Consumption Inequality and Family Labor Supply

Richard Blundell   Luigi Pistaferri
Itay Saporta-Eksten
Discussion by Mark Aguiar

October 19, 2012
Motivation

- How do households insure income shocks?
Motivation

- How do households insure income shocks?
- Canonical model: Self-insurance through credit markets
Motivation

- How do households insure income shocks?
- Canonical model: Self-insurance through credit markets
- Adjustments to market labor supply
Motivation

- How do households insure income shocks?
- Canonical model: Self-insurance through credit markets
- Adjustments to market labor supply
- Adjustments to home production (non-separability)
The fact that dispersion in consumption grows less rapidly than dispersion in income indicates that households are able to effectively insure some fraction of persistent income fluctuations.

The precise magnitudes of the life-cycle increases in inequality are sensitive to whether one controls for year or cohort effects. For example, the variance of log disposable income rises twice as fast under the cohort view (the right panels) than under the time view (the left panels).

If one takes the pure cohort view, cross-sectional inequality can increase only if each successive cohort starts out with more unequal income. If one takes the pure time view, cross-sectional inequality can increase only if all cohorts see faster growth in within-cohort inequality.

The right panels of Figure 14 indicate that over this period, within-cohort disposable income inequality was rising rapidly, whereas the left panels attribute much of this rise to a general increase in income inequality over time.

Why is the life-cycle profile for income so sensitive to whether one adopts the time or cohort view, while the earnings and consumption profiles look more similar? Recall from Figure 12 that the cross-sectional variances of log earnings and log consumption are relatively stable over time in the CEX, while the variance of disposable income shows a marked increase. Thus, whether non-stationarity is modeled through year or cohort effects should have relatively little impact on the implied age profiles for earnings or consumption inequality, whereas more is at stake in deciding whether to model rising income inequality through time or cohort effects.

Source: Heathcote, Perri, and Violante (2010)
In an ideal world, we could use a unique longitudinal household survey to track the joint dynamics of income, hours, consumption, net saving, and wealth. Unfortunately, no such data set exists for the United States. The best one can do, with US data, is to combine different surveys. Therefore, it is paramount that different surveys yield similar patterns for the overlapping variables. In this section, we briefly assess the comparability of the CPS, the PSID, and the CEX.

Figure 15 compares the evolution of inequality over the life cycle across data sets. For all variables —head wage, head hours, raw household earnings, and OECD-equivalized household earnings—we find very close alignment across the three data sets. As discussed above, the life cycle profile for the variance of log wages is concave, but the dramatic U-shape in the variance of log hours translates into a convex profile for the variance of log household earnings. Figure 15 plots age profiles controlling for year effects (see Section 5).

Source: Heathcote, Perri, and Violante (2010)
Wages and Earnings

Source: Heathcote, Perri, and Violante (2010)
The effect of wage shocks on consumption can be mitigated by adjusting labor supply

In the canonical single-worker-household framework this runs into trouble:

\[-u_n = wu_c\]
The effect of wage shocks on consumption can be mitigated by adjusting labor supply.

In the canonical single-worker-household framework this runs into trouble:

\[-u_n = wu_c\]
\[\theta N^\omega = WC^{-\gamma}\]
The effect of wage shocks on consumption can be mitigated by adjusting labor supply.

In the canonical single-worker-household framework this runs into trouble:

\[-u_n = wu_c\]

\[\ln \theta + \omega \ln N = \ln W - \gamma \ln C\]
The effect of wage shocks on consumption can be mitigated by adjusting labor supply.

In the canonical single-worker-household framework this runs into trouble:

\[-u_n = \omega u_c\]

\[\ln \theta + \omega n = w - \gamma c\]
The effect of wage shocks on consumption can be mitigated by adjusting labor supply.

In the canonical single-worker-household framework this runs into trouble:

\[-u_n = wu_c\]

\[\omega^2 Var_t(n) = Var_t(w) + \gamma^2 Var_t(c) - 2\gamma Cov_t(w, c)\]
In an ideal world, we could use a unique longitudinal household survey to track the joint dynamics of income, hours, consumption, net saving, and wealth. Unfortunately, no such data set exists for the United States.

