

Real-Time Inequalities and Policies during the Pandemic in the US*

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*The views expressed are our own and are not necessarily shared by Bank of Italy and Istat.

- 1 Introduction
- 2 Data
- 3 Consumption inequality
- 4 Identification and empirical model
- 5 Results
- 6 Conclusion

Outline

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Motivation

Three research questions:

- 1 Covid-19 and inequality
 - How has inequality evolved during the pandemic in the US?
- 2 Covid-19 and Fed's policies
 - What measures has the Fed taken in response to the pandemic crisis?
- 3 Fed's policies and inequality
 - How Fed's measures have affected the evolution of inequality during Covid-19?

Related literature

1 Covid-19 and inequality

- Cotton et al. (2021) and Bachas et al. (2020) use US credit card data, Aspachs et al. (2021) use Spanish bank record data, Gathergood et al. (2021) and Chronopoulos et al. (2020) with UK data

2 Covid-19 and Fed's policy

- Labonte (2021), Clarida et al. (2021), Ferrero and Giglioli (2020)

3 Monetary policy and inequality

- Montecino and Epstein (2015), Coibion et al. (2017) for US, Mumtaz and Theophilopoulou (2016) for UK, Lenza and Slacalek (2018) and Guerello (2017) for the Euro area, Corrado and Fantozzi (2021) with Italian data

This paper

We investigate whether the measures that the Fed has taken in response to the pandemic had an effect on inequality.

Main contributions:

- High-frequency (daily) data on consumption spending, aggregated by county
- We distinguish between:
 - ① *purely monetary policies* - announcements of conventional and unconventional monetary policy actions that include federal funds rate, Repo agreements and QE programs;
 - ② *quasi-fiscal policies* - announcements of liquidity and funding operations, subsidized lending facilities, other tools to provide more direct support to credit, such as under-remunerated reserve requirements and other banking initiatives.

Preview of results

- Inequality of consumption spending increases during the pandemic and after Fed's policies.
- Consumption spending and employment are more stimulated by Fed's policies for richer counties, less for poorer ones, and in an equal manner for the two quartiles in the middle. This is driven by quasi-fiscal policies rather than pure monetary ones in the short term and is mainly due to a wealth effect.

Outline

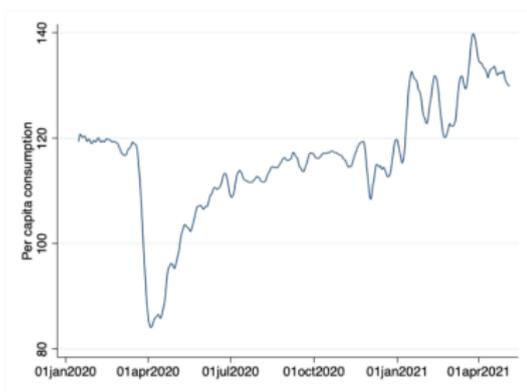
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Consumption spending and employment

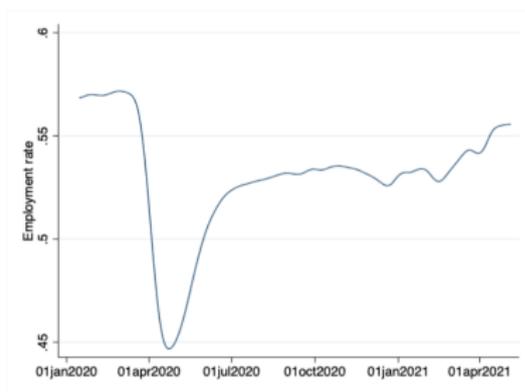
- Chetty et al. (2020) provide daily information on percent changes in consumption expenditure and employment by county in the US, measured using private sector data on credit and debit card spending and employment.
 - To transform *percent change* data into *level data* we combine them with annual 2019 data on per capita consumption and employment from the US Bureau of Economic Analysis (BEA).
 - To divide the counties in four quartiles based on per capita income, we use data on 2019 per capita income by county from the BEA.
 - Sample period: 20th January 2020 - 31st March 2021, daily data (310 observations for each variable, for a sample of 856 counties).

