Household Behavior and the Dynamics of Income and Earnings Inequality

Launch of the Business in Society Inequality Platform

Richard Blundell

UCL & IFS

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DIMENSIONS OF ECONOMIC INEQUALITY

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- *Family or household economics* - **inequalities in family earnings, family labor supply** and **time allocations.**
- *Public economics* - **inequality in income** and **the impact of taxation and welfare benefits**.
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These need to be brought together to get a clearer understanding of the dynamics of inequality. With insights from other disciplines too!

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- The link between these various measures is mediated by multiple 'insurance' mechanisms:
    - Labor supply, etc. (wages→ earnings)
    - Family labour supply, assortative matching and family time allocations (earnings→ family earnings)
    - Taxes, welfare and social insurance (earnings→ net income)
    - Saving and borrowing (income→ consumption→ wealth) − *don't forget nonseparabilities*!
    - Networks, gifts and other mechanisms.

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    - Networks, gifts and other mechanisms.

- The aim of this research is to develop a framework, *the partial insurance approach*, for uncovering the role of these mechanisms, primarily during working life.

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- **Some motivating background descriptives....**

Male Median Real Wages by Education in the US
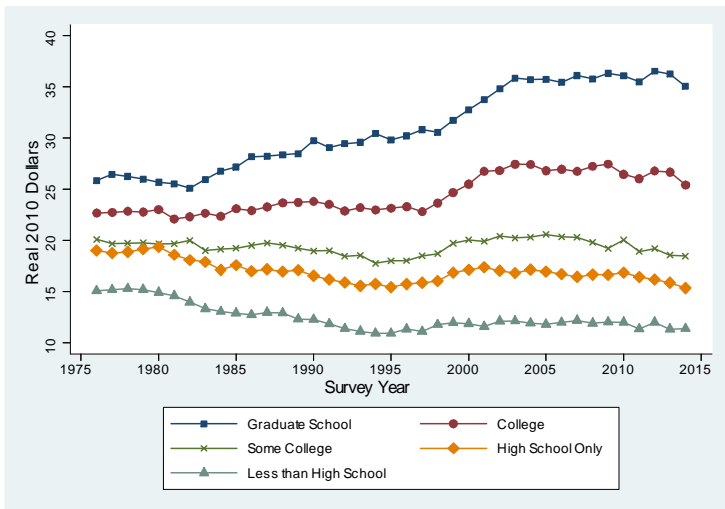
Notes: CPS, Ages 25-55; Source: Blundell, Norris-Keiller and Ziliak (2018)
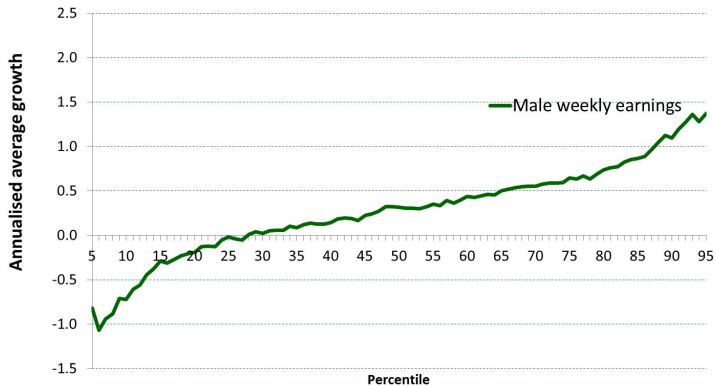
Earnings Change by Education and Gender, US
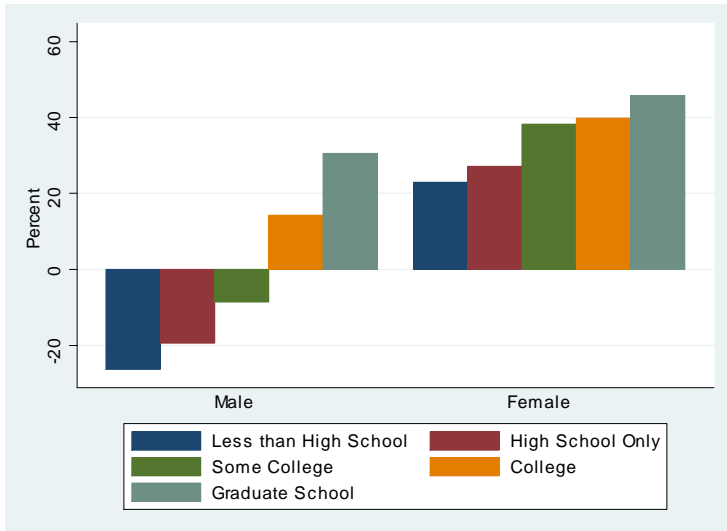
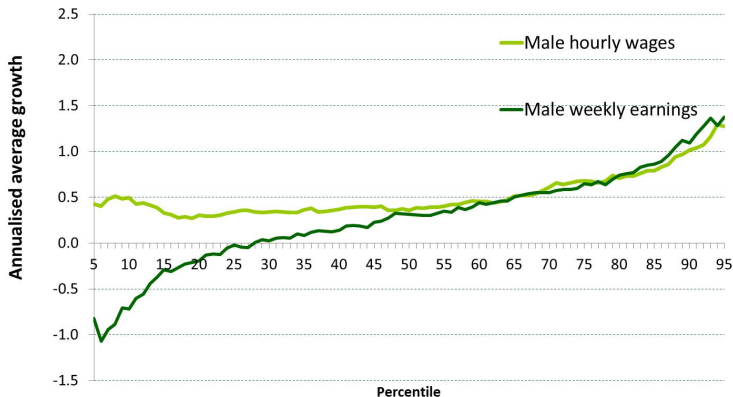Notes: CPS, real median earnings 1976-2014, Ages 25-55.
Source: Blundell, Norris-Keiller and Ziliak (2018)

