Shocks, Frictions, and Inequality in US Business Cycles Bayer, Born and Luetticke (WP, 2020)

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Research Questions

Research questions

- How much does inequality matters for the business cycle?
- How much does the business cycle matters for inequality?
- How would inequality have developed if government business cycle policies had been different?

Contributions

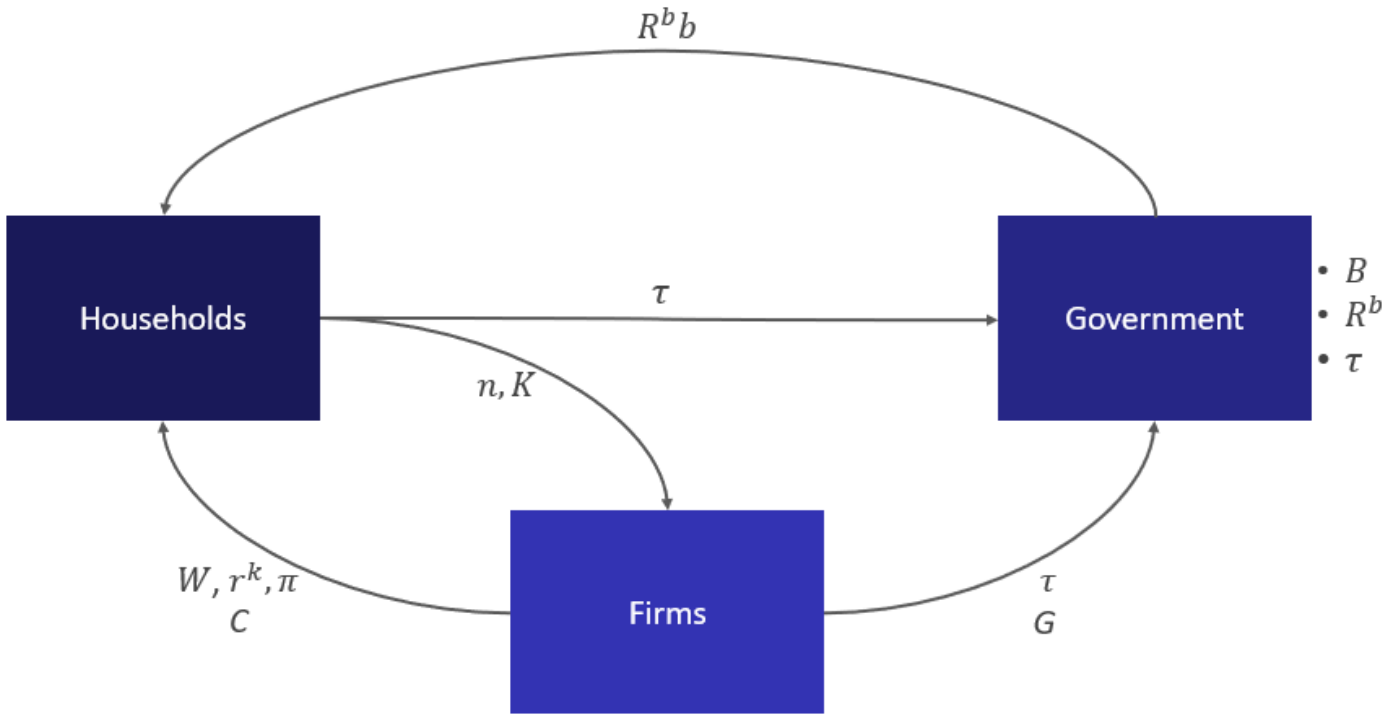
- Include inequality measures in estimation
- Portfolio choice
- Methodological

Main results

- Distributional data does not change inference about aggregate shocks
- Business cycle shocks generate persistent movements in wealth and income (explain 50% of rise in inequality 1980-2015)
  - **Wealth:** *technology & fiscal:* spread liquid and illiquid asset. *Markups:* income distribution
  - **Income:** income risks
  - **Consumption:** mixture of both

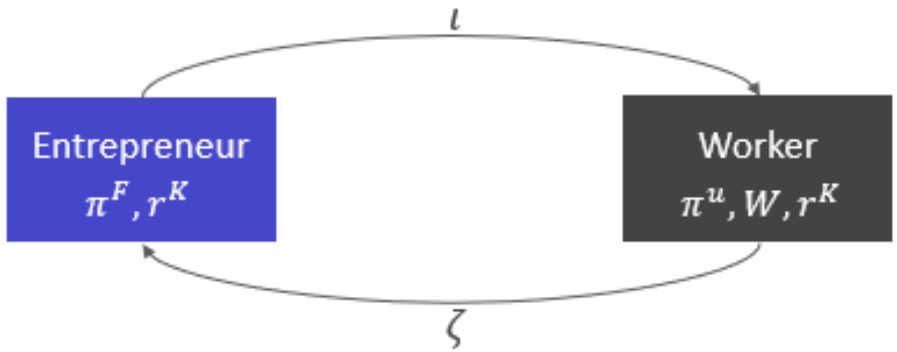
Overview

- Shocks: aggregate and investment productivity shocks, wage and price markup, monetary and fiscal policy, risk premium, progresivity of taxes and idiosyncratic productivity risk



