

# Monetary policy and inequality

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February, 2021

# Overview

# Motivation

- ▶ Notion that *expansionary* monetary policy primarily benefits the wealthy has become more prevalent
  - ▶ “low for long” environment will lead to “disastrous consequences” (Acemoglu and Johnson (2012))
- ▶ *Contractionary* monetary policy – through its dampening effect on economic growth – may be at the root of inequality
- ▶ Other popular theories as to what has been driving the rise in inequality including:
  1. Skill-biased technological change
  2. Global trade
  3. Unionization
  4. Lack of capital taxation (Piketty 2013)

## Relevant papers

The doves:

- ▶ Coibion et al. (2012) (main focus here)
  - ▶ Contractionary monetary policy increases inequality in labour earnings, total income, consumption and total expenditures.
  - ▶ Size of the contribution of monetary policy shocks to inequality is of a similar magnitude as their contribution to other macroeconomic variables.
- ▶ Bunn, Haldane, and Pugh (2020) (BoE staff working paper):
  - ▶ ...

The hawks:

- ▶ Andersen et al. (2020):
  - ▶ ...

## Theoretical underpinnings

## Channels - the hawks

Expansionary monetary policy → rise in inequality

1. Income composition channel: heterogeneity across households in terms of primary sources of income, which in turn may be affected disproportionately by monetary policy.
2. Financial fragmentation channel: heterogeneity with respect to access to financial markets. Those more connected to financial markets may be the primary beneficiaries of expansionary monetary policy.
3. Portfolio channel: if low-income households tend to hold relatively more currency than high-income households, then inflationary pressures erode their net wealth.

Coibion et al. (2012) find evidence consistent with income composition channel:

- Financial income rises sharply while business income labour earnings fall. Income transfers are found to be an effective tool to soften the blow.

## Channels - the doves

Contractionary monetary policy → rise in inequality:

1. Savings redistribution channel: an unexpected rise in interest rates hurts borrowers. (This may lead to a rise in inequality if we assume that poorer households tend to be net borrowers of wealthier households.)
2. Earnings heterogeneity channel: contractionary policy may cause a disproportionate increase in unemployment of low income groups.

Coibion et al. (2012) provide evidence consistent with the *earnings heterogeneity channel*: heterogeneous wage responses to contractionary shocks.

Data



## Household survey

- ▶ Measures of inequality come from detailed household-level data from the Consumer Expenditures Survey (CEX) since 1980:
  - ▶ monthly frequency (aggregated to quarterly), which is necessary to analyse the effect of (conventional) monetary policy shocks.
  - ▶ provided by the Bureau of Labor Statistics (BLS)
  - ▶ CEX was and still is used for construction of CPI weights

## Distributional measures

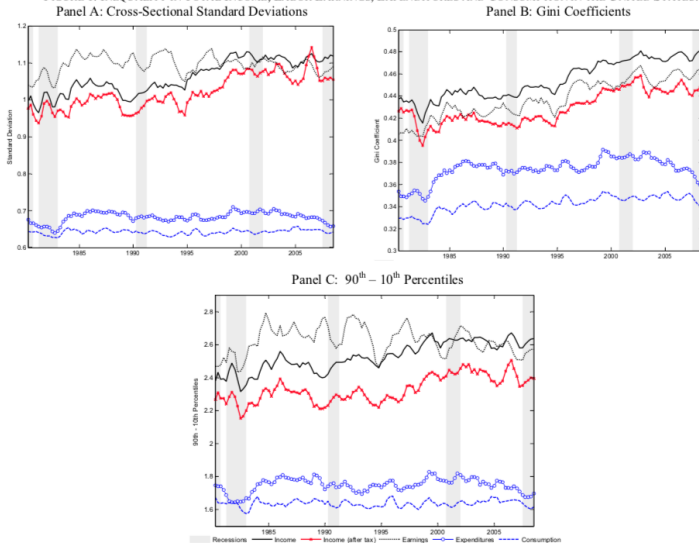
Both income and consumption inequality are measured through three different distributional measures:

- a. Gini coefficients of levels (area under 45-degree line)
  - b. cross-sectional standard deviations of log levels
  - c. differences between individual percentiles of the cross-sectional distribution of log levels
- ▶ a. is widely used but subject to the influence of outliers. b. and c. are less subject to outliers and more in line with the narrative of the paper (focusing on income percentiles), but 0s need to be eliminated
  - ▶ measures are unsurprisingly all highly correlated (though less so for the labor earnings inequality measures since here the effect of eliminating zeros plays a larger role.)
  - ▶ income is further split into 1) labor earnings and 2) total income (labor earnings plus financial income, business income and transfers for each household)

# Inequality over time

- ▶ sharp rise in income inequality during early 80s - attributable to contractionary Volcker rule?