Growth in UK male weekly earnings: 1994/95 – 2015/16

Source: Blundell, Joyce, Norris Keiller and Ziliak (2018)
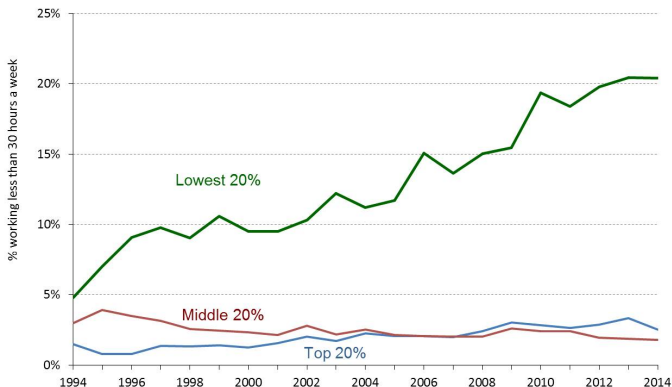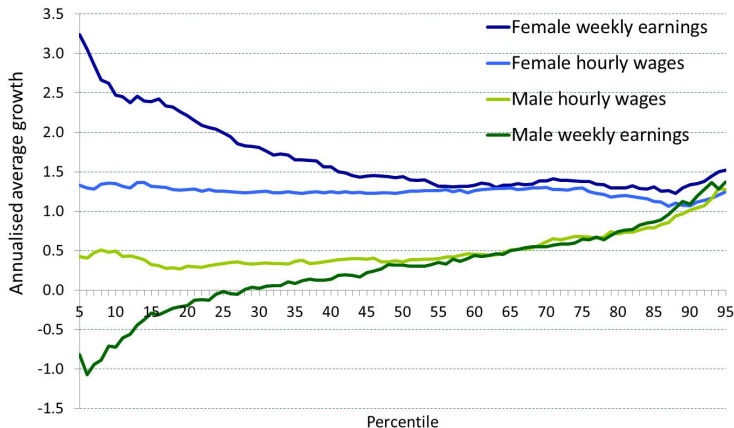Data used is UK FRS 1994-95 and 2015-16.

Growth in UK male hourly wages: 1994/95 – 2015/16

Male hours of work in the UK by wage quintile: 1994/95 – 2015/16

Source: Blundell, Joyce, Norris Keiller and Ziliak (2018)
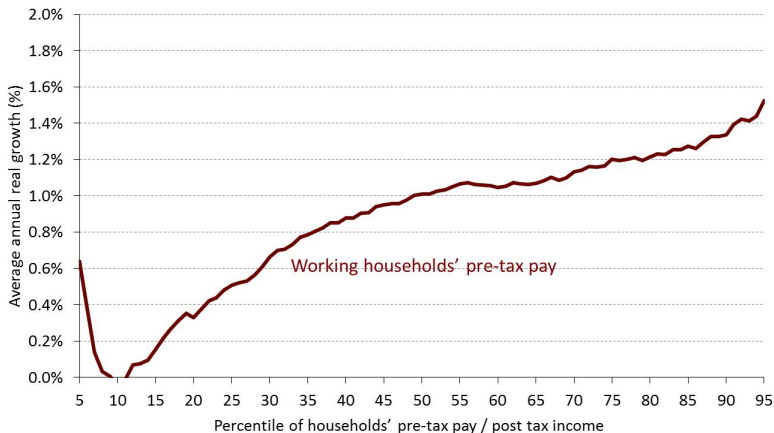Data used is UK FRS 1994-95 and 2015-16.

Growth in UK male and female earnings: 1994/95 – 2015/16

Source: Blundell, Joyce, Norris Keiller and Ziliak (2018)
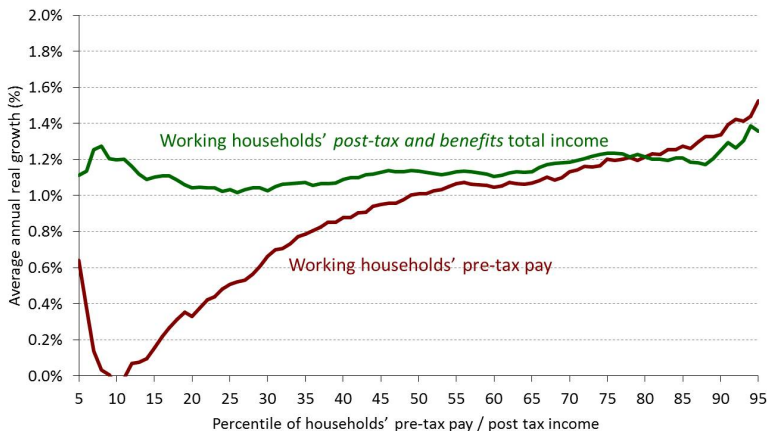Data used is UK FRS 1994-95 and 2015-16.

