Aggregate Demand and the Top 1%

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Two canonical models of inequality

1. Income inequality literature:
   ▶ Considers random growth income processes
   ▶ Gets Pareto tail of the income distribution

2. Incomplete markets literature:
   ▶ Considers variety of income processes (typically lognormal)
   ▶ Gets predictions for aggregate consumption, savings and wealth

This paper combines 1 and 2 to examine macro consequences of an increase in top 1% of labor incomes, leaving average income constant. Focus on aggregate demand (partial equilibrium) outcomes. Top 1% ↑ ⇒ desired consumption ↓ in short run, wealth ↑ in long run. General equilibrium consequences depend on monetary policy response. See "Inequality and Aggregate Demand". Case study: US labor income inequality, 1980–today.
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Simple random growth income process

- Suppose process for gross labor income $z_{it}$ follows

$$d \log z_{it} = -\mu dt + \sigma dZ_{it}$$

with $Z_{it}$ standard Brownian motion and reflecting barrier at $z_{it} = z$

- ⇒ stationary distribution is Pareto

$$P(z_i \geq z) \propto z^{-\alpha}$$

with tail coefficient

$$\alpha = \frac{2\mu}{\sigma^2}$$

- Parsimonious, explains incomes within top 1% well
Top 1% labor income shares in US (wages and salaries)

$$\alpha = \frac{1}{1 - \frac{\log(\text{top 1\% share})}{\log(1\%)}}$$

<table>
<thead>
<tr>
<th>Year</th>
<th>Top 1% share</th>
<th>Top 0.1% share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td></td>
<td>2.47</td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td>1.91</td>
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Source: World Top Incomes Database
Top 1% labor income shares in US (wages and salaries)

\[ \alpha = \frac{1}{1 - \frac{\log(\text{top 1% share})}{\log(1\%)}} \Rightarrow \left\{ \begin{array}{l} \alpha_{1980} = 2.47 \end{array} \right\} \]

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\alpha = \frac{1}{1 - \frac{\log(\text{top 1\% share})}{\log(1\%)}} \Rightarrow \begin{cases} 
\alpha_{1980} = 2.47 \\
\alpha_{\text{today}} = 1.91 
\end{cases}
\]

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Parameterizing the model

- Estimates of income risk: $\sigma^2 \in [0.01, 0.04]$, possibly rising over time
  - Set $\sigma^2_{1980} = 0.02$
  - Then $\mu_{1980} = 0.024$ matches $\alpha_{1980}$

- Consider three explanations for fall in $\alpha$:

  $$ \alpha = \frac{2\mu}{\sigma^2}, \quad \frac{2\mu}{\sigma^2} \uparrow, \quad \frac{2\mu}{\sigma^2} \uparrow\uparrow $$

  ie

  $$ \sigma^2_{\text{today}} = \sigma^2_{1980} \left( \frac{\alpha_{1980}}{\alpha_{\text{today}}} \right)^k \quad k = 0, 1, 2 $$

- Our benchmark is $k = 2$
  - Transitions between income percentiles unchanged, but levels spread
  - Interpretation: secular trend in relative skill prices
  - Transition can be infinitely fast: Gabaix, Lasry, Lions and Moll (2016)
Model: households

- Mass 1 of ex-ante identical households. Purely idiosyncratic risk:
  - pre-tax income $z_{it}$, discretized version of above process
  - stationary (Pareto) distribution of income states, $\mathbb{E} [z] = 1$

- Separable preferences, constant EIS $\nu$: $u(c) = \frac{c^{1-\nu-1}}{1-\nu-1}$

- Incomplete markets: trade in risk-free asset $a_{it}$ with return $r_t$

$$\max \mathbb{E} \left[ \sum_{t=0}^{\infty} \beta^t u(c_{it}) \right]$$

s.t. $c_{it} + a_{it} = y_{it} + (1 + r_{t-1}) a_{it-1}$

$a_{it} \geq 0$

- Post-tax income: affine transformation of pre-tax

$$y_{it} = \tau^r + (1 - \tau^r) z_{it}$$
Model calibration and experiment

- Calibration to 1980 steady-state:
  - $\sigma_{1980} = 2\%$, $\mu_{1980} = 2.4\%$
  - $\tau^r = 17.5\%$ consistent with progressivity of US tax system
  - $\beta = 0.95$ generates wealth/post-tax income ratio $W_{1980}$ when $r = 4\%$

- Our quantitative experiment:
  - Achieve $\alpha \downarrow$ through $k = 0, 1, 2$; leaving $\mathbb{E}[z] = \mathbb{E}[y] = 1$
  - Phased in between 1980 and today
  - Maintain $r = 4\%$ constant
  - Trace out impact on consumption path $dC_t$ and ss wealth $\frac{dW}{W}$
Why this matters

- In Auclert-Rognlie “Inequality and Aggregate Demand”, we embed above framework in general equilibrium:
  - Neoclassical GE same as Aiyagari (1994)
    - full employment at all times
  - With downward nominal wage rigidities and binding zero lower bound
    - can have depressed employment
    - temporarily or permanently (’secular stagnation’)
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Key result: $dC_t$ and $\frac{dW}{W}$ **sufficient statistics** for effects on macro aggregates of changes in income inequality

- real interest rates, consumption, employment, and output, e.g.

  Output effect = (GE multiplier) \cdot (PE sufficient statistic)
Partial eqbm path for aggregate wealth $dW_t/W$

- Recall $k = 0$ has constant $\sigma$ and lower $\mu$
- → not just a precautionary savings effect
Decomposing steady-state $dW/W$

When $k = 2$

\[
\frac{dW}{W} = 1.98 = \text{Cov}(\epsilon_{W,y}, dy)
\]

where $\epsilon_{W,y}$ is effect of only increasing income level 'y'
Decomposing impact effect $dC$

When change in distribution is temporary

$$dC = -1.8\% = \text{Cov}(MPC_y, dy)$$

where $dC$ is effect, $MPC$ is average for income $'y'$ at $t = 0$
Conclusion

- Rise in top 1% may have depressed aggregate demand:
  - Lower aggregate consumption via MPC channel (likely small effect)
  - Raise aggregate savings via precautionary savings + wealth effect channels (possibly very large)

- Macroeconomic consequences depend on monetary policy:
  - Away from the ZLB, lowers equilibrium interest rate
    - In our experiments $dr = -45$bp to $-85$bp
Predicted path for equilibrium interest rates

\[ r_t^k \]

- \( k = 0 \)
- \( k = 1 \)
- \( k = 2 \)
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    - In our experiments $dr = -45\text{bp}$ to $-85\text{bp}$
    - One factor contributing to bringing economy to ZLB, may persist

- At the ZLB, generates unemployment
  - Model implies permanent depression (secular stagnation)
  - Mitigated by expansionary fiscal policy
  - see Auclert-Rognlie