HOUSEHOLD BEHAVIOR AND THE DYNAMICS OF INEQUALITY

NEMMERS LECTURE
NORTHWESTERN UNIVERSITY

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- *Labor economics* - inequality in wages and earnings.
- *Family or household economics* - inequalities in family earnings, family labor supply and time allocations.
- *Public economics* - inequality in income and the impact of taxation.
- Often left to *macroeconomics* - the distributional dynamics of consumption (and wealth).
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The research agenda I present here argues that these need to be brought together to get a handle on the subject of this lecture:

..... “Household Behavior and the Dynamics of Inequality”.....
Two key motivating issues:

- falling real earnings for low skilled, especially men,
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Requiring the design of appropriate policy responses.

The aim of this research agenda is to explore the mechanisms families and households use to accommodate shocks, to see how successful are tax and welfare systems and to suggest how policies could be better targeted.

Some background descriptive motivation on different measures of inequality....
Male Median Real Wages by Education in the US

Notes: CPS, Ages 25-55; Source: Blundell, Norris-Keiller and Ziliak (2017)
Male Median Real Wages by Education and Race in the US

Notes: CPS, Men Ages 25-55; Source: Blundell, Norris-Keiller and Ziliak (2017)
Earnings Change by Education and Gender, US

Male Real Wages Inequality by Birth Cohort and Age in the US

Notes: CPS FTFY workers aged 25-55; Source: Blundell, Norris-Keiller and Ziliak (2017)
Female Real Wage Inequality (90/10) by Birth Cohort and Age in the US

Notes: CPS FTFY workers aged 25-55; Source: Blundell, Norris-Keiller and Ziliak (2017)
Consumption Inequality by age and birth cohort (US)

Notes: var (log); Source: Blundell, Pistaferri and Preston (2008)
Consumption inequality by age and birth cohort (UK)

Notes: Variance (log); Source: Blundell, O’Dea and Joyce (2016).
Expenditure per Capita, Non-Medicaid Means Tested Programs, US.

Source: Moffitt (2016); SNAP, EITC and SSI, [note AFDC/TANF].
The links between inequality measures


The link between these various measures is mediated by multiple ‘insurance’ mechanisms:

- Labor supply, etc. (wages → earnings)
- Family labour supply and time allocations (earnings → family earnings)
- Taxes and welfare (earnings → net income)
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The Research Agenda

- Drawing from recent, and on-going, research on household behavior:
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- This is team work and there is detail behind it!
- Here just an overview......
A DATA REVOLUTION IN EMPIRICAL MICROECONOMICS

I. Administrative linked data: e.g. Norwegian population register.

- Linked registry databases with unique individual identifiers.
  - Containing records for every Norwegian from 1967 to 2006.
  - Detailed demographic and socioeconomic information (market income, cash transfers). Recent links to real estate and assets; and to hours of work. New consumption measurements.
- Family identifiers allow to match spouses and children.
  - see Blundell, Graber and Mogstad (2015).
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II. Newly designed panel surveys: e.g. PSID since 1999.

- Collection of consumption and assets had a major revision in 1999
  - ~70% of consumption expenditures. Good match with NIPA
  - The sum of food at home, food away from home, gasoline, health, transportation, utilities, clothing etc.

- Earnings and hours for all earners; Assets measured in each wave.
  - see Blundell, Pistaferri and Saporta-Eksten (2016).
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- persistent shocks to income are more difficult to insure,
- especially the young with low assets.
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How families cope with persistent shocks and the implications for inequality will be the main focus of this talk:

- short-run fluctuations will matter too, of course,
- especially for households with low assets (or low access to liquid assets).
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where $\eta_{it}$ is a process of permanent/persistent shocks,

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and where $\varepsilon_{it}$ is a transitory shock, possibly some low order MA process.
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A key consideration is to allow the distributions of the persistent and transitory factors ($\eta_t$ and $\varepsilon_t$) to vary with age/time for each birth cohort.