Growth in UK household earnings: 1994/95 – 2015/16

Source: Blundell, Joyce, Norris Keiller and Ziliak (2018)
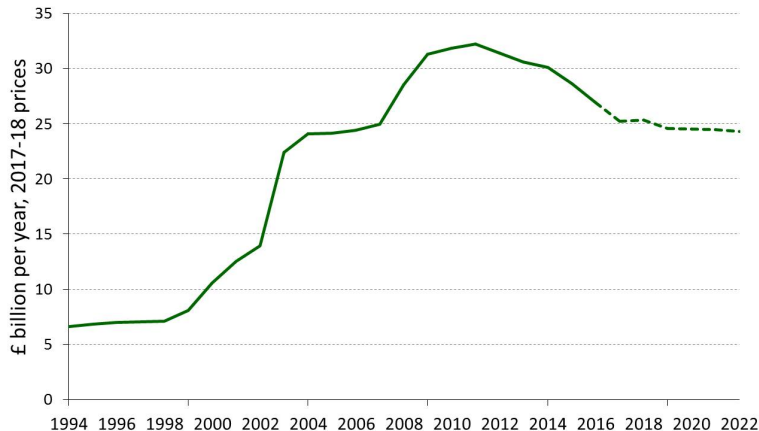Data used is UK FRS 1994-95 and 2015-16.

Growth in UK household post-tax income: 1994/95 – 2015/16

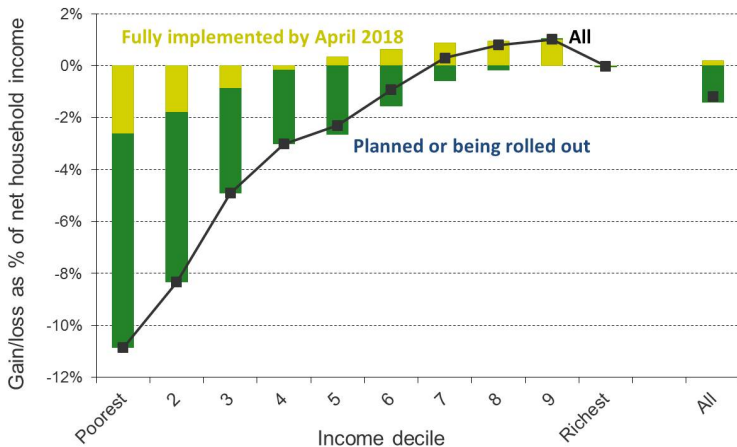Source: Blundell, Joyce, Norris Keiller and Ziliak (2018)
Data used is UK FRS 1994-95 and 2015-16.

Growth in UK tax and welfare expenditure: 1994/95 –>

Source: Blundell, Joyce, Norris Keiller and Ziliak (2018).
DWP calculations plus IFS.

UK tax and welfare policy responses

Source: Blundell, Joyce, Norris Keiller and Ziliak (2018).
IFS calculations.

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- Driven by a data revolution....

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 2014.**
  - Detailed socioeconomic information (market income, cash transfers). Links to financial transactions data on real estate and assets; and to hours of work⇒ *new consumption measurements*.
- Family identifiers allow to match spouses and children.
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II. Newly designed panel surveys: e.g. PSID 1999 - 2015.

- Collection of consumption and assets had a major revision in 1999
  - ~70% of consumption expenditures. Around 90% from 2005.
  - Food at home, food away from home, gasoline, health, transportation, utilities, clothing, etc with choice of purchase frequency.
- Earnings and hours for all earners; Assets measured in each wave.
  - e.g. Blundell, Pistaferri and Saporta-Eksten (2016).

THE PARTIAL INSURANCE APPROACH

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The partial insurance approach

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- There is also good economic reasoning behind this decomposition:
  - persistent shocks to income are more difficult to insure,
  - especially the young with low assets.
- How families cope with persistent shocks and the implications for inequality is the main focus.
  1. First, look at some baseline partial insurance results,
  2. Second, examine the importance of nonlinearities and heterogeneity in persistence of income,
  3. Third, unpack the role of family labour supply and time use.

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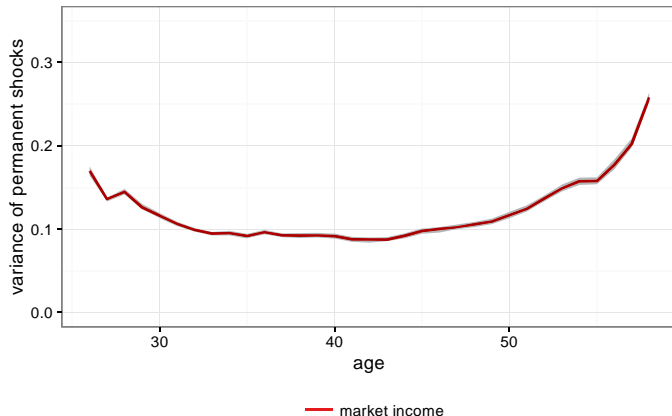 where η_{it} is a process of permanent/persistent shocks,