Consumption spending and employment

Consumption and employment trends



(a) Average per capita consumption spending



(b) Average employment rate

Source: elaborations on Chetty et al. (2020) and US Bureau of Economic Analysis

Note: average is intended to be across US counties

Fed's policies

- The daily frequency data we use to analyse Fed's policies are taken from the FRED database:
 - short term (3 month) and long term (10 year) Treasury bill rates;
 - stock market variables: NASDAQ 100 Index;
 - Fed press conferences with Covid-19 related policy announcements (data from the Fed's public website).

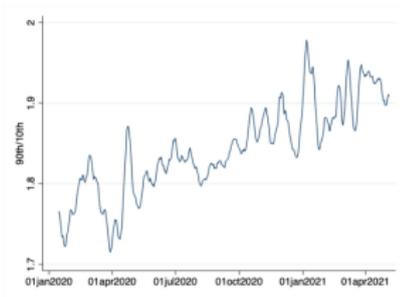
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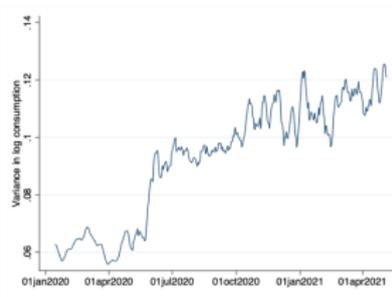
Consumption inequality indices

- We construct four indices of consumption inequality across counties at daily frequency, weighted for counties' per capita income:
 - the Covid-19 pandemic had a large and heterogeneous economic impact leading to a higher consumption spending inequality across US counties in 2020;
 - a peak is evident in March, which corresponds to the outbreak of the pandemic, and at the beginning of 2021.

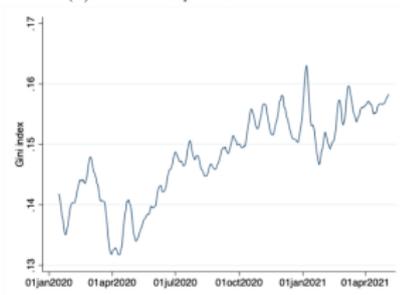
Consumption inequality indices



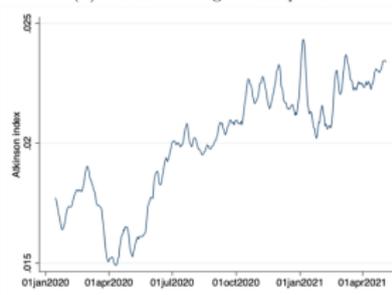
(a) 90th–10th percentile difference



(b) Variance of log consumption



(c) Gini index



(d) Atkinson index

Source: elaborations on Chetty et al. (2020) and US Bureau of Economic Analysis

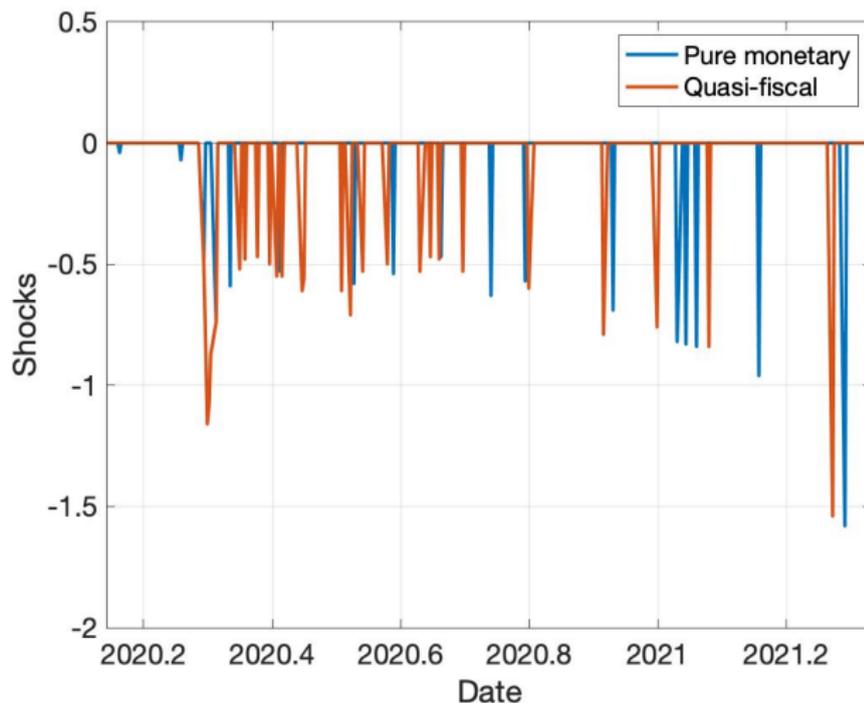
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Identification strategy