Simple but can be very revealing - detailed work on Norwegian population register panel data....
Variance of permanent shocks to income

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Variance of permanent shocks to income (low skilled)

To account for the impact of income shocks on consumption we introduce *transmission parameters* writing consumption growth as:

\[
\Delta \ln C_{it} \equiv \gamma_{it} + \Delta Z_{it} \varphi + \phi_t \nu_{it} + \psi_t \varepsilon_{it} + \zeta_{it}
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For a simple benchmark intertemporal consumption model for consumer of age \(t\), BLP (2013) show

\[
\phi_t = (1 - \pi_{it}) \quad \text{and} \quad \psi_t = (1 - \pi_{it}) \gamma_{Lt}
\]

where

\[
\pi_{it} \approx \frac{\text{Assets}_{it}}{\text{Assets}_{it} + \text{Human Wealth}_{it}}
\]

and \(\gamma_{Lt}\) is the annuity value of a temporary shock to income for an individual aged \(t\) retiring at age \(L\).
Consumption inequality in Norway by age, low skilled.
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Social insurance takes most of the strain in insuring consumption fluctuations. Little role for self-insurance or other channels.

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Using the US PSID data, BPP estimates of partial insurance, $\hat{\phi}_t$:

- 0.6423 (.09) overall,
- 0.9439 (.13) for the sample without college education, and
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Transmission Parameters and Partial Insurance

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0.9439 (.13) for the sample without college education, and
0.7928 (.18) for those born in the 1940s.

- The estimate falls by more than 30% if we exclude taxes, EITC and food stamps for the no college group.

- For a low wealth sample $\hat{\phi}_t$ is .8489 and there are significant impacts of transitory fluctuations in income too.
These are key results linking the distributional dynamics of income and consumption but the estimates also point to some potential puzzles:

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2. Other mechanisms: in particular family labor supply and time use with children.
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1. **The income process**: usual shocks and nonlinear persistence.
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- see also the work separating employment shocks by *Hamish Low, Costas Meghir* and *Luigi Pistaferri* (*AER*).
- advance information could be a key issue too (*ABB*).
1. Unusual Income Shocks and Nonlinear Persistence

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- Develop a new framework that allows unusual shocks to wipe out the memory of past shocks, and future persistence of a current shock to depend on the future shocks.

We find this has important implications for income inequality, and on the partial insurance links to consumption behavior.
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- **Evidence of such nonlinearity?**
Nonlinear Persistence in the PSID

Nonlinear Persistence in the Norwegian Register Data

Unusual Income Shocks and Nonlinear Persistence

- A twist to the standard model:
  - allow for nonlinear persistence in the permanent component $\eta_{it}$. 

The persistence of shocks to $\eta_{it}$ depend on the sign and size of the shock; and also level of $\eta_{it}$ represented by a conditional quantile model $\eta_{it} = Q_t(\eta_{it}, u_{it})$ - quite different from the standard model of income dynamics. And delivering a new measure of nonlinear persistence. Use this new nonlinear framework to explore the complete distributional dynamics of income, and then the implications for consumption and savings decisions...
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Nonlinear Persistence in Permanent Income

Notes: Pre-tax household labor earnings, Age 30-60 1999-2009 (US). Estimates of the average derivative of the conditional quantile function see source paper.
Confidence Intervals for Estimated Nonlinear Persistence

Notes: 95% CI for estimated average derivative of the conditional quantile function see source paper; parametric bootstrap.
Source: Arellano, Blundell and Bonhomme (2017).
Allow the permanent and transitory income components to interact with assets, age and individual heterogeneity:

\[ c_{it} = g_t(A_{it-1}, \eta_{it}, \varepsilon_{it}, \nu_{it}, \zeta_i) \]

- assets \( A_{it-1} \),
- permanent income \( \eta_{it} \),
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A flexible model of the consumption policy function and more general definition of partial insurance.
Implications for the Consumption Distribution

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- A flexible model of the consumption policy function and more general definition of partial insurance.

- Track the impact of a permanent income shift on consumption for different levels of assets and for different ages......
Source: Arellano, Blundell and Bonhomme (2017).
Consumption responses for older worker (high income [90th], bad shock [10th])

Notes: Impulse response of persistent shock; 90th percentile of permanent income, 10th percentile shock; 25th percentile (blue) and 75th percentile (green) of assets. Families with head aged 50-60, 1999-2009 (US). Source: Arellano, Blundell and Bonhomme (2017).
Consumption responses for younger worker (high income [90th], bad shock [10th])

Notes: Impulse response of persistent shock; 90th percentile of permanent income, 10th percentile shock; 25th percentile (blue) and 75th percentile (green) of assets. Families with head aged 35-60, 1999-2009 (US).
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Families have the possibility of adjusting on many margins.

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  1. Labor supply of other family members,
  2. Non-linear taxes and welfare,
  3. Self-insurance (i.e., savings) through the direct use of net assets,
  4. Other informal mechanisms and networks....
2. What about a role for family labor supply?