Households

Income



Utility

$$\boldsymbol{h = 0} \qquad x = c - G(h, n) \qquad \bar{\boldsymbol{n}}$$

Dixit-Stiglitz Aggregator

Taxes

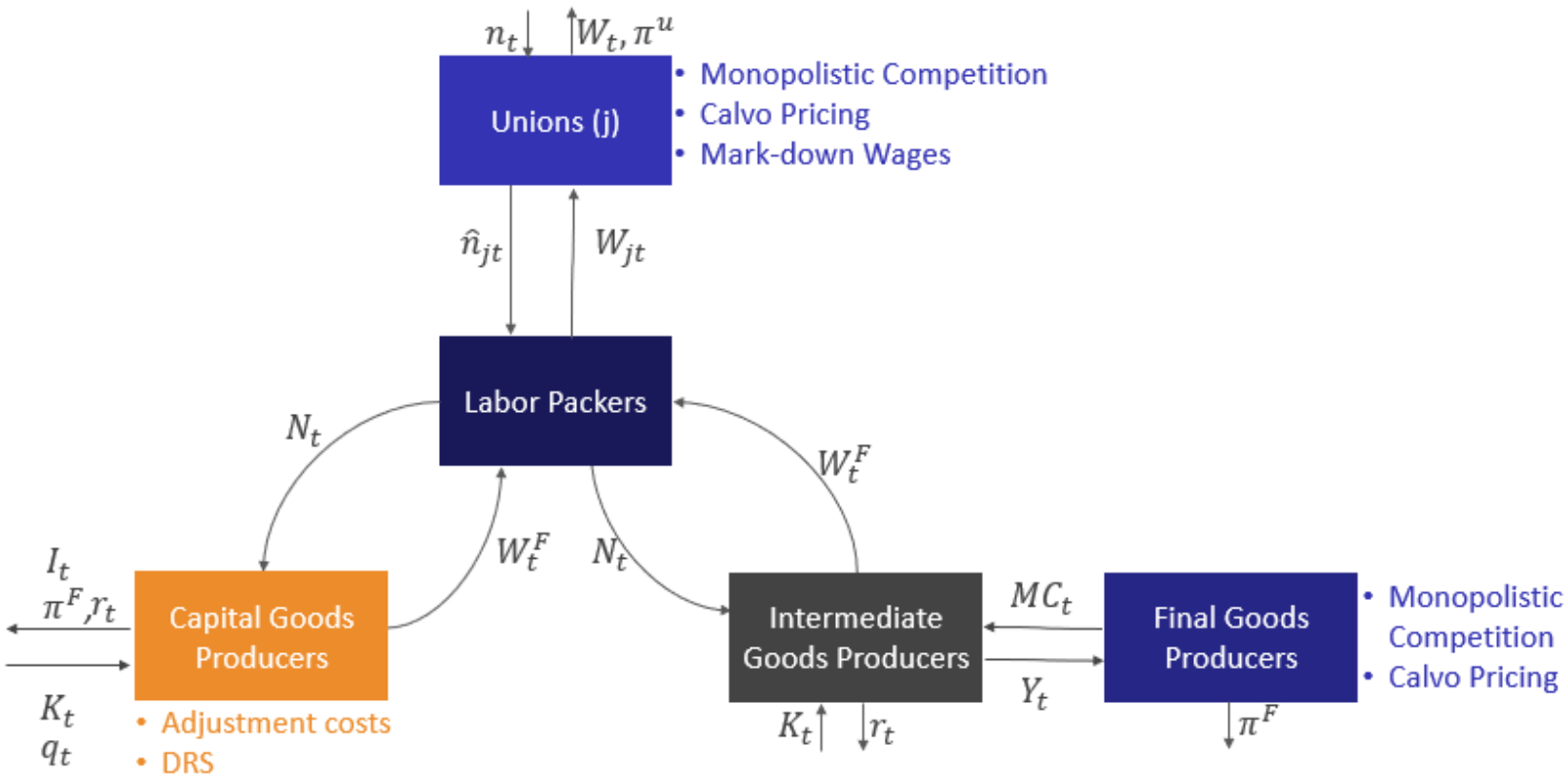
$$y - (1 - \tau^L) y^{1-\tau^P}$$

Investment

b, K

Wedge $(A_t R_t^b (+\bar{R}))$ | Adjustment at Rate λ

Firms


n_t
W_t, π^u
Unions (j)
• Monopolistic Competition
• Calvo Pricing
• Mark-down Wages
$\hat{n}_{jt}$
W_{jt}
Labor Packers
N_t
W_t^F
I_t
π^F, r_t
Capital Goods Producers
W_t^F
N_t
K_t
q_t
• Adjustment costs
• DRS
Intermediate Goods Producers
MC_t
Y_t
K_t
r_t
Final Goods Producers
• Monopolistic Competition
• Calvo Pricing
π^F