- High frequency data + narrative approach:
 - Spread between the LT and the ST interest rates on Treasury bills in the days of Covid-19 related Fed press conferences as a measure for the shock (42 events);
 - narrowing of the spread is an indicator of an unconventional expansionary monetary policy intervention.

Identification strategy: shock series



Source: elaborations on FRED data.

Note: percentage points on the y-axis.

VAR model (1)

We look at the response of the Gini index to the two shocks:

$$Y_t = B_0 + B_1 Y_{t-1} + B_2 Y_{t-2} + \dots + B_p Y_{t-p} + e_t \quad e_t \sim \mathcal{N}(0, \Sigma)$$

- ① One estimate for the total shock: Y_t contains average consumption, average employment rate, our narrative-HF total shock, the NASDAQ 100 index and the inequality index.
- ② One estimate distinguishing purely monetary and quasi-fiscal shocks: Y_t contains average consumption, average employment rate, our narrative-HF purely monetary shock, our narrative-HF quasi-fiscal shock, the NASDAQ 100 index and the inequality index.

Variables are in deviation from the 20-days moving average.

VAR model (2)

Different estimates for the four quartiles of the income distribution of counties:

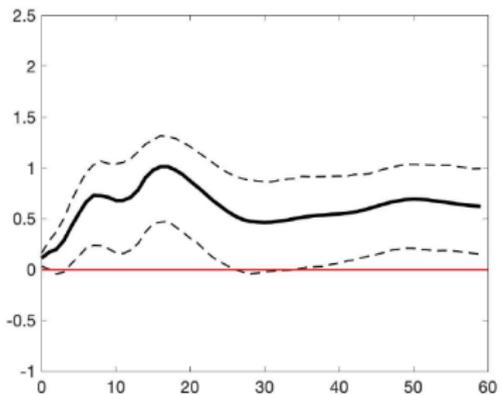
$$Y_t = B_0 + B_1 Y_{t-1} + B_2 Y_{t-2} + \dots + B_p Y_{t-p} + e_t \quad e_t \sim \mathcal{N}(0, \Sigma)$$

- 1 One estimate for the total shock: Y_t contains quartile-specific consumption, quartile-specific employment rate, our narrative-HF total shock and the NASDAQ 100 index.
- 2 One estimate distinguishing purely monetary and quasi-fiscal shocks: Y_t contains quartile-specific consumption, quartile-specific employment rate, our narrative-HF purely monetary shock, our narrative-HF quasi-fiscal shock and the NASDAQ 100 index.

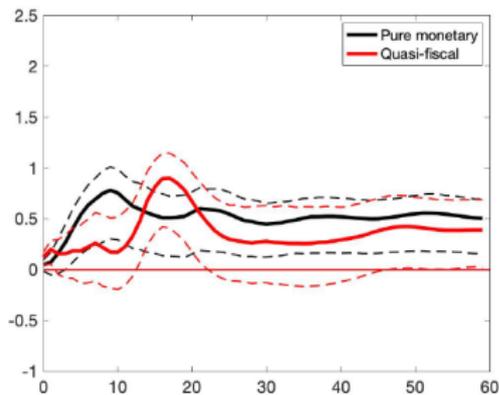
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IRFs of Gini coefficient



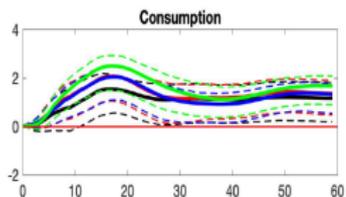
(a) Total shock



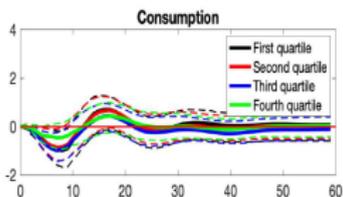
(b) Pure monetary and quasi-fiscal shocks

Note: confidence intervals at 68%. Responses are in percentage of the average value of the variable during the sample period.

