Inequality, Leverage and Crises, by M. Kumhof and R. Ranciere (Nov. 2010)

Economics of Inequalities Class - C. Lebarz

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Overview

- How high leverage and crises can arise as a result of changes in the income distribution.

- Theoretical model where a large increase in the income share of the rich and in the leverage of the remainder arise endogenously as a result of a shift in the bargaining power over incomes.
Stylized Facts

- Income Inequality and Household Leverage
- Income Inequality and Consumption Inequality
- Wealth Inequality and Household Debt-to-Income Ratios
- Size of the US Financial Sector

The Model

- Investors
- Workers
- Technology

Conclusion
Stylized Facts

Figure 1. Income Inequality and Household Leverage

1920-1931

- Private Non Corporate + Trade Debt to GNP
- Share of Top 5% in Income Distribution
Figure 2. Real Income Inequality

Male Hourly Real Wage

- Top Decile of Earnings Distribution
- Median Decile of Earnings Distribution
- Bottom Decile of Earnings Distribution

Cumulative Percent Change

Cumulative Percent Change
Stylized Facts

**Male Real Annual Earnings**

- Top Decile of Earnings Distribution
- Median Decile of Earnings Distribution
- Bottom Decile of Earnings Distribution

Cumulative Percent Change

- 1970
- 1975
- 1980
- 1985
- 1990
- 1995
- 2000
- 2005

Income Inequality and Household Leverage
Income Inequality and Consumption Inequality
Wealth Inequality and Household Debt-to-Income Ratios
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Stylized Facts

Figure 3. Income Inequality and Consumption Inequality

- Disposable Income Gap (Ratio of 90th to 10th percentile of Income Distribution)
- Non Durable Consumption Gap (Ratio of 90th to 10th percentile of Income Distribution)
Stylized Facts

Figure 5. Debt to Income Ratios

- **Bottom 95% of the Wealth Distribution**
- **Top 5% of the Wealth Distribution**
- **Aggregate Economy**

The graph shows the trend of debt-to-income ratios over the years from 1984 to 2006, comparing different wealth distribution groups and the aggregate economy.
Stylized Facts

Figure 6. The Size of the U.S. Financial Sector

- Private Credit to GDP
- Value Added GDP Share of Financial Sector

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Stylized Facts

Figure 7. Mortgage Debt and Subprime Borrowing

- Total Debt to Income (Aggregate Economy)
- Mortgage Debt to Income (Aggregate Economy)

Source: Survey of Consumer Finance. Mortgage Debt corresponds to the amount outstanding.
Stylized Facts

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Conclusion
Investors

- A share $\chi$ of the population (5%)
- Utility from consumption (standard CRRA) and wealth
- Wealth can take 2 forms
  - Physical capital $k_t$ (Stone Geary form)
  - Financial investment $d_t$ (Log form adjusted for expected losses)
Investors

- Losses from a crisis depend on $\Pi_t$ (proba of a crisis) and on the percentage of loan or capital stocks destroyed $(1 - \gamma_l)$ and $(1 - \gamma_k)$
  - Expected loan: $d_t(1 - (1 - \gamma_l)\Pi_t)$
  - Expected capital: $k_t(1 - (1 - \gamma_k)\Pi_t)$

- Lifetime Utility

$$U^i_0 = E_0 \sum_0^\infty \beta^t_i \left[ \frac{(c^i_t - \bar{c}^i_{min})^{1 - \frac{1}{\sigma_i}}}{1 - \frac{1}{\sigma_i}} + \zeta_d \log(d_t(1 - (1 - \gamma_l)\Pi_t)) + \zeta_k \log(\bar{k} + k_t(1 - (1 - \gamma_k)\Pi_t)) \right]$$
Investors

- Investors are the owners of the economy’s entire stock of physical capital whose law of motion is

\[ k_t = (1 - \delta)\Delta k_t k_{t-1} + I_t \]

\( (\Delta k_t = \gamma k < 1 \text{ if crisis, } = 1 \text{ otherwise}) \)

- \( q_t \): price of a deposit that pays off 1 unit of output at \( t+1 \)

- Investors budget constraint

\[ d_t q_t + I_t + c_t^i = \Delta l_t d_{t-1} + r_t^k \Delta k_t k_{t-1} \]
Workers

- A share $1 - \chi$ of the population (95%)
- Utility from consumption (same standard CRRA with subsistence level)

$$U_0^k = E_0 \sum_0^\infty \beta_k^t \left[ \frac{(c_t^k - \bar{c}_k^{\min})^{1 - \frac{1}{\sigma_k}}}{1 - \frac{1}{\sigma_k}} \right]$$

- They supply inelastically one unit of labor per capita

$$\text{(BC)} \ w_t + l_t q_t = \Delta_l t_{t-1} + c_t^w$$

- They default on their loan obligation with proba $\Pi_t$ (Increasing in their debt to income ratio according to a logistic function)
Technology

- Aggregate production function

\[ y_t = A(\chi \Delta_t^k k_{t-1})^\alpha (1 - \chi)^{1-\alpha} \]

- Factors returns are determined by the outcome of a Nash Bargaining over the real wage (\(\eta_t\) bargaining power)

\[ \text{Max}_{w_t} (\text{Workers surplus})^{\eta_t} (\text{Investors surplus})^{1-\eta_t} \]

(FOC) \( w_t = \eta_t \times \text{marginal product of labor} \)

- \(\eta_t\) follows an autoregressive stochastic process given by

\[ \eta_t = (1 - \rho)\bar{\eta} + \rho \eta_{t-1} + e_t^n \]
Equilibrium

- Maximization of investors and consumers utilities
- Market clearing conditions
  - for goods
    \[ y_t = \chi(c_t^i + l_t) + (1 - \chi)c_t^w \]
  - for financial claims
    \[ (1 - \chi)l_t = \chi d_t \]
Figure 10. Baseline Scenario

- Bargaining Power
- GDP
- Agg. Investment
- Return to Capital
- Real Wage
- Agg. Consumption
- Loan Interest Rate
- Capital
- Loans
- Leverage
- Income Ratio
- Consumption Ratio
- Crisis Probability
Conclusions

- The crisis barely improve workers situation (while their loan drop by 10% due to default, their wage also drops significantly and the real interest rate on remaining debt shoots up to raise debt servicing)

- By contrast, restoration of poor and middle income households’ bargaining power can be very effective (sustained reduction in leverage that should reduce the probability of a further crisis)

- Link between crisis and leverage: the specification of the crisis probability

- Extend this to open economy (same mechanism) and explain current account imbalances triggered by income inequality in surplus countries