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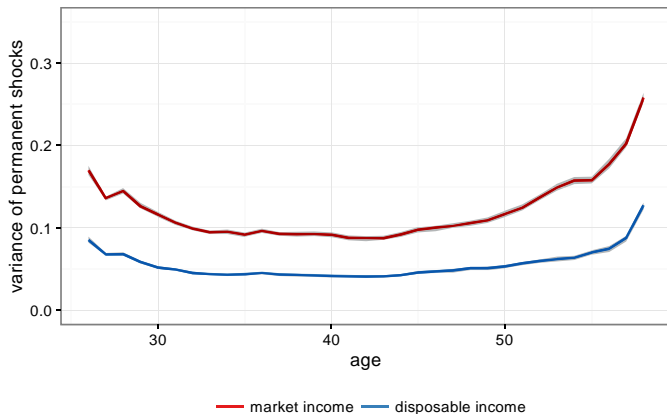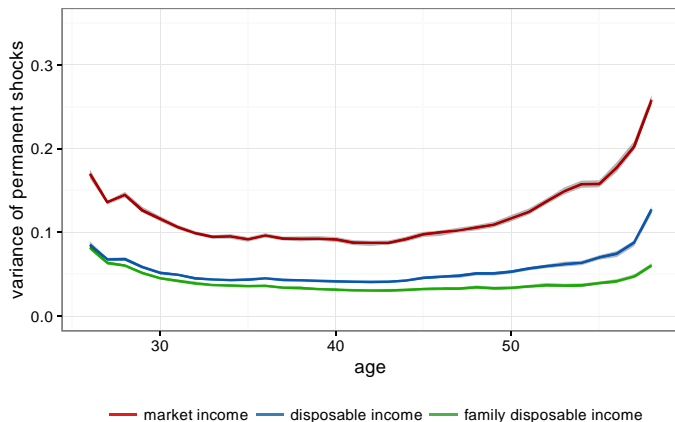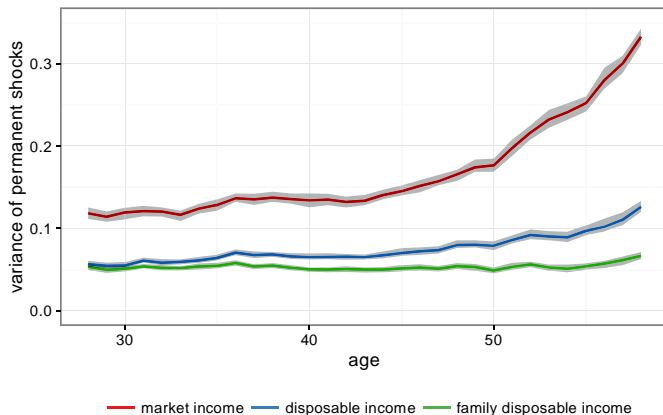
Variance of permanent shocks to income

Source: Blundell, Graber and Mogstad (2015).

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Variance of permanent shocks to income (low skilled)

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Introduce *transmission* or *partial insurance* parameters, writing consumption growth as:

$$\Delta \ln C_{it} \cong \gamma_{it} + \Delta Z'_{it} \varphi + \phi_t v_{it} + \psi_t \varepsilon_{it} + \xi_{it}$$

where ϕ_t and ψ_t can be individual specific and provide the link between the consumption and income distributions - v_{it} the persistent and ε_{it} the transitory shock to income.

PARTIAL INSURANCE:
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- For example, in a simple benchmark intertemporal consumption model for consumer of age t
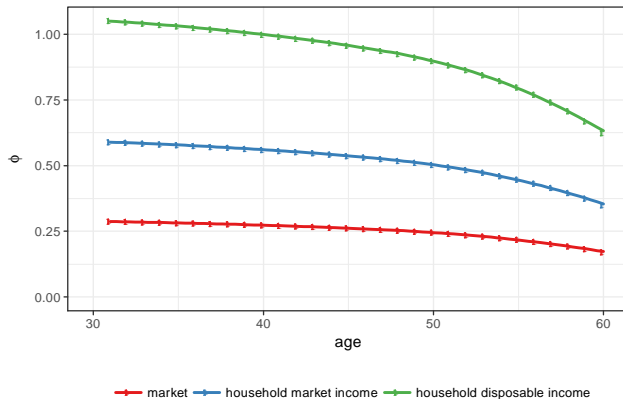
$$\phi_{it} = (1 - \pi_{it})$$

where

$$\pi_{it} \approx \frac{\text{Assets}_{it}}{\text{Assets}_{it} + \text{Human Wealth}_{it}}.$$

- We generalise this framework: taxes, welfare benefits, and other mechanisms that add to the degree of 'partial insurance'.
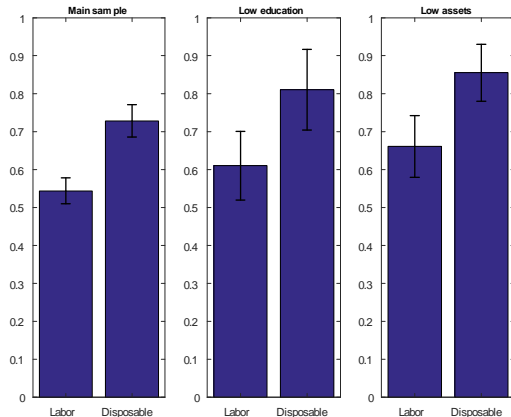
Norway: 1994-2014, High Skill

Notes: Consumption data constructed from the register data, following earlier work in Denmark. Source: Blundell, Graber and Mogstad (2018).

PARTIAL INSURANCE AND THE TRANSMISSION OF PERMANENT INCOME SHOCKS

US: 1999-2009, average transmission coefficients.

PSID: 1999-2009, average transmission coefficients for persistent shocks. Source: Arellano, Blundell, Bonhomme and Light (2018).

DIGGING DEEPER....

- These have proven to be useful results, linking the distributional dynamics of income and consumption inequality. With key results on the value of self-insurance and welfare transfers.

- Perhaps a little "too much" insurance, especially in the PSID.

- I want to briefly highlight two important directions/issues to explore:

1. The income process: usual shocks and nonlinear persistence.

2. Other mechanisms: family labor supply and time use with children, and separate out the role of assets and of taxation and welfare benefits.

1. NONLINEAR PERSISTENCE AND PARTIAL INSURANCE

A flurry of recent descriptive research on large administrative data points to important heterogeneity and outlying shocks that can change the persistence of income, e.g. Browning and Ejrnaes (2016) and Guvenen, Ozkan and Song (2014):

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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.

Show this has important implications for income inequality and self-insurance.