The best one can do, with US data, is to combine different surveys. Therefore, it is paramount that different surveys yield similar patterns for the overlapping variables. In this section, we briefly assess the comparability of the CPS, the PSID, and the CEX.

Life cycle Figures 15 compares the evolution of inequality over the life cycle across CPS, PSID, and CEX samples. For all variables —head wages, head hours, raw household earnings, and OECD-equivalized household earnings—we find very close alignment across the three data sets. As discussed above, the life cycle profile for the variance of log wages is concave, but the dramatic U-shape in the variance of log hours translates into a convex profile for the variance of log household earnings.

Figure 15 plots age profiles controlling for year effects (see Section 5). We also computed the same.

See Krueger and Perri (2009) and Jappelli and Pistaferri (2009, this volume) for studies along these lines using the Italian Survey of Household Income and Wealth.
Labor Supply of Spouse

- Added-worker effect
- Spouse increases labor supply in response to a decline in earnings for other household member – pure income effect
- Nice to incorporate it together with consumption/savings decisions
Non-separability/Home Production

- Expenditure not a sufficient statistic for marginal utility of consumption
Non-separability/Home Production

- Expenditure not a sufficient statistic for marginal utility of consumption
- Clearly at work for extensive margin (retirement)
Non-separability/Home Production

- Expenditure not a sufficient statistic for marginal utility of consumption
- Clearly at work for extensive margin (retirement)
- Long-term vs. short-term: Maybe less for short unemployment spells
Non-separability/Home Production

- Expenditure not a sufficient statistic for marginal utility of consumption
- Clearly at work for extensive margin (retirement)
- Long-term vs. short-term: Maybe less for short unemployment spells
- Intensive margin: employed workers with reduced hours increase home-production time in recent recession
Non-separability/Home Production

- Expenditure not a sufficient statistic for marginal utility of consumption
- Clearly at work for extensive margin (retirement)
- Long-term vs. short-term: Maybe less for short unemployment spells
- Intensive margin: employed workers with reduced hours increase home-production time in recent recession
- Much of increase in variance of expenditure over lifecycle is driven by goods that are substitutes for time
Non-separability/Home Production

- Expenditure not a sufficient statistic for marginal utility of consumption
- Clearly at work for extensive margin (retirement)
- Long-term vs. short-term: Maybe less for short unemployment spells
- Intensive margin: employed workers with reduced hours increase home-production time in recent recession
- Much of increase in variance of expenditure over lifecycle is driven by goods that are substitutes for time
- Complementarity goods with high income elasticities (like entertainment expenditures) show declines in cross-sectional variance over the lifecycle.
Approach of BPS

- Log wage a sum of deterministic component, a random-walk shock, and an $iid$ shock
Approach of BPS

- Log wage a sum of deterministic component, a random-walk shock, and an iid shock
- Husband and wife have correlated shocks
Approach of BPS

- Log wage a sum of deterministic component, a random-walk shock, and an iid shock
- Husband and wife have correlated shocks
- In log first-differences after controlling for demographics:

\[ \Delta w_{ijt} = \Delta u_{ijt} + \nu_{ijt} \]
Approach of BPS

- Log wage a sum of deterministic component, a random-walk shock, and an iid shock
- Husband and wife have correlated shocks
- In log first-differences after controlling for demographics:

\[ \Delta w_{ijt} = \Delta u_{ijt} + \nu_{ijt} \]

- Moments of wage process estimated separately from consumption process
Consumption Function

- Log-linearize consumption and labor policy functions
- Separable case: Assume zero response to transitory shock:

\[ \Delta c_{it} = \kappa_{c1} \nu_{i1t} + \kappa_{c2} \nu_{i2t} \]
Consumption Function

- Log-linearize consumption and labor policy functions
- Separable case: Assume zero response to transitory shock:

\[ \Delta c_{it} = \kappa_{cv_1} \nu_{i1t} + \kappa_{cv_2} \nu_{i2t} = 0.13 \nu_{i1t} + 0.07 \nu_{i2t} \]