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- We then examine each step in the distributional dynamics from wages to consumption.
Allow for correlated shocks to spouses *individual wages*

- assortative matching (and data) suggests positive correlation,
- no insurance through wages!

Leisure preferences tend to display complementarity like each other's company - loving or caring preferences, no insurance there either!

‘Frisch’ complements but ‘Marshallian’ substitutes!

Even with correlated wages and complementary preferences, the framework allows a persistent decline in one spouse earnings to induce an increase in earnings of the other to maintain consumption.

Might love to spend time together but have to eat!

A persistent shock to his wages will depend on preferences over time use and consumption, but also on the net assets the family can draw on and how important his earnings are in the human capital of the family.
Allowing for assortative matching and preference complementarities

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- A persistent shock to his wages will depend on preferences over time use and consumption, but also on the net assets the family can draw on and how important his earnings are in the human capital of the family ....
The share of his human wealth by age

\[ s_{i,t} \approx \frac{\text{Human Wealth}_{\text{male},i,t}}{\text{Human Wealth}_{i,t}} \]

Notes: PSID couples. Source: Blundell, Pistaferri and Saporta-Eksten (2016)
The distribution of his human wealth by age

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The share of assets to human wealth by age

$$\pi_{i,t} \approx \frac{\text{Assets}_{i,t}}{\text{Assets}_{i,t} + \text{Human Wealth}_{i,t}}$$

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WHAT DO WE FIND?

Household consumption responses to an adverse persistent shock to husband’s real wages

Response of Consumption to a 10% Permanent Decrease in the Male’s Wage Rate

Notes: Average response. Source: Blundell, Pistaferri and Saporta-Eksten (2016)
Household consumption responses to an adverse persistent shock to husband’s real wages

Consumption Response to a -10% Permanent Shock to Head's Wages ($k_3$)

Notes: Distribution of responses.
Source: Blundell, Pistaferri and Saporta-Eksten (2016)
IMPLICATIONS....

- Found that family labor supply is a key mechanism for ‘insuring’ unexpected shocks,
  - especially for younger families and for those with limited access to assets,
  - leisure time turns out to be a Frisch complement but a Marshallian substitute.
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For lowest income quintile: consumption declines on average by only 2.6%,

- SNAP (Food stamps) and EITC dominate with family labor supply responses making up the difference.

Overall, once family labor supply, assets and taxes/benefits are accounted for, there is little evidence for additional insurance.

But where do these hours adjustments come from?
Time-use data (ATUS) allows us to unpack what’s going on.
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A tension between the desire of spouses to spend leisure time with each other, and the specialization in care of children,

- complementarity in leisure but specialization in childcare.
- family labor supply flips between being substitutes to complements as the child ages...
Implications for family time-use allocations with children.

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- A neat and simple household production model works a treat!
  - it is mother’s time with children that takes a hit...
Mother’s labor supply response to a persistent adverse shock (10%) to husband’s earnings

Notes: ATUS and PSID; Source: Blundell, Pistaferri and Saporta-Eksten (2017)
Mother’s time with children response to a persistent adverse shock to husband’s earnings

Notes: ATUS and PSID; Source: Blundell, Pistaferri and Saporta-Eksten (2017)
....Note, Nonlinear Persistence remains a key feature for male wages

GATHERING UP THE RESULTS...

Focus on understanding the transmission of inequality over the working life.

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- Finding a key role for unusual shocks and nonlinear persistence.
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- Finding a key role for unusual shocks and nonlinear persistence.

- Documenting the importance of different aspects of *household behavior* and of *tax/welfare policy*:
  
  - Labor supply, etc. (wages \rightarrow \text{earnings})
  - Family labour supply and time-use allocations (earnings \rightarrow \text{family earnings})
  - Taxes and welfare (earnings \rightarrow \text{net income})
  - Saving and borrowing (income \rightarrow \text{consumption} \rightarrow \text{wealth}).
**Gathering up the results...**

- Focus on understanding the **transmission of inequality** over the working life.

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- Showing the value, of high quality data on household earnings, hours, consumption and assets.

- Drawing from linked administrative population register data and carefully collected panel data surveys.
Dig deeper into these behaviors and their implications for policy reform,
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That’s it for now!

Household Behavior and the Dynamics of Inequality

Nemmers Lecture
Northwestern University

Richard Blundell
UCL & IFS

May 2017