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- **Evidence of such nonlinearity?**

Nonlinear Persistence in the PSID
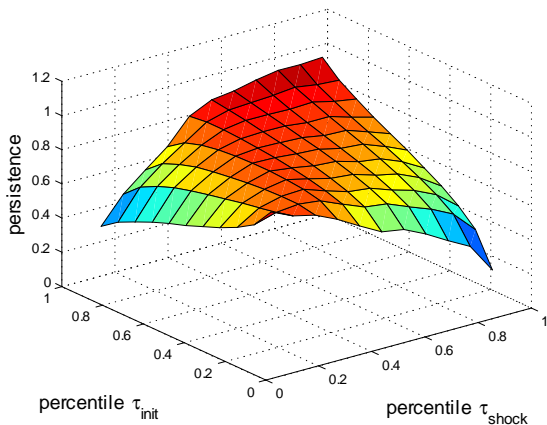
Notes: Family labor earnings, Age 30-60 1999-2009 (US).
Estimates of the average derivative of the conditional quantile function.
Source: Arellano, Blundell and Bonhomme (2017).

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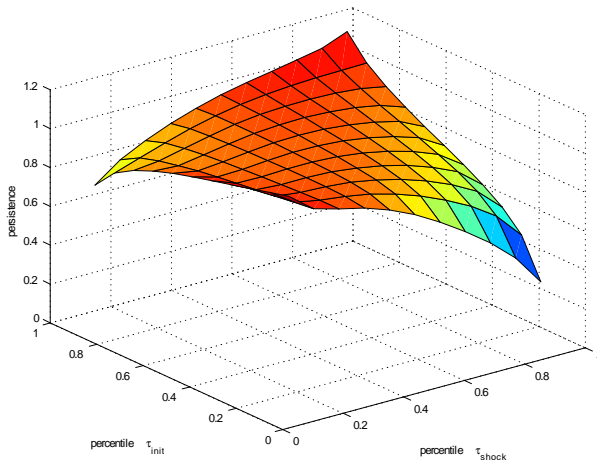
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$$\rho_t(\eta_{it-1}, \tau) = \frac{\partial Q_t(\eta_{it-1}, \tau)}{\partial \eta}$$

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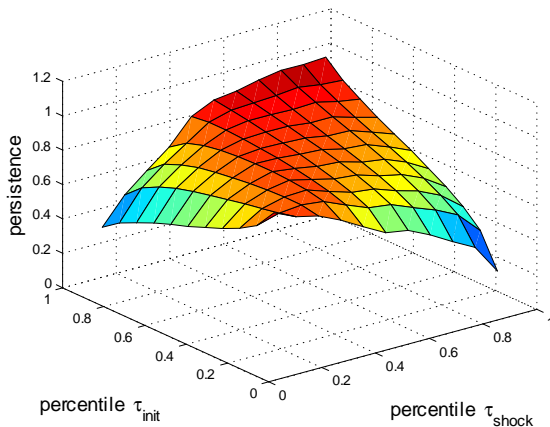
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- Use this nonlinear framework to explore the complete distributional dynamics over the life-cycle.
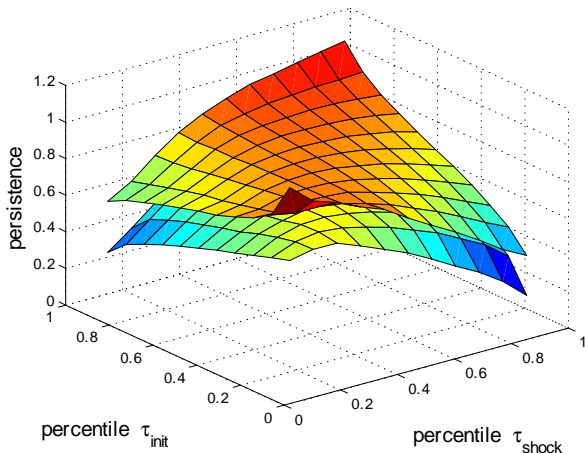
Implied Model Simulation of Persistence in Income

Notes: PSID Household labor earnings, Age 30-60 1999-2009 (US).
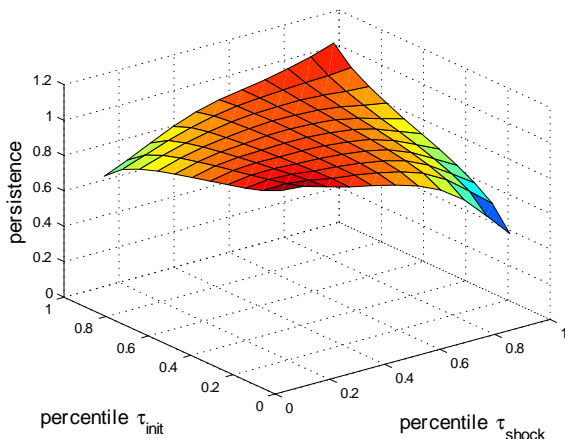Source: Arellano, Blundell and Bonhomme (2017).

Confidence Intervals for Estimated Nonlinear Persistence

Notes: PSID; 95% CI for estimated average derivative of the conditional quantile function see source paper; parametric bootstrap.
Source: Arellano, Blundell and Bonhomme (2017).

Implied Model Simulation of Persistence in Norwegian Data

Notes: Norwegian Population Register, Family Labour Income.
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IMPLICATIONS FOR THE CONSUMPTION DISTRIBUTION

- Allow the permanent and transitory income components to interact with assets, age and individual heterogeneity:

$$c_{it} = g_t(A_{it-1}, \eta_{it}, \varepsilon_{it}, \nu_{it}, \xi_i)$$

-> assets A_{it-1}, permanent income η_{it}, transitory shocks ε_{it}, heterogeneity ν_{it}, ξ_i.

