

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

Luisa Corrado¹ Daniela Fantozzi²
Simona Giglioli^{1 3}

¹University of Rome Tor Vergata

²Italian National Institute of Statistics (ISTAT)

³Bank of Italy

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

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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?

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

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.

- Inequality of consumption spending increases during the pandemic period and after Fed's policies.
- Consumption spending and employment are more stimulated by Fed's policies for richer counties, less for poorer ones. This is more evident with quasi-fiscal policies than with pure monetary ones in the short term.

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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).
 - Sample period: 20th January 2020 - 31st March 2021, daily data (310 observations for each variable, for a sample of 856 counties).
 - 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.

Consumption and employment trends

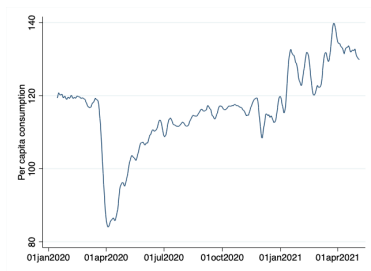


Figure 1: Average per capita consumption spending

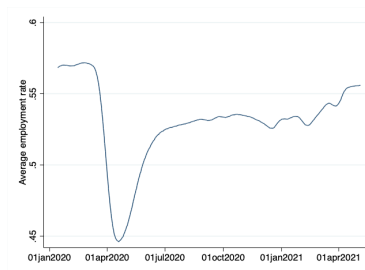


Figure 2: Average employment rate

Source: elaborations on Chetty et al. (2020) and US Bureau of Economic Analysis
Note: average is intended to be across US counties

Interest rates and 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:
 - the Covid-19 pandemic had a large and heterogeneous economic impact leading to a higher consumption spending inequality across US counties;
 - a peak is evident in March, which corresponds to the outbreak of the pandemic, and at the beginning of 2021.

Consumption spending inequality

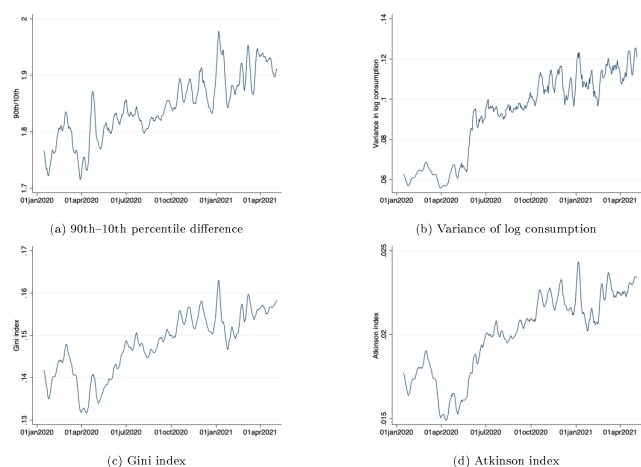


Figure 3: Inequality indices

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

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- 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

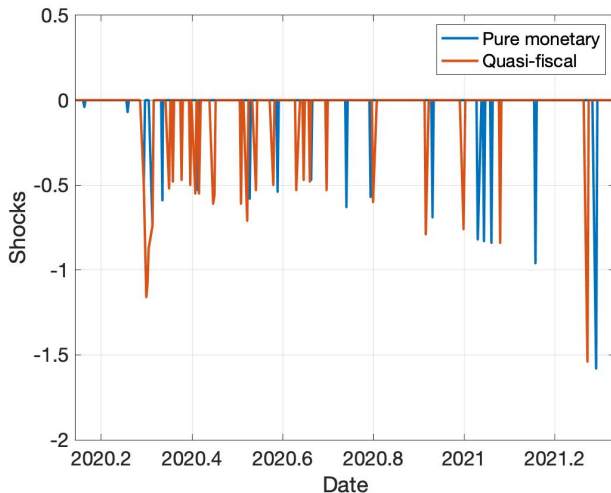


Figure 4: Change in long-short term interest rate differences

Source: elaborations on FRED data. Note: percentage points on the y-axis.

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

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

Y_t contains:

- average consumption
- average employment rate
- narrative-HF shock
- NASDAQ 100 index
- inequality index

One estimate for the total shock, and one distinguishing purely monetary and quasi-fiscal shocks.

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

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

Y_t contains:

- quartile-specific consumption
- quartile-specific employment rate
- narrative-HF shock
- NASDAQ 100 index

One estimate for the total shock, and one distinguishing purely monetary and quasi-fiscal shocks.

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IRFs of consumption and employment