Government

Monetary

- Taylor rule

Fiscal

- Issue debt to finance deficit
- G stabilizes debt in long run and Y in short run
- Sets taxes

Shocks

- Monetary policy
- Tax progressivity
- Tax level
- Deficit

Numerical solution and Estimation

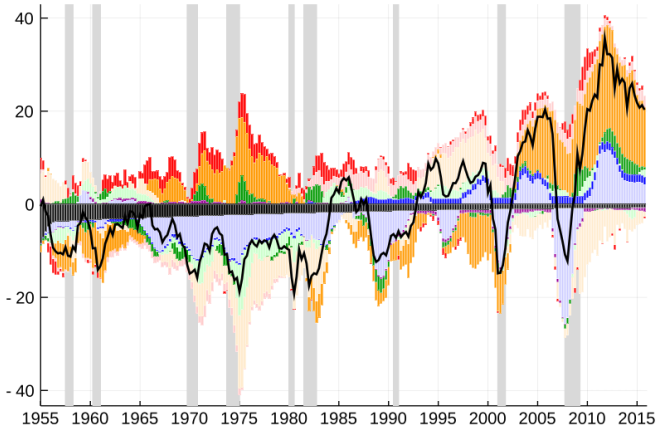
1. Replace value function with linear interpolants and distribution functions with histograms
2. Calculate stationary equilibirum
3. Calibrate parameters that affect s.s.
4. Perform dimensionality reduction before linearization
   - Use discrete consine transformation (DCT) for value function (only perturb largest coefficients)
   - Fixed copula and flexible marginals
5. Solve following Schmitt-Grohé and Uribe (2004)
6. Use Bayesian likelihood (Férnandez-Villaverde (2010)): state space representation in Kalman filter (*missing values and mixed frequency*) to obtain likelihood. Random Walk Metropolis-Hastings to generate draws from posterior

Mechanisms for propagation of inequality

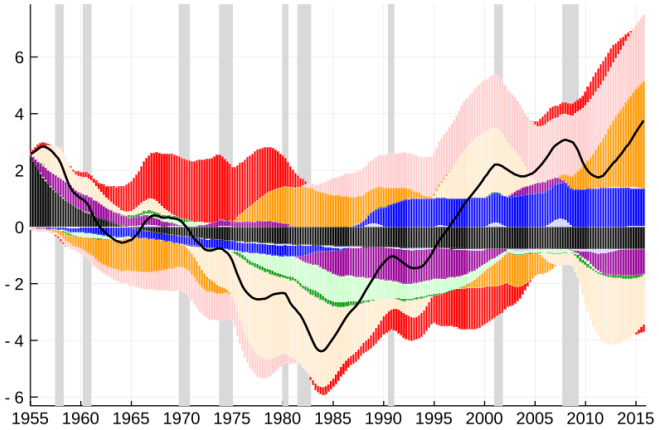
Persistence response: wealth $>$ consumption $>$ income

- **Price-markup shock:** $\uparrow$ income entrepreneurs $\rightarrow$ (sticky prices) $\uparrow$ Consumption inequality $\downarrow$ wealth inequality $\rightarrow$ (prices adjust) $\uparrow$ wealth inequality
- **Income risk shock:** poor households $\uparrow$ liquid savings ($\downarrow$ wealth inequality) $\rightarrow \downarrow$ consumption $\uparrow$ markups $\rightarrow$ ($\uparrow$ income dispersion) $\uparrow$ income inequality $\uparrow$ wealth inequality