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- Track the impact of a permanent income shift on consumption for different levels of assets and for different ages......

Partial Insurance by Age and Assets
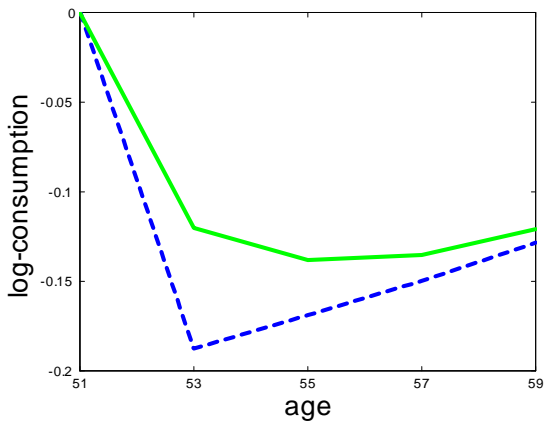

Labor income

Disposable income
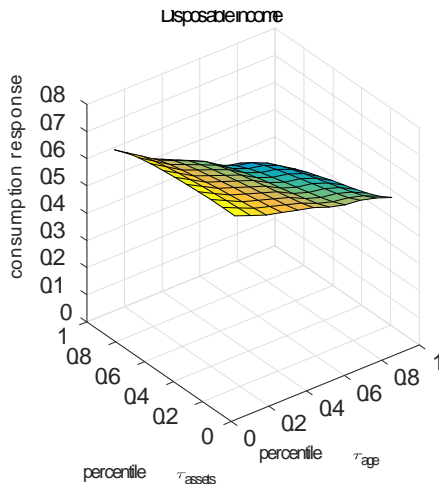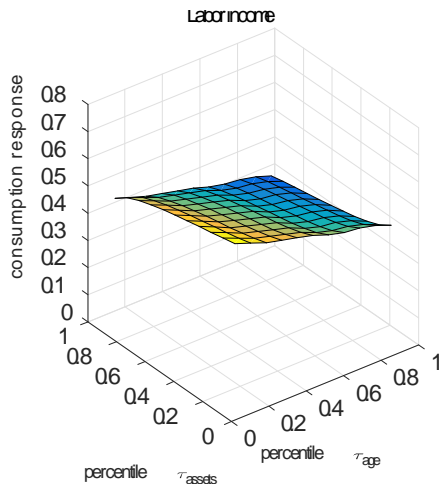
Notes: Families with head aged 30-60, 1999-2009 (US).
Nonparametric estimates of the average partial insurance of persistent shocks.
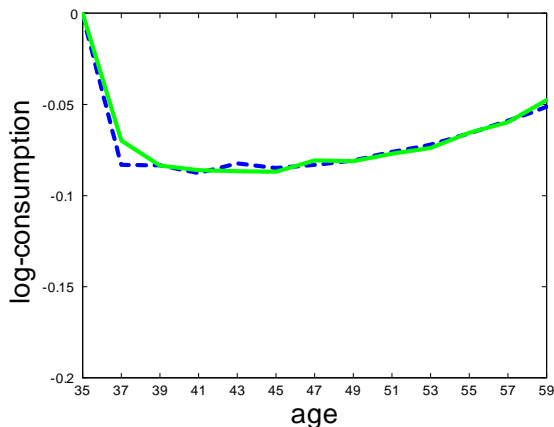Source: Arellano, Blundell, Bonhomme and Light (2018).

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).
Source: Arellano, Blundell and Bonhomme (2017).

2. What role for family labour supply?

- Separate labour supply, tax/benefit and self-insurance mechanisms:

  1. Labour supply of other family members,

  2. Non-linear taxes and welfare,

  3. Self-insurance (i.e., savings) through the *direct* use of net assets,

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- Extend baseline partial insurance model to allow wage shocks to impact on consumption *and* on family labour supply.

- We can then examine each step in the dynamics of inequality from wages to consumption.

CORRELATED SHOCKS AND COMPLEMENTARY PREFERENCES

- Allow for correlated shocks to spouses *individual wages*
  - assortative matching (and data) suggests positive correlation,
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- Responses to a persistent shock depend on share of earnings, importance of assets, and family labour supply elasticities....
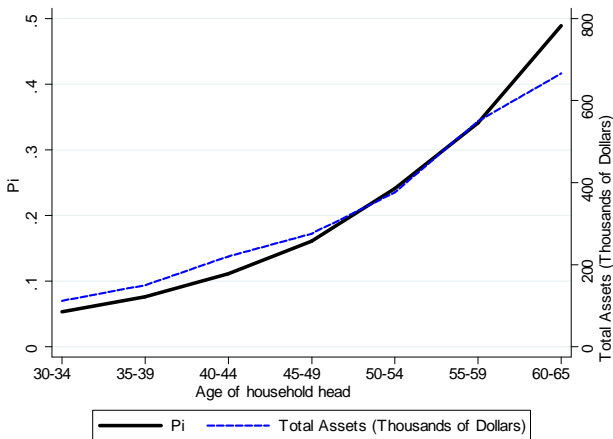
The share of his human wealth by age