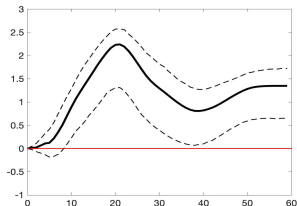


Figure 5: Total shock on consumption

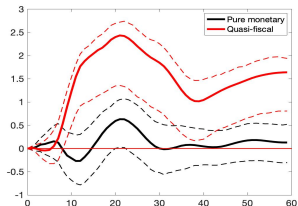


Figure 7: PM and QF shocks on consumption

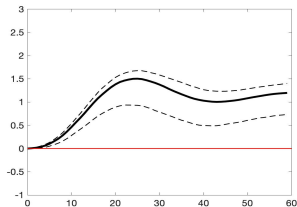


Figure 6: Total shock on employment

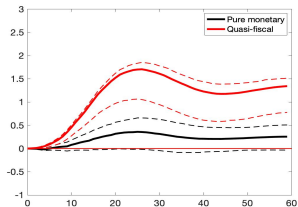


Figure 8: PM and QF shocks on employment

IRFs of Gini coefficient

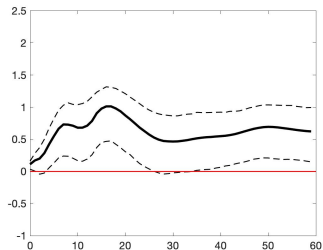


Figure 9: Total shock

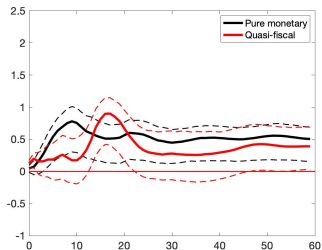


Figure 10: PM and QF shocks

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

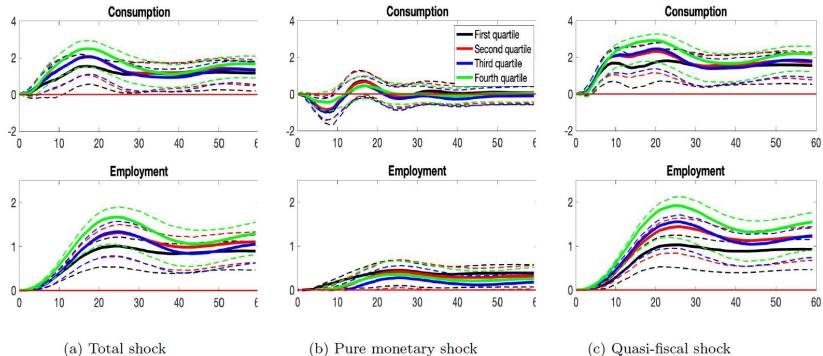


Figure 11: Consumption and employment response

Consumption response and income per capita

We estimate one VAR for each county:

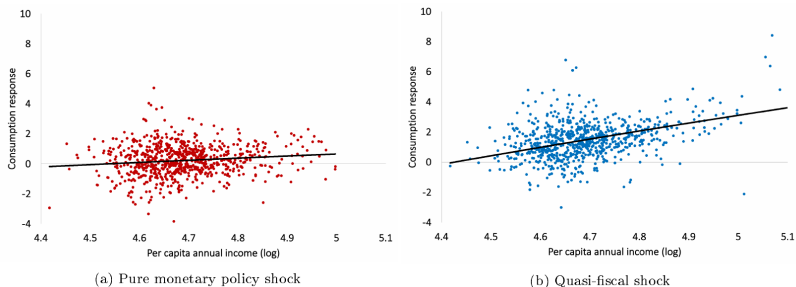


Figure 12: Semielasticity of the response of consumption to income

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: intuition

Wealth effect: Fed's policies make asset prices increase and asset are held more by richer counties.

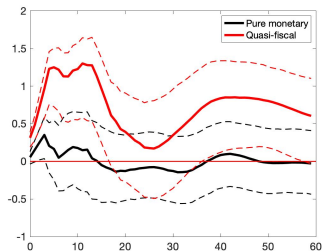


Figure 13: NASDAQ response

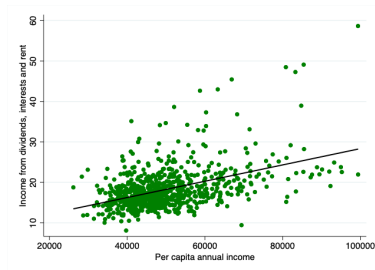


Figure 14: PM and QF shocks

Economic mechanism: intuition

Employment and budget constraint: Paycheck Protection Program sustains employment and avoid mass layoffs, thus boosting consumption spending.

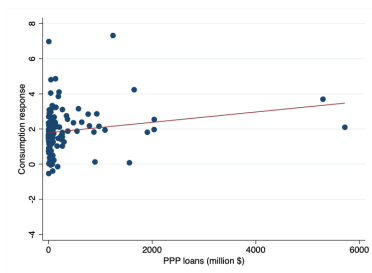


Figure 15: Quasi-fiscal shock

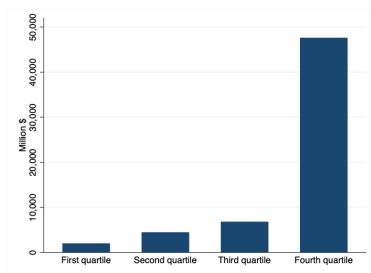


Figure 16: Loans granted

	(1) PM	(2) QF
Income from assets	-0.00205 (-0.05)	0.136*** (3.31)
PPPLF loans	0.0146** (3.25)	0.0177*** (3.89)
Leisure&hospitality	0.0184 (1.75)	-0.0273** (-2.67)
Debt-to-inc. ratio	-0.0413 (-1.43)	-0.00324 (-0.16)
Covid-19 cases	0.0242 (0.92)	-0.0337 (-1.38)
Median age	0.335* (2.18)	-0.104 (-1.48)
Observations	714	714
Counties	All	All

t statistics in parentheses

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

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- 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.

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;
- counties in the top quartile increased their consumption spending through wealth effect and increased labor income.

Thank you!

Robustness checks

- Information shocks
- Other shock measures
- Other inequality measures
- Control for fiscal policies
- 7day-MA before removing weekends
- 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

Economic mechanism

	(1)	(2)	(3)	(4)	(5)	(6)
	PM	QF	PM	QF	PM	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

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

Population-weighted Gini