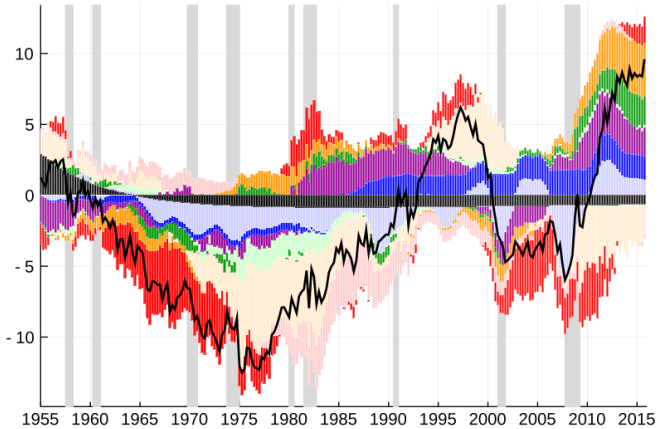
Historical decomposition of inequality



(a) Top 10% income share



(b) Top 10% wealth share



(c) Gini coefficient of consumption

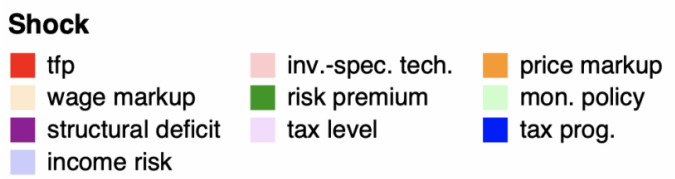
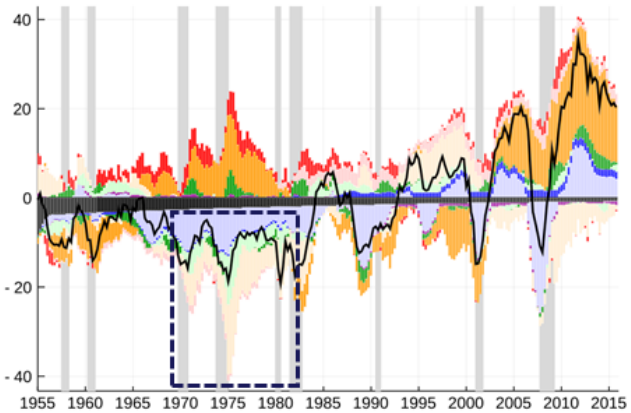


Figure: Historical decomposition of US inequality

Income inequality 1960-1970



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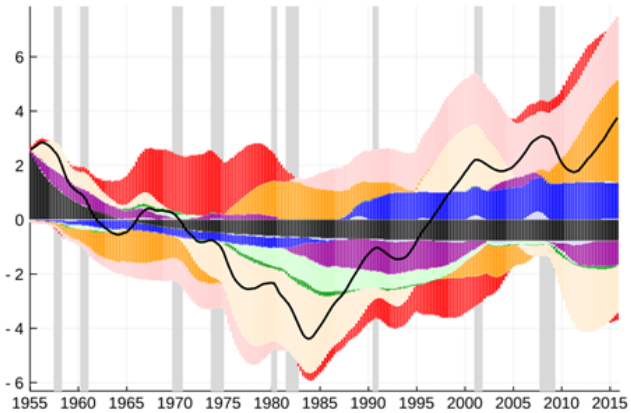
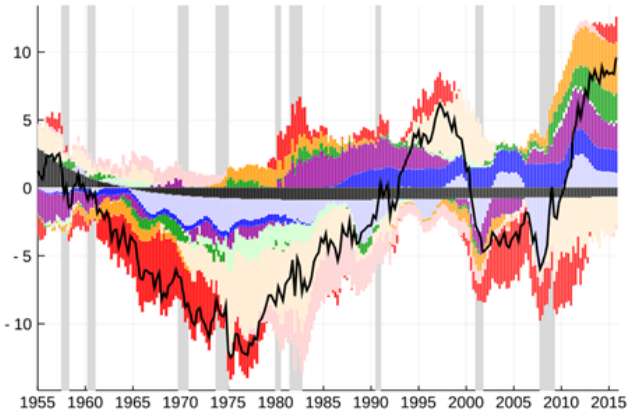