$$s_{i,t} \approx \frac{\text{Human Wealth}_{male,i,t}}{\text{Human Wealth}_{i,t}}$$
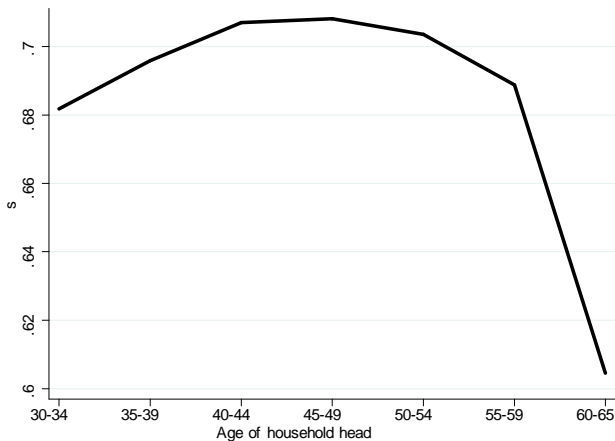
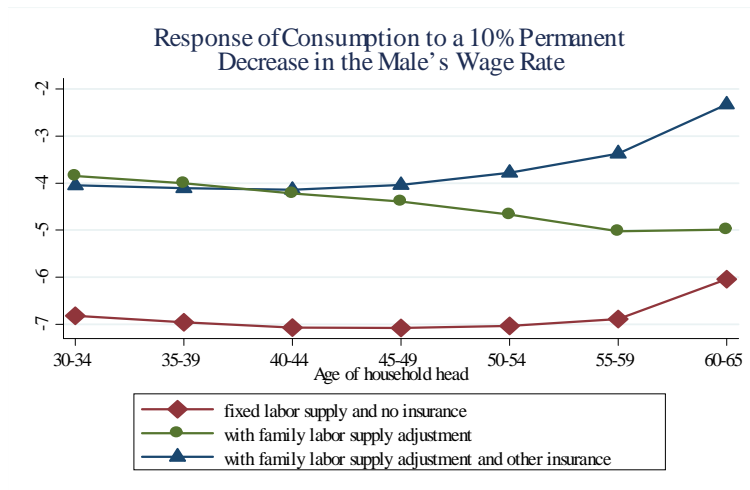Notes: PSID couples. Source: Blundell, Pistaferri and Saporta-Eksten (2016)

The share of assets to human wealth by age

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

Source: Blundell, Pistaferri and Saporta-Eksten (2016)

Household consumption responses to an adverse persistent shock to husband's real wage.

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

Legend:
- fixed labor supply and no insurance
- with family labor supply adjustment
- with family labor supply adjustment and other insurance

Notes: Average response. Source: Blundell, Pistaferri and Saporta-Eksten (2016)

FINDINGS....

- Found that family labor supply is a key mechanism for 'insuring' persistent adverse shocks,
  - especially for younger families and for those with limited access to assets,
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  - recent work on time use data allows us to unpack the effect - Mother's time with child takes the hit.

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- For lowest income quintile: consumption declines on average by only 2.6%,
    - welfare benefits, SNAP (Food stamps) and EITC in the US, dominate with family labor supply responses making up the difference.

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

- We have a neat story linking the distributional dynamics of inequality in earnings, incomes and consumption.

- Focus on understanding the dynamic transmission of inequality over the working life:

  wages→ earnings→ joint earnings→ income→ consumption.

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- Documenting the importance of different aspects of household behavior and of tax/welfare policy:
  - Labor supply, etc. (wages→ earnings)
  - Family labour supply and time-use allocations (earnings→ family earnings)
  - Taxes and welfare benefits (earnings→ net income)
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- Linking the dimensions of inequality and showing the value, of high quality data on household earnings, hours, consumption and assets.

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Key research question: How should we balance tax/welfare reform with other policies to address the adverse effects of inequality?
- minimum wages; family policies; housing policies; training and wage progression; skills and technology....

That's it for now!

Congratulations on the launch of the CBS Business in Society Inequality Platform!

**Richard Blundell**

UCL & IFS

CBS, October 2018

Extra Slides follow

REFERENCES TO CITED PAPERS

1. Blundell, Pistaferri and Preston [BPP] 'Consumption inequality and partial insurance' (*AER*, 2008)

2. Blundell, Low and Preston [BLP] 'Decomposing changes in income risk using consumption data' (*QE*, 2013)

3. Blundell, Graber and Mogstad [BGM] 'Labor income dynamics and insurance' (*JPubE*, 2015; 2018)

4. Arellano, Blundell and Bonhomme [ABB] 'Earnings and consumption dynamics: a nonlinear framework' (*Ecta*, 2017; 2018)

5. Blundell, Pistaferri and Saporta-Eksten [BPS1/2] 'Consumption inequality and family labor supply' (*AER*, 2016; *JPE*, 2018)

6. Blundell, Costa-Dias, Meghir and Shaw [BCMS] 'Female labour supply, human capital and welfare reform' (*Ecta*, 2016).
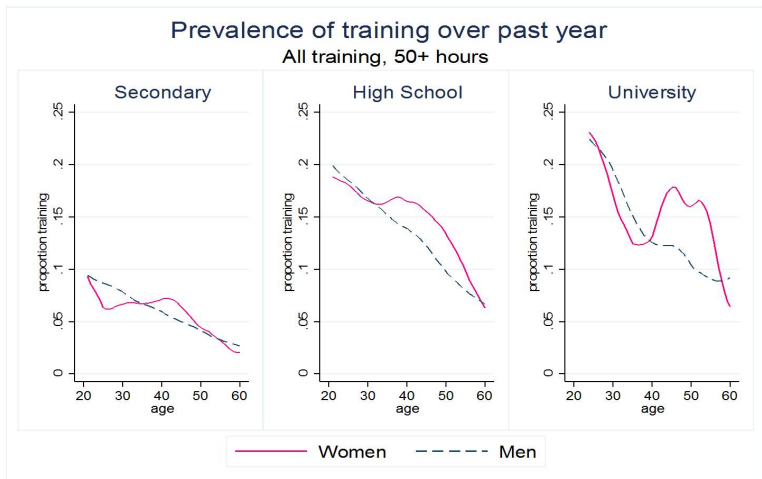
all on my webpage!