FIGURE 1: INEQUALITY IN TOTAL INCOME, LABOR EARNINGS, EXPENDITURES AND CONSUMPTION IN THE UNITED STATES.



## Monetary policy shocks - reaction function

- ▶ Romer and Romer is subject to endogeneity: preferences or objectives of the central bank and political constraints may play a role in these shocks.
- ▶ Instead of short-term shocks, may instead model permanent changes to Taylor-type rule based optimal interest rate and inflation targets

Empirical strategy

# Impulse response functions

Estimate ADL model in first differences

$$x_t = \beta_0 + \sum_{j=1}^J \alpha_j x_{t-j} + \sum_{i=0}^I \beta_i \hat{\varepsilon}_{t-1} + v_t \quad (1)$$

where  $J = 8$  (2 years) and  $I = 12$  (3 years, conventional policy horizon) for the whole sample. Choices are small for restricted sample.

Alternative approach models variables in their VMA representation

$$x_t = \beta_0 + \sum_{i=0}^N \beta_i \hat{\varepsilon}_{t-1} + v_t \quad (2)$$

where  $\beta_i$  directly correspond to IRF. May be less precise in shorter samples.

## Additional shocks

Another approach includes shocks to other variables (T=technology, O=oil, F=fiscal) in the model:

$$x_t = \beta_0 + \sum_{j=1}^4 \alpha_j x_{t-j} + \sum_{i=0}^8 \beta_i \hat{\varepsilon}_{t-1} + \sum_{s \in \{T, O, F\}} \sum_{i=0}^2 \gamma_i^s \hat{\eta}_{t-1}^s + v_t \quad (3)$$



# VAR

- ▶ Model system of endogenous variables  
 $\mathbf{y} = (gdp, unemp, \pi, mp, ineq)$

$$\mathbf{Y}_t = \begin{bmatrix} y_t & emp_t & \pi_t & mp_t & ineq_t \end{bmatrix}'$$

where  $\sum_{i=0}^t \varepsilon_t^{(mp)}$ .

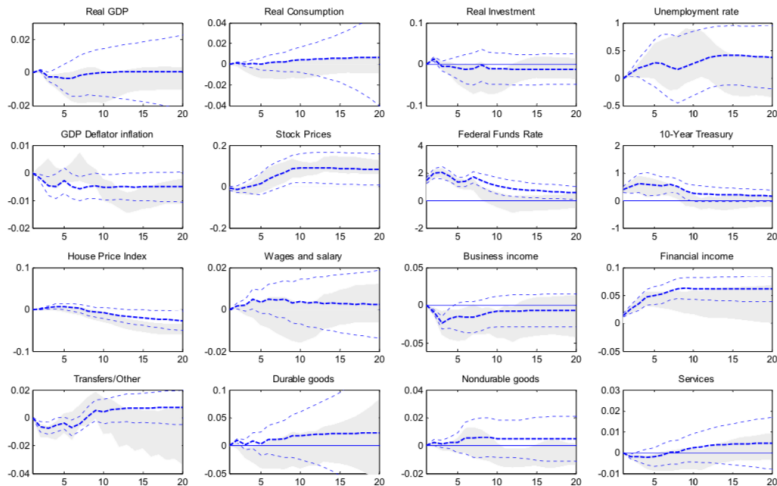
- ▶ Cholesky decomposition in that order:

$$\mathbf{B}_0 = \begin{bmatrix} B_{y,y} & 0 & 0 & 0 & 0 \\ B_{emp,y} & B_{emp,emp} & 0 & 0 & 0 \\ B_{\pi,y} & B_{\pi,emp} & B_{\pi,\pi} & 0 & 0 \\ B_{mp,y} & B_{mp,emp} & B_{mp,\pi} & B_{mp,mp} & 0 \\ B_{ineq,y} & B_{ineq,emp} & B_{ineq,\pi} & B_{ineq,mp} & B_{ineq,ineq} \end{bmatrix}$$