- Key result: Limited response to permanent wage shocks.
Consumption Function

- Log-linearize consumption and labor policy functions
- Separable case: Assume zero response to transitory shock:

\[ \Delta c_{it} = \kappa c v_1 \nu_{i1t} + \kappa c v_2 \nu_{i2t} \]

- Key result: Limited response to permanent wage shocks.
- \( \kappa c,\nu = \text{model response} \times (1 - \beta) \)
Consumption Function

- Log-linearize consumption and labor policy functions
- Separable case: Assume zero response to transitory shock:

\[ \Delta c_{it} = \kappa_{cv_1} \nu_{i1t} + \kappa_{cv_2} \nu_{i2t} \]

- Key result: Limited response to permanent wage shocks.
- \( \kappa_{c,\nu} = \text{model response} \times (1 - \beta) \)
- \( \beta = 0.74 \) – a large amount of “missing” insurance
Non-separable Case

- Consumption responds to transitory shocks due to (strong) endogenous labor supply response

\[ \Delta c_{it} = \kappa_{cu1} \Delta u_{i1t} + \kappa_{cu2} \Delta u_{i2t} + \kappa_{cv1} \nu_{i1t} + \kappa_{cv2} \nu_{i2t} \]
Non-separable Case

- Consumption responds to transitory shocks due to (strong) endogenous labor supply response

\[ \Delta c_{it} = \kappa_{cu1} \Delta u_{i1t} + \kappa_{cu2} \Delta u_{i2t} + \kappa_{cv1} \nu_{i1t} + \kappa_{cv2} \nu_{i2t} \]

\[ = -0.14 \Delta u_{i1t} - 0.14 \Delta u_{i2t} + 0.38 \nu_{i1t} + 0.21 \nu_{i2t} \]
Non-separable Case

- Consumption responds to transitory shocks due to (strong) endogenous labor supply response

\[ \Delta c_{it} = \kappa_{cu1} \Delta u_{1t} + \kappa_{cu2} \Delta u_{2t} + \kappa_{cv1} \nu_{1t} + \kappa_{cv2} \nu_{2t} \]

\[ = -0.14 \Delta u_{1t} - 0.14 \Delta u_{2t} + 0.38 \nu_{1t} + 0.21 \nu_{2t} \]

- Much less hidden insurance: \( \beta = -0.12 \)
Non-separable Case

- Consumption responds to transitory shocks due to (strong) endogenous labor supply response

\[
\Delta c_{it} = \kappa_{cu_1} \Delta u_{i1t} + \kappa_{cu_2} \Delta u_{i2t} + \kappa_{cv_1} \nu_{i1t} + \kappa_{cv_2} \nu_{i2t}
\]

\[
= -0.14 \Delta u_{i1t} - 0.14 \Delta u_{i2t} + 0.38 \nu_{i1t} + 0.21 \nu_{i2t}
\]

- Much less hidden insurance: \( \beta = -0.12 \)
- Consumption and leisure are *complements*
Non-separable Case

- Consumption responds to transitory shocks due to (strong) endogenous labor supply response

\[
\Delta c_{it} = \kappa_{cu1} \Delta u_{i1t} + \kappa_{cu2} \Delta u_{i2t} + \kappa_{cv1} \nu_{i1t} + \kappa_{cv2} \nu_{i2t} \\
= -0.14 \Delta u_{i1t} - 0.14 \Delta u_{i2t} + 0.38 \nu_{i1t} + 0.21 \nu_{i2t}
\]

- Much less hidden insurance: $\beta = -0.12$
- Consumption and leisure are *complements*
- Including transitory shock has large effect on permanent shock coefficient
Non-separable Case

