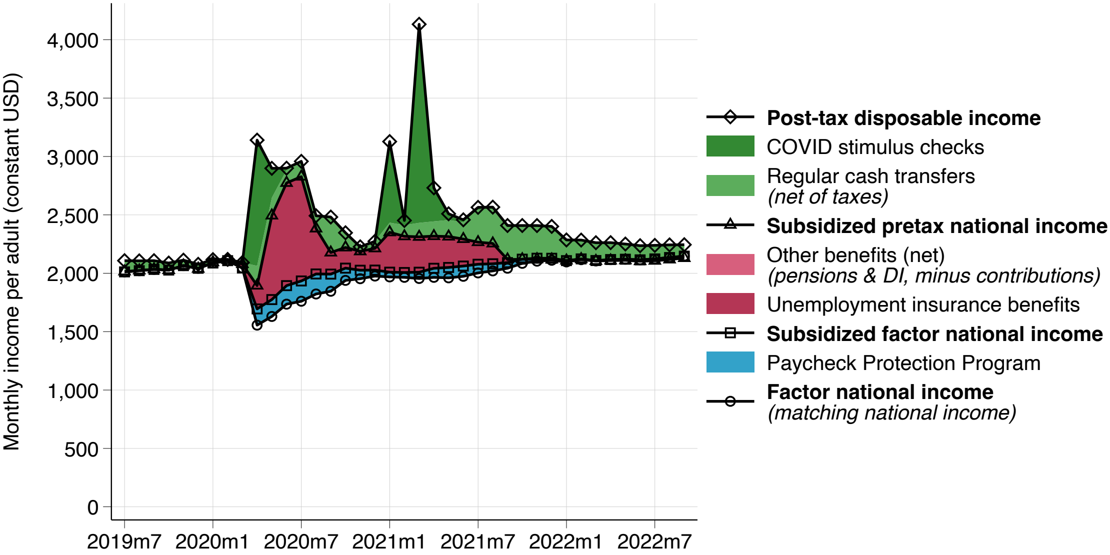
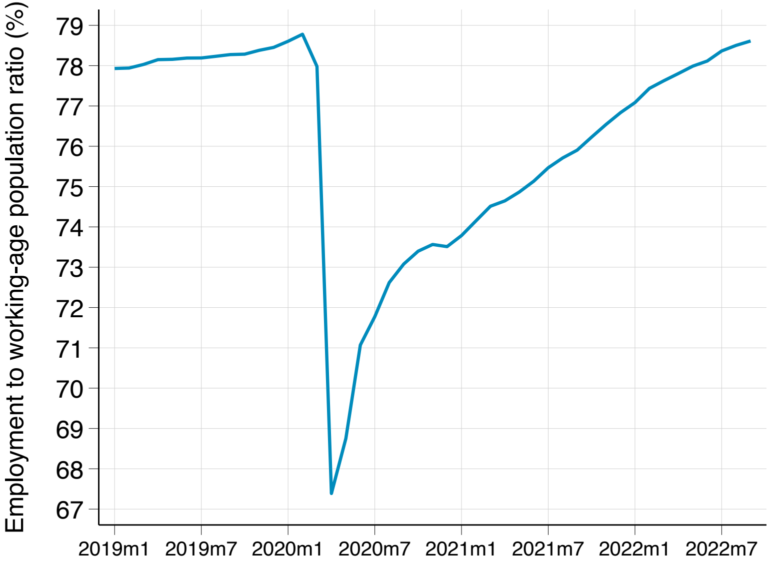
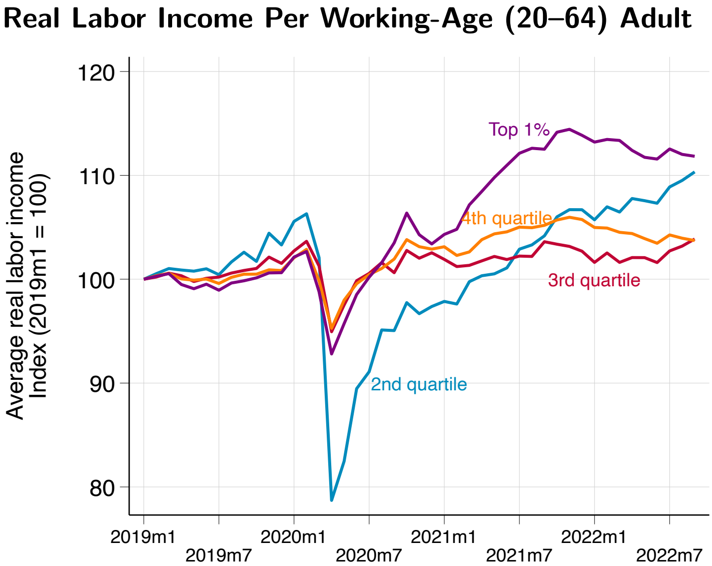