## Results

# Standard macro variables

- IRFs have expected shape:

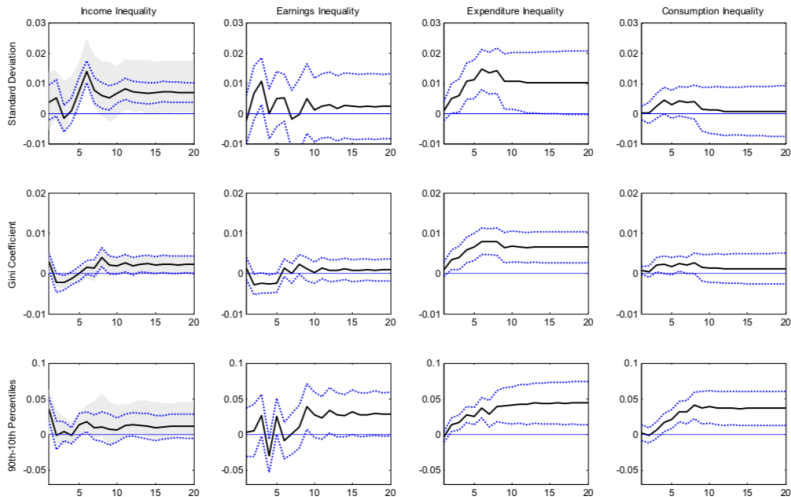


*Note:* The figure presents impulse responses of macroeconomic variables to 100 b.p. monetary policy shocks. The grey shaded areas indicate one-standard deviation confidence intervals using data from 1969Q1 until 2008Q4. The light dashed lines are one standard deviation confidence intervals using data since 1980Q1, with the bold dashed line indicating point estimates. See section 3.1 for details.

# Inequality

Positive, statistically significant effect of monetary policy shocks on inequality.

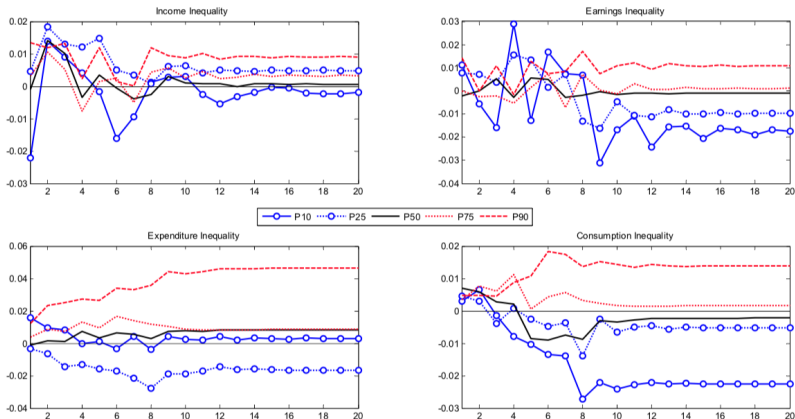
FIGURE 4: RESPONSE OF ECONOMIC INEQUALITY TO A CONTRACTIONARY MONETARY POLICY SHOCK



# Distributional effects in detail

- ▶ Bottom left panel is the *killer chart*: in response to contractionary monetary policy shocks labour earnings increase for high-income groups, while the decrease for low-income groups.