- Consumption responds to transitory shocks due to (strong) endogenous labor supply response

\[ \Delta c_{it} = \kappa_{cu_1} \Delta u_{i1t} + \kappa_{cu_2} \Delta u_{i2t} + \kappa_{cv_1} \nu_{i1t} + \kappa_{cv_2} \nu_{i2t} \]

\[ = -0.14 \Delta u_{i1t} - 0.14 \Delta u_{i2t} + 0.38 \nu_{i1t} + 0.21 \nu_{i2t} \]

- Much less hidden insurance: \( \beta = -0.12 \)
- Consumption and leisure are *complements*
- Including transitory shock has large effect on permanent shock coefficient
- Negative coefficient on transitory income runs counter to liquidity constraints
Excess Smoothness

Income

Consumption
Separable Case

- Identification from contemporaneous covariance between income and consumption
- Weakened by slow adjustment of expenditure
- Classic excess smoothness-excess sensitivity problem
Nonseparable Case

- Identification from covariance between today’s consumption growth and yesterday’s income growth: $\text{Cov}(\Delta w_{t-1}, \Delta c_t)$
- If this is positive, then consumption and leisure are complements
Nonseparable Case

- Identification from covariance between today’s consumption growth and yesterday’s income growth: $\text{Cov}(\Delta w_{t-1}, \Delta c_t)$
- If this is positive, then consumption and leisure are complements
- Identification assumption: Response of consumption to previous shocks only due to labor supply response to transitory shocks
Nonseparable Case

- Identification from covariance between today’s consumption growth and yesterday’s income growth: $Cov(\Delta w_{t-1}, \Delta c_t)$
- If this is positive, then consumption and leisure are complements
- Identification assumption: Response of consumption to previous shocks only due to labor supply response to transitory shocks
- A positive transitory shock today involves a positive change in wage today and a (predictable) negative change tomorrow
Nonseparable Case

- Identification from covariance between today’s consumption growth and yesterday’s income growth: $\text{Cov}(\Delta w_{t-1}, \Delta c_t)$
- If this is positive, then consumption and leisure are complements
- Identification assumption: Response of consumption to previous shocks only due to labor supply response to transitory shocks
- A positive transitory shock today involves a positive change in wage today and a (predictable) negative change tomorrow
- If consumption at $t$ is positively correlated with lagged wage growth ($t - 1$), then it is responding to the contemporaneous decline in labor supply at time $t \Rightarrow$ consumption declines with wealth-neutral increases in labor supply
Effect on Insurance

- Consumption has a low contemporaneous covariance with income
Effect on Insurance

- Consumption has a low contemporaneous covariance with income
- Some of that can be attributed to non-separability
Effect on Insurance

- Consumption has a low contemporaneous covariance with income
- Some of that can be attributed to non-separability
- Raising consumption’s response to a permanent income shock
Consumption response to predictable wage changes clearly a violation of the standard model.

BPS fit this feature through consumption-leisure complementarity.
Consumption response to predictable wage changes clearly a violation of the standard model

BPS fit this feature through consumption-leisure complementarity

Other tests of complementarity:
  - Extensive margin – BPS show this has the reverse sign (substitutes)
Consumption response to predictable wage changes clearly a violation of the standard model

BPS fit this feature through consumption-leisure complementarity

Other tests of complementarity:
- Extensive margin – BPS show this has the reverse sign (substitutes)
- Deterministic lifecycle profile of hours? Should we expect this to generate a counter-factually U-shape profile in consumption?
Conclusion

- A very innovative paper: Fully exploits PSID, includes family labor supply effects, ...
Conclusion

- A very innovative paper: Fully exploits PSID, includes family labor supply effects, ...
- Carefully done: Measurement error, selection, ...
A very innovative paper: Fully exploits PSID, includes family labor supply effects, ...

Carefully done: Measurement error, selection, ...

Striking conclusion: No “unexplained” insurance. No excess smoothness puzzle.
Conclusion

- A very innovative paper: Fully exploits PSID, includes family labor supply effects, ...
- Carefully done: Measurement error, selection, ...
- Striking conclusion: No “unexplained” insurance. No excess smoothness puzzle.
- Suggestion: Shed more light on identification and other implications of consumption-leisure complementarity?