The Post-Covid Recovery: Is Real Labor Income Growing? For Whom?

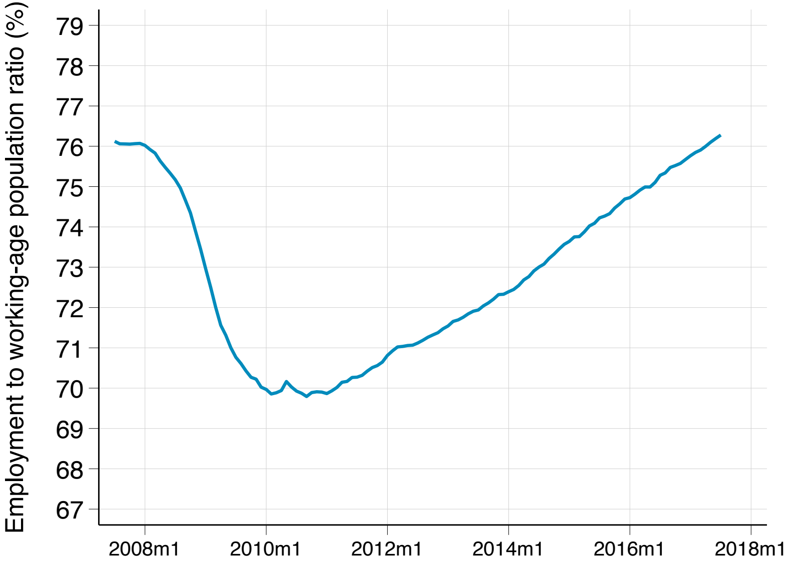
Employment Rate (age 20-64) Back to Pre-COVID Levels by mid-2022



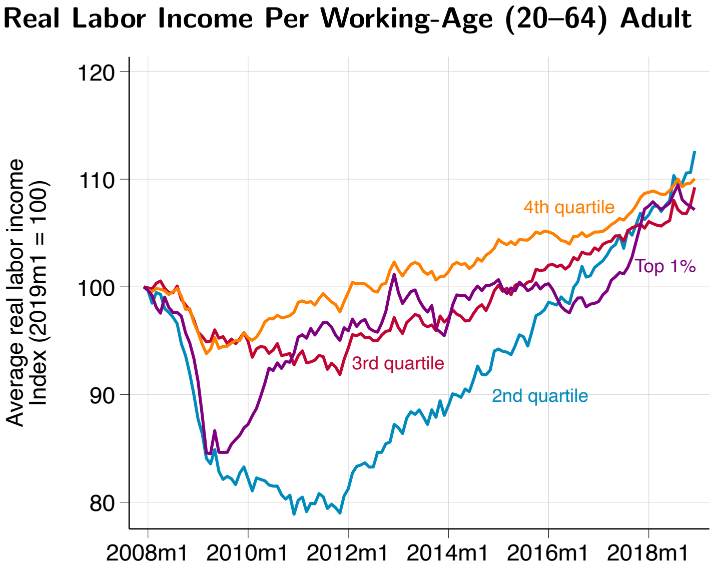
The Tight Labor Market Benefits Low-Wage Workers