Wage progression by education: women in the UK
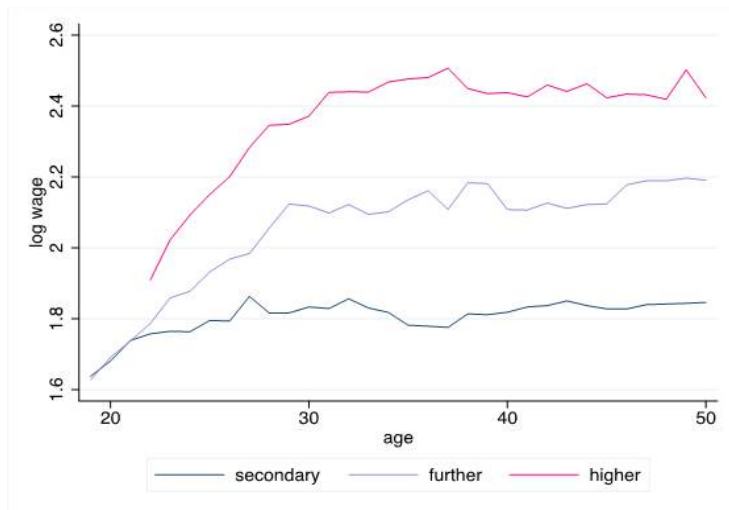
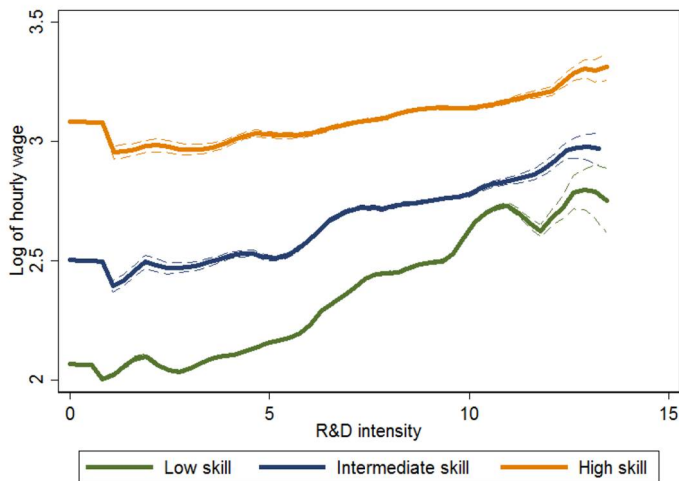Source: Blundell, Costa-Dias, Meghir and Shaw (2016)
Data used is UK BHPS.

Training profiles by education, gender and age in the UK

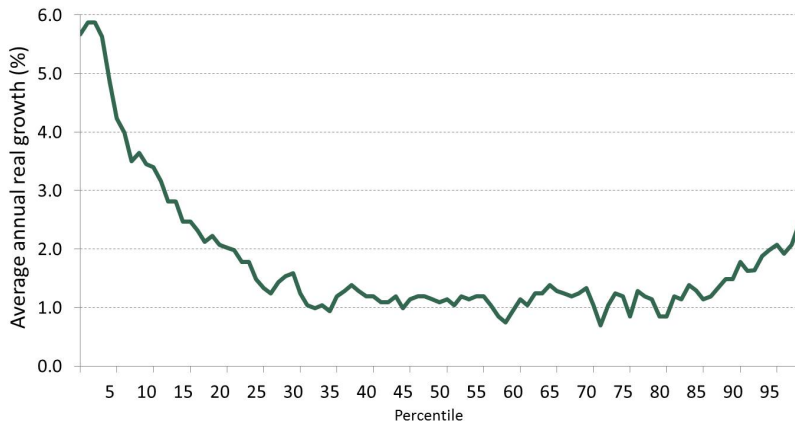Source: Blundell, Costa-Dias, Goll and Meghir (2018)
Data used is UK BHPS.

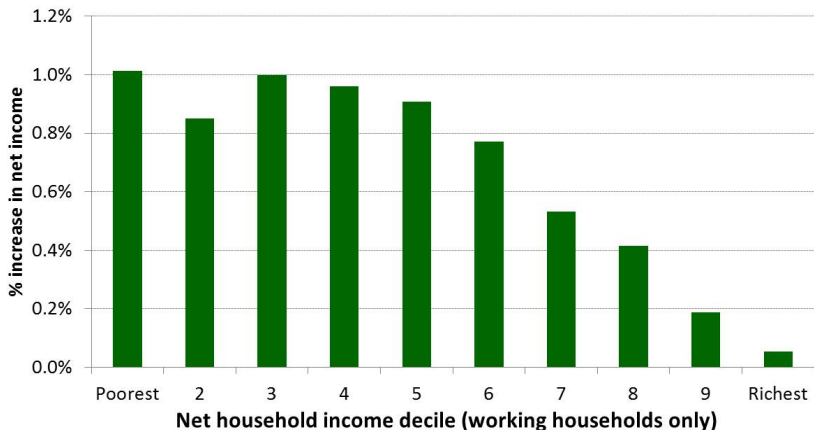# Wage profiles and R&D intensive firms, by skill group

Min wage and the real growth in UK hourly wages by percentile, April 2015-April 2017

Source: Blundell, Joyce, Norris Keiller and Ziliak (2018)