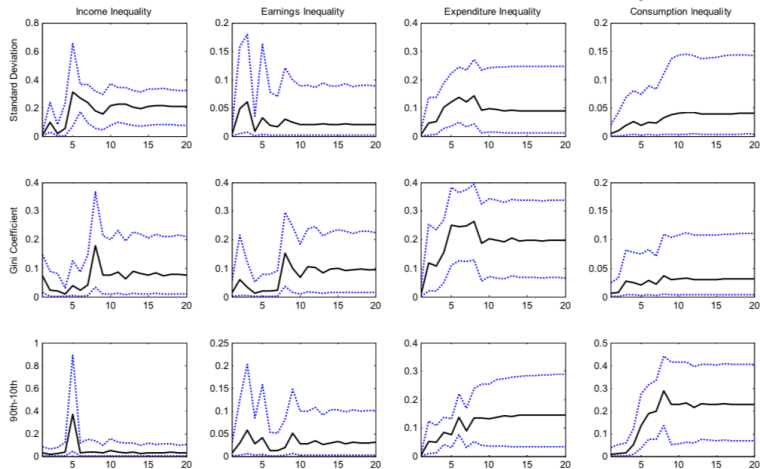
FIGURE 5: DISTRIBUTIONAL EFFECTS OF CONTRACTIONARY MONETARY POLICY SHOCK BY PERCENTILE S



# Economic significance

FEVDs reveal significant contribution of monetary policy shocks to variation in inequality.

FIGURE 7: CONTRIBUTION OF MONETARY POLICY SHOCKS TO FORECAST ERROR VARIANCE OF INEQUALITY



Note: The figure plots the contribution of monetary policy shocks to the forecast error variance of economic inequality at different time horizons (quarterly, x-axis). Dotted blue lines indicate 68 percent confidence intervals while the solid line is the median estimate. See section 3.5 in the text for details.

## Robustness checks

- ▶ Vary lag length: consistent.
- ▶ Discard Volcker disinflation period: consistent.
- ▶ Discard recessions: consistent.
- ▶ VMA approach: results less precise/significant.
- ▶ Controlling for additional shocks: magnitudes broadly unchanged, but results more precise/significant.
- ▶ VAR approach: consistent.
- ▶ Controlling for household characteristics: magnitudes broadly unchanged, but results more precise/significant.
- ▶ Shocks to reaction function: Results are qualitatively and quantitatively very similar.

## Caveats

- ▶ CEX data does not include top 1 percent, but if anything that can be expected to downward-bias the estimates.
- ▶ Households are moving across the distribution through time
  - ▶ Authors check for this: find no significant impact of mon pol shocks on transition probabilities after two years, but effect in first 2 years may be reason for volatility of IRFs in that time frame.
- ▶ CEX underreports consumption relative to aggregate data and that this underreporting has become more severe over time. the potential underreporting of consumption in the CEX is less of a concern, since we will focus on cyclical fluctuations in consumption inequality
- ▶ ordering of the VAR model seems somewhat arbitrary: imposes that inequality reacts contemporaneously to all other covariates



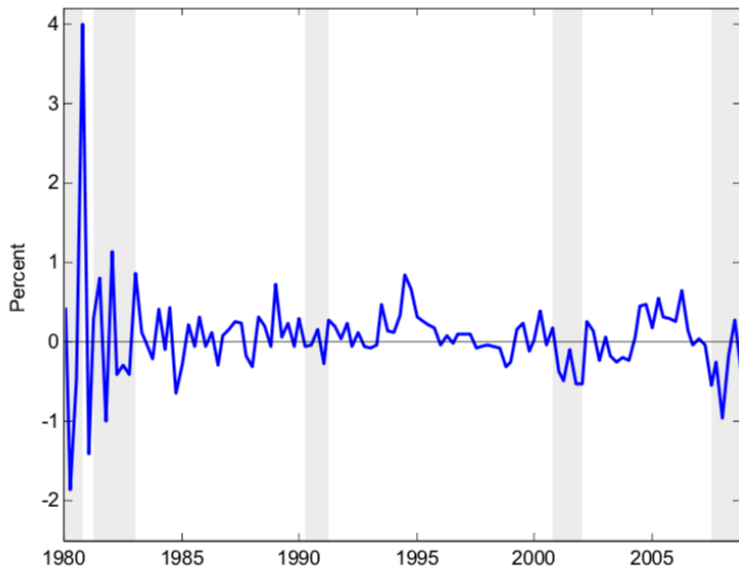
## References

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## Annex

# Monetary policy shocks

FIGURE 2: MONETARY POLICY SHOCKS



*Note:* The figure plots the quarterly sum of monetary policy shocks as identified in Romer

# Reaction function

FIGURE 10: HISTORICAL ESTIMATES OF THE FEDERAL RESERVE'S TARGET RATE OF INFLATION