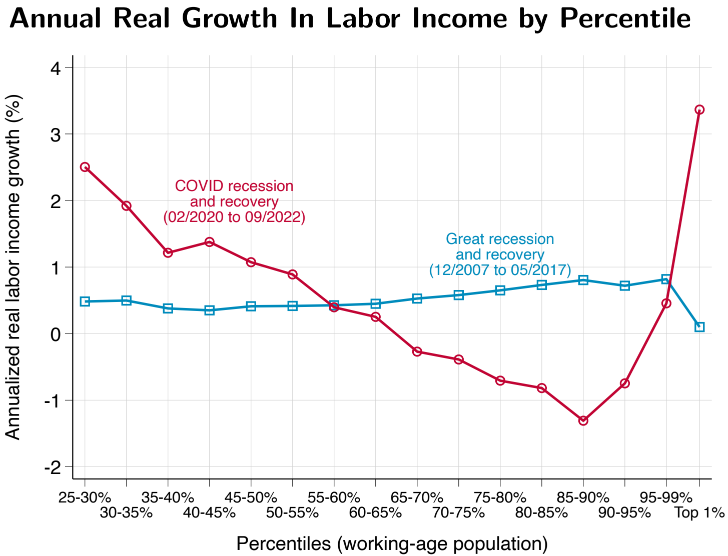
After the Great Recession, Employment Took 8 Years to Recover



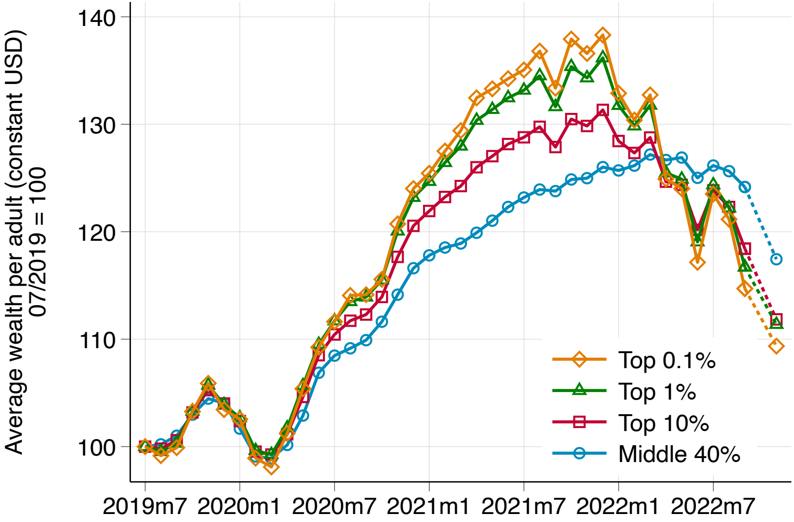
Low-Wage Workers Recovered Very Slowly from Great Recession