(b) Top 10% wealth share



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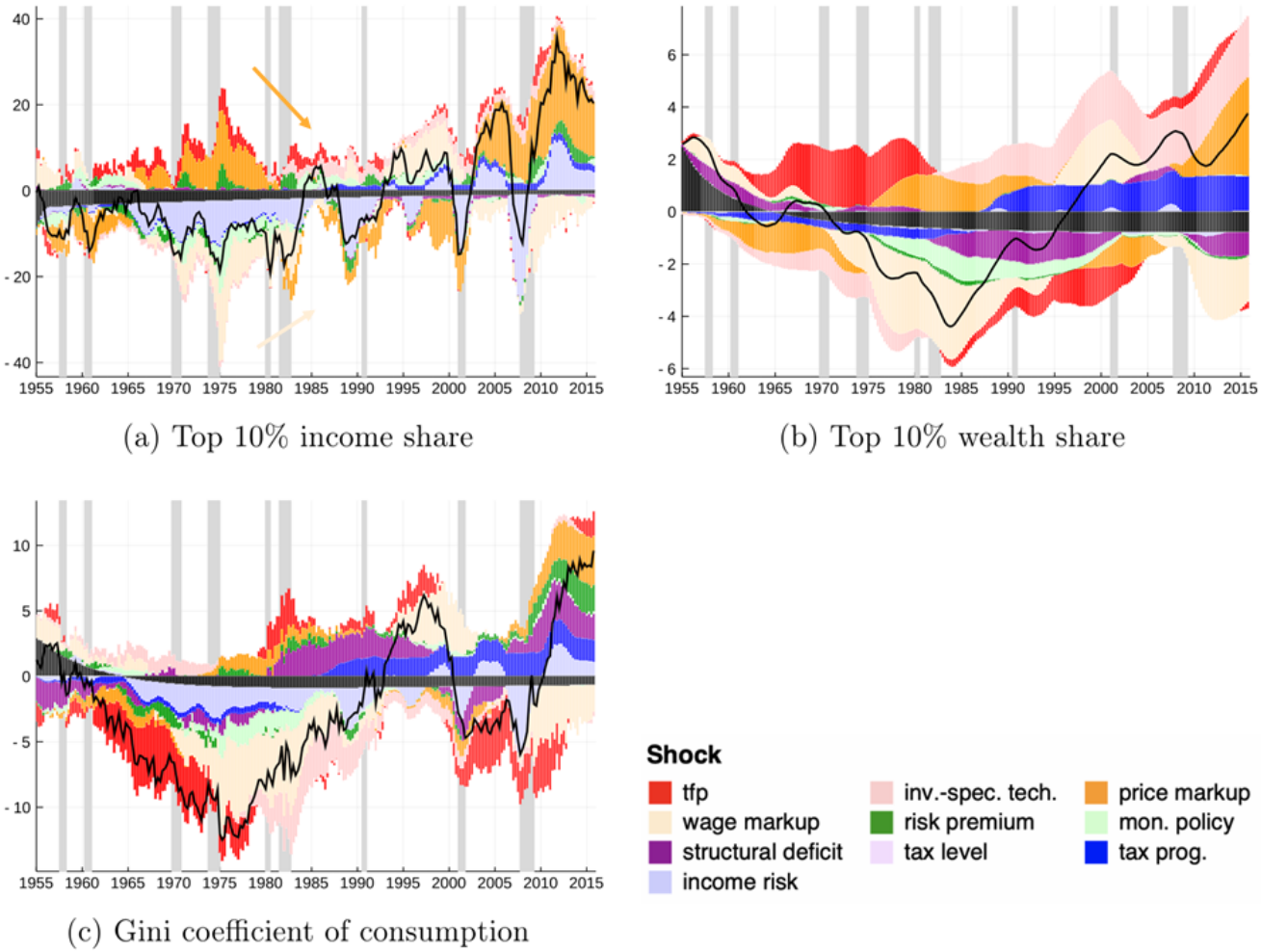
Income inequality 1970-1980



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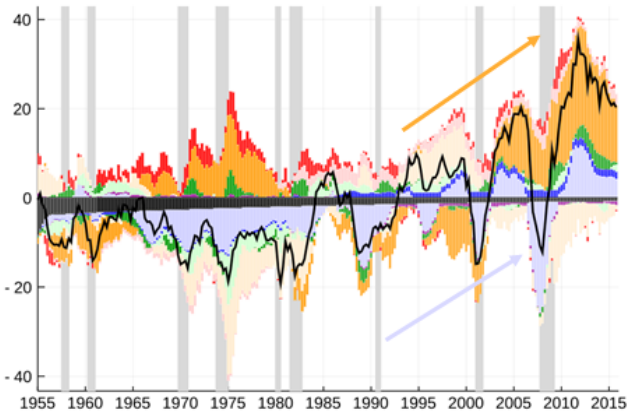
Income inequality 1990-2000



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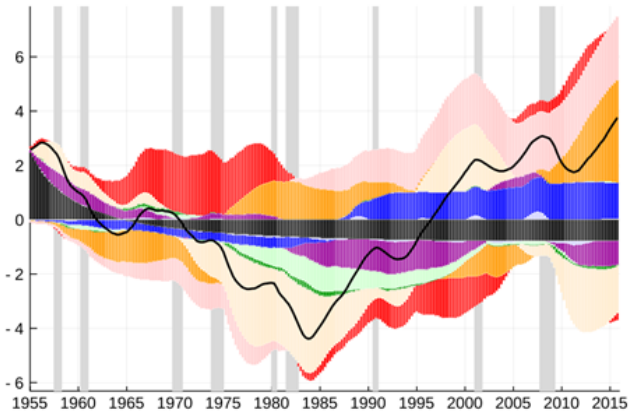
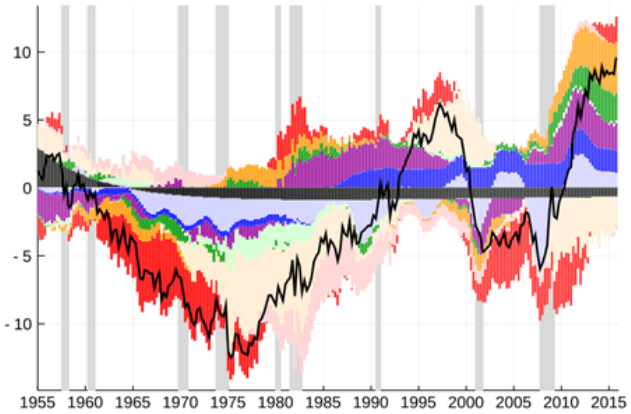