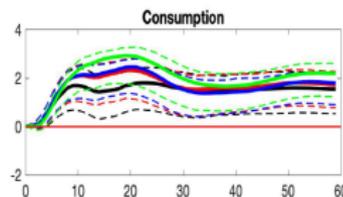
IRFs of consumption and employment by income quartile



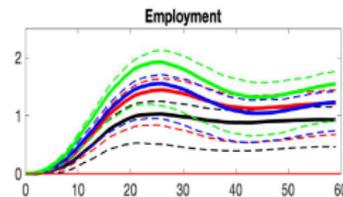
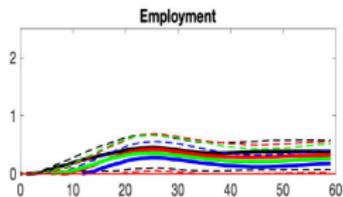
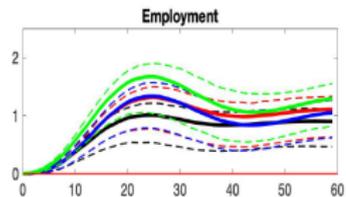
(a) Total shock



(b) Pure monetary shock

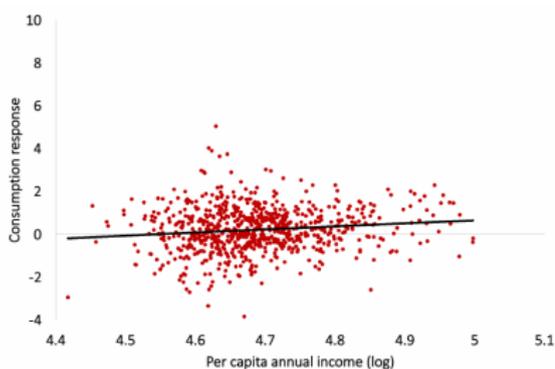


(c) Quasi-fiscal shock

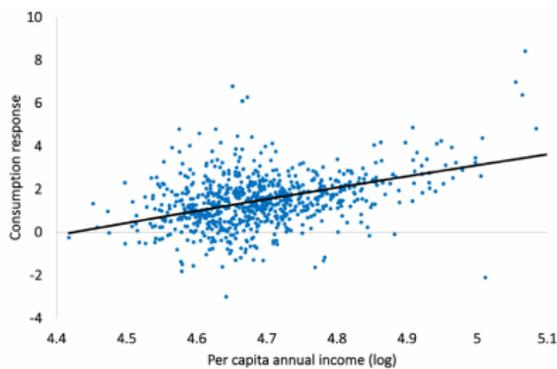


Note: confidence intervals at 68%. Responses are in percentage of the average value of the variable during the sample period.

Consumption response and income per capita



(a) Pure monetary policy shock



(b) Quasi-fiscal shock

Note: each dot represents a county. Responses are taken at a 30-day horizon and are in percentage of the average value of the variable during the sample period.