COVID vs. Great Recession Recovery

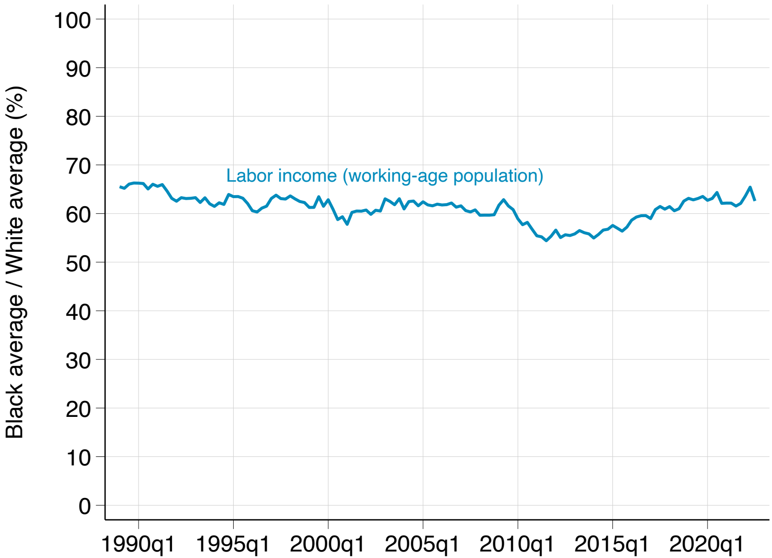


Real Wealth Growth per Adult During and After COVID



Crisis and Recovery by Race and Gender

A Comprehensive Estimate of Black/White Economic Disparities



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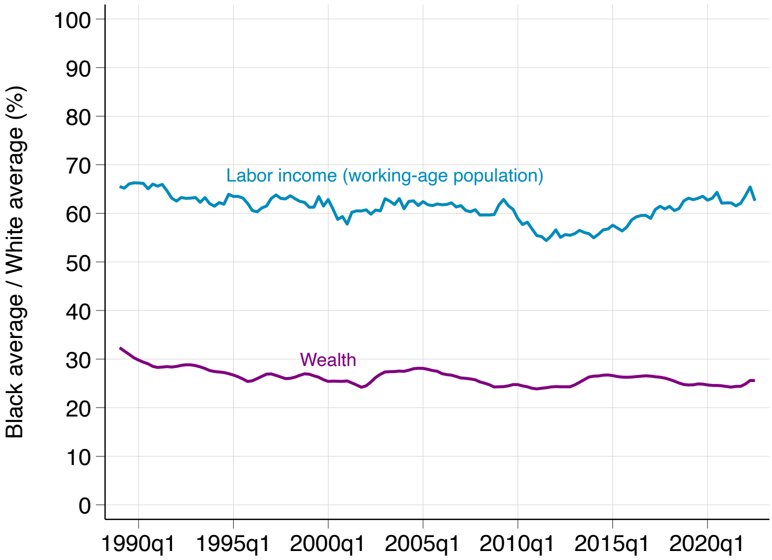

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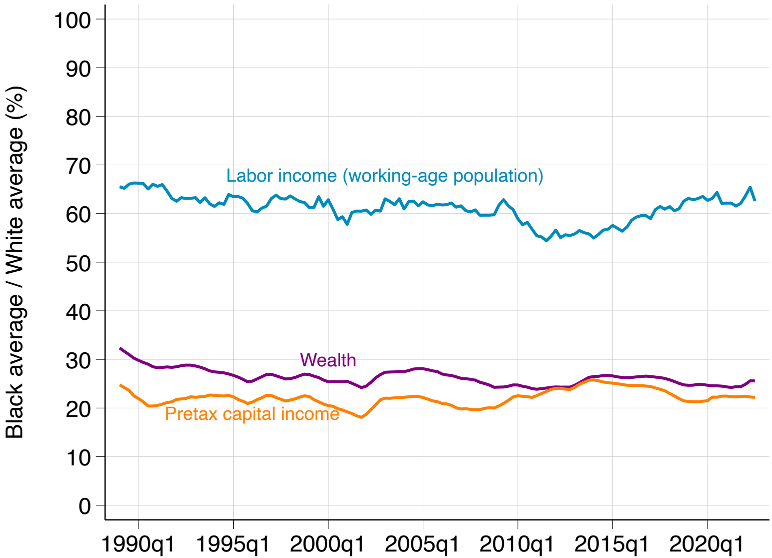

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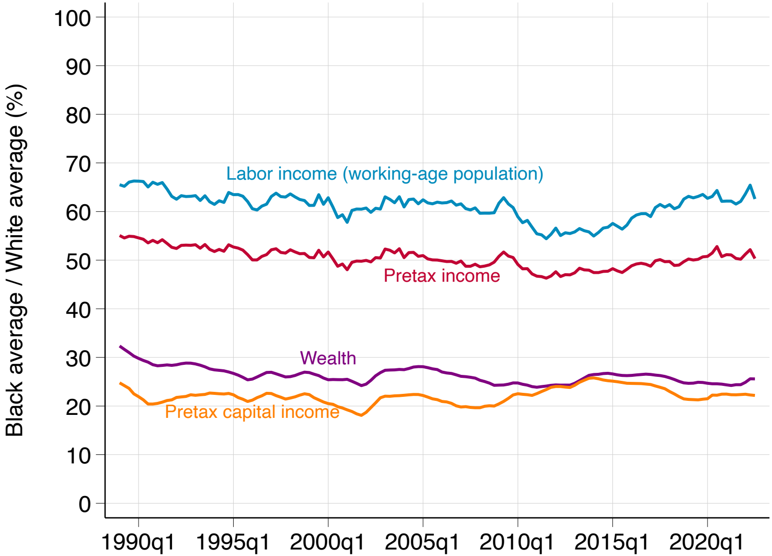
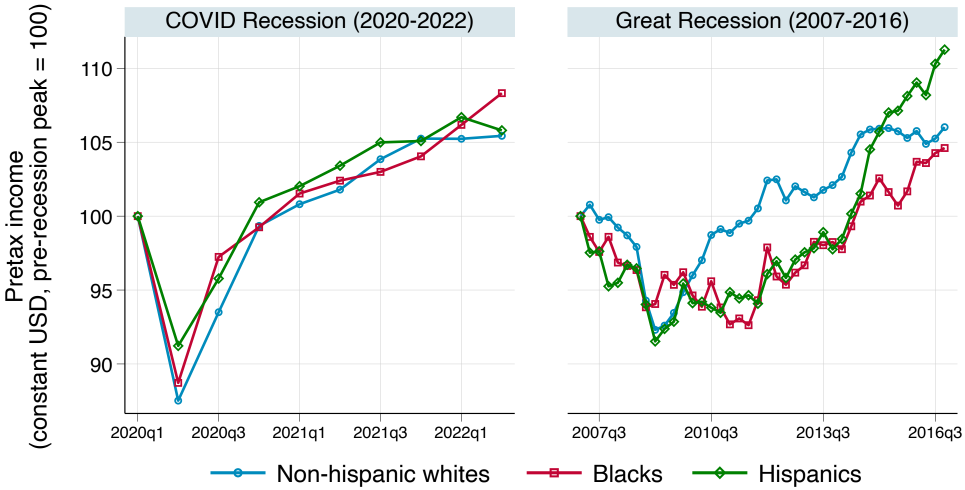
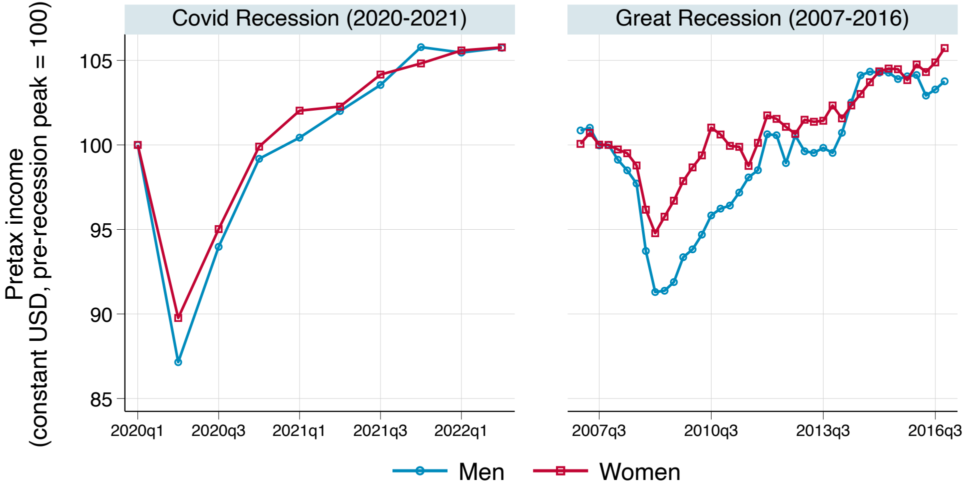


Recessions and Recovery by Race and Ethnicity



A Covid "Shecession"? Recessions and Recovery by Gender



Conclusion

- It's possible to track inequality in near real-time.
- Estimates based solely on public data.
- Prototype to be improved and run by government agencies down the road.
- Stark contrast between the recoveries from the last two recessions.

- `realtimeinequality.org`
- Updated daily for wealth, quarterly for income.