(b) Top 10% wealth share



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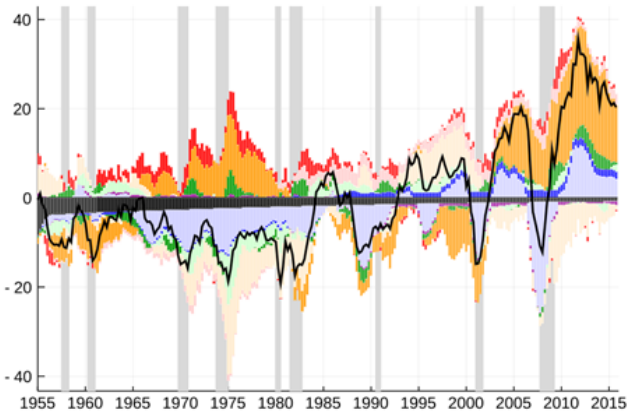
Wealth inequality 2000



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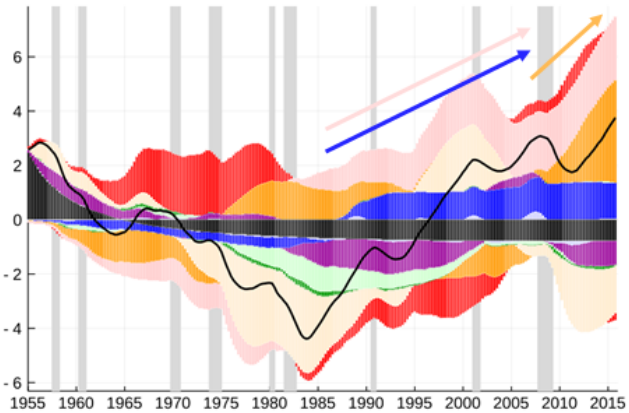

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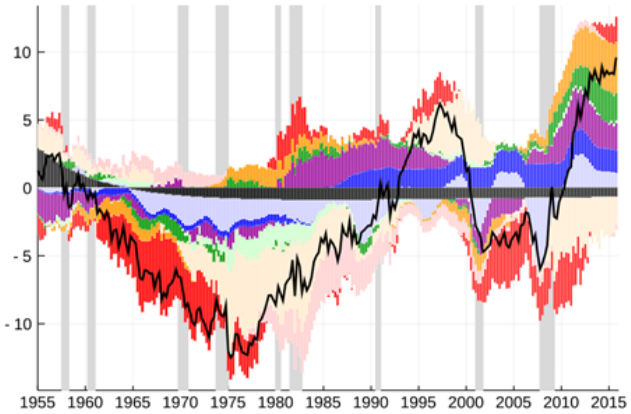

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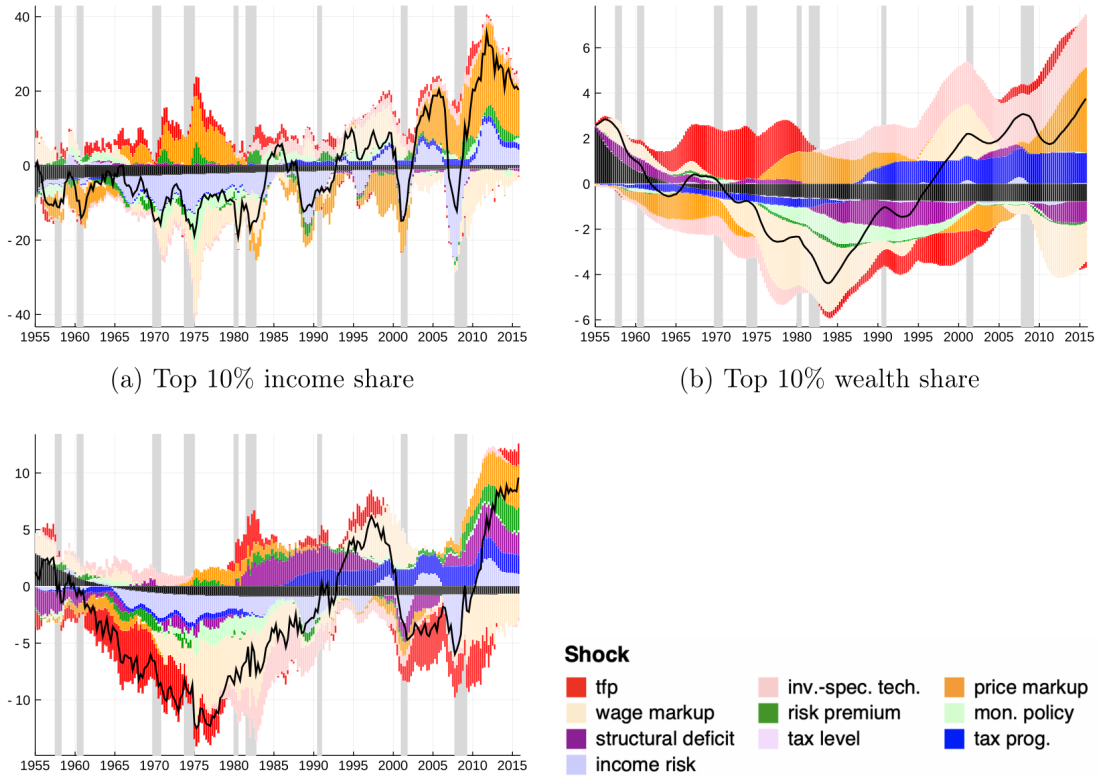
Figure: Historical decomposition of US inequality