Economic mechanism

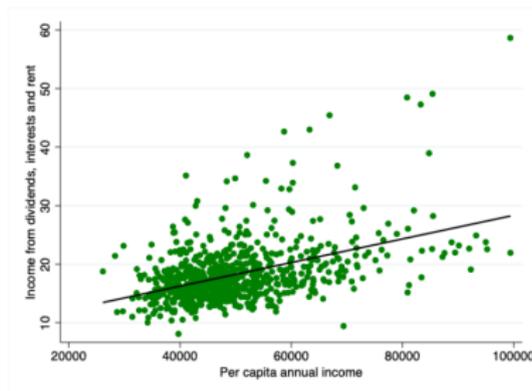
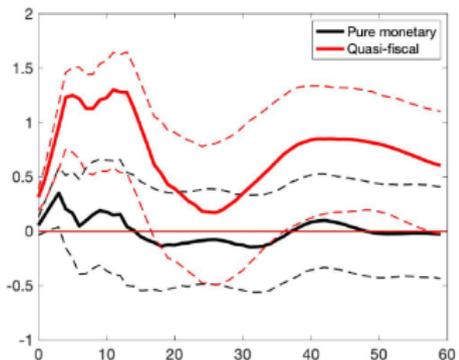
	(1) PM	(2) QF	(3) PM	(4) QF	(5) PM	(6) QF
Income from assets	-0.00205 (-0.05)	0.136*** (3.31)	0.0275 (0.74)	0.106* (2.13)	-0.154 (-1.17)	0.0274 (0.41)
PPPLF loans	0.0146** (3.25)	0.0177*** (3.89)	0.00960* (2.45)	0.0189*** (3.78)	0.0189 (1.44)	-0.0125 (-1.93)
Leisure&hospitality	0.0184 (1.75)	-0.0273** (-2.67)	0.0148 (1.18)	-0.0135 (-1.01)	0.0376 (1.82)	-0.0211 (-1.43)
Debt-to-inc. ratio	-0.0413 (-1.43)	-0.00324 (-0.16)	-0.0329 (-1.66)	-0.0114 (-0.45)	-0.0474 (-0.72)	0.0111 (0.41)
Covid-19 cases	0.0242 (0.92)	-0.0337 (-1.38)	0.0369 (1.22)	-0.0229 (-0.72)	-0.00673 (-0.13)	-0.0394 (-1.12)
Median age	0.335* (2.18)	-0.104 (-1.48)	0.159 (1.83)	-0.141 (-1.54)	0.473 (1.71)	-0.131 (-1.30)
Observations	714	714	426	426	288	288
Counties	All	All	Rich	Rich	Poor	Poor

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

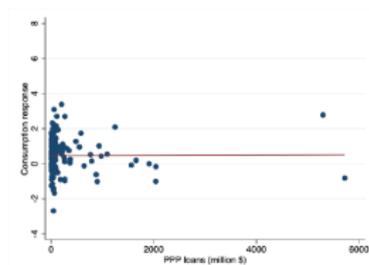
Economic mechanism: wealth effect

Fed's policies make asset prices increase: held by richer counties.

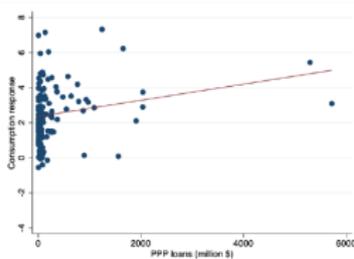


Economic mechanism: employment and budget constraint

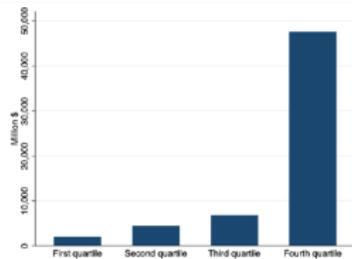
Paycheck Protection Program Liquidity Facility (PPPLF):



(a) Pure monetary policy shock



(b) Quasi-fiscal shock



(c) Loan amounts

PPP sustains employment and avoid mass layoffs, thus boosting consumption spending. But it happens more in richer counties.

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Conclusion

- 1 Investigated the development of consumption inequality in the US during Covid-19 pandemic, and the effect of Fed's policies on such inequality;
- 2 use of recently released high-frequency (daily) data from credit card transactions to compute inequality measures at a daily frequency;
- 3 HF + narrative approach to evaluate the impact of monetary and quasi-fiscal policies.

Conclusion

We find that:

- consumption spending inequality increased during the pandemic and following both MP and QF shocks;
- Fed's policies did not favour redistribution in the tails (but helped the lower-middle income counties);
- counties in the top quartile increased their consumption spending through wealth effect and increased labor income.

Robustness checks

- Information shocks
- Other shock measures
- Other inequality measures
- Control for fiscal policies
- Invert the order of C and E in VAR
- Move the shocks as first variables in VAR
- Set p as to cover one month of observations and equal to the average of AIC and BIC criteria
- Y_t containing Gini in consumption, Gini in employment, shock, stock market variable
- Remove counties with no mandatory lockdown measures