Consumption inequality

Portfolio choice problem makes income risk most important driver in short run



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(b) Top 10% wealth share

(c) Gini coefficient of consumption

Figure: Historical decomposition of US inequality

Counterfactuals

- Monetary policy
  - Hawkish: $\uparrow$ reaction to inflation $\rightarrow$ outut losses in markup shocks, stabilizes demand shocks
  - Dovish: $\uparrow$ reaction to output $\rightarrow$
- Fiscal policy
  - Deficit stimulus: $\uparrow$ persistence B^g, average tax path as in benchmark
  - Tax stimulus: adjustment of taxes more heavily, deficit and debt as in benchmark. ZLB abstraction

Counterfactual: monetary policy

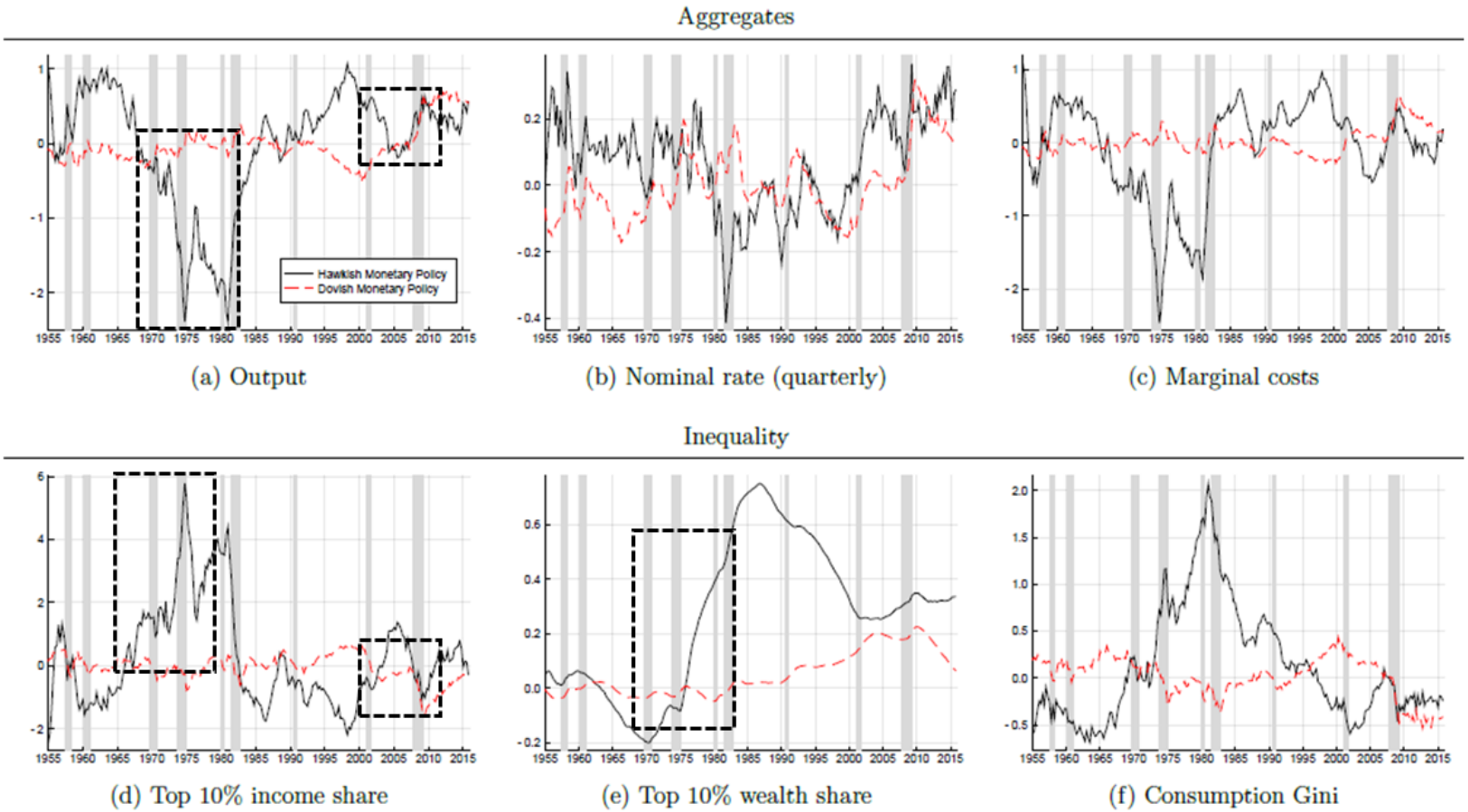

Figure: Changes in monetary policy. 0 is benchmark model

Counterfactual: fiscal policy

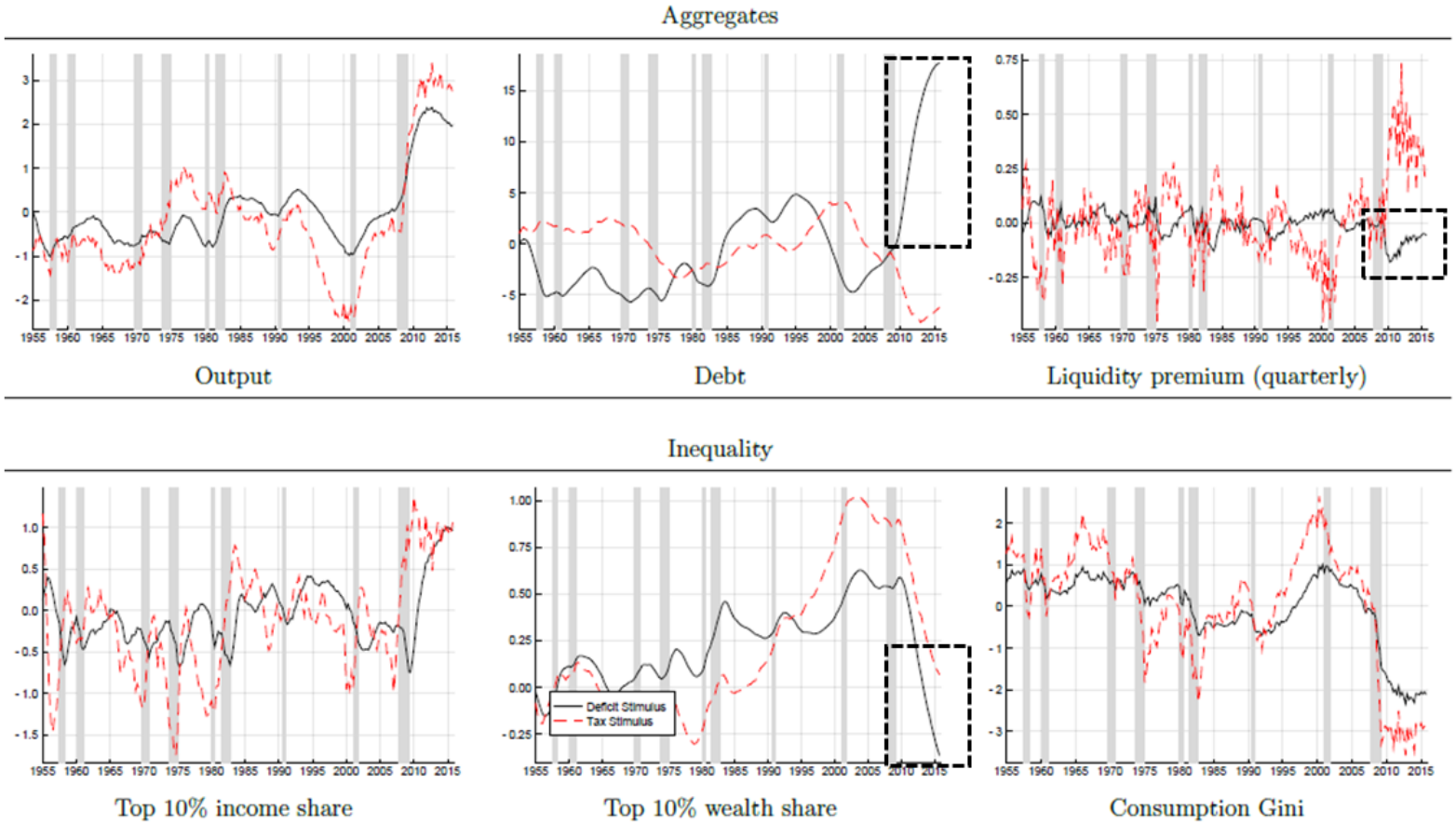

Figure: Changes in fiscal policy. 0 is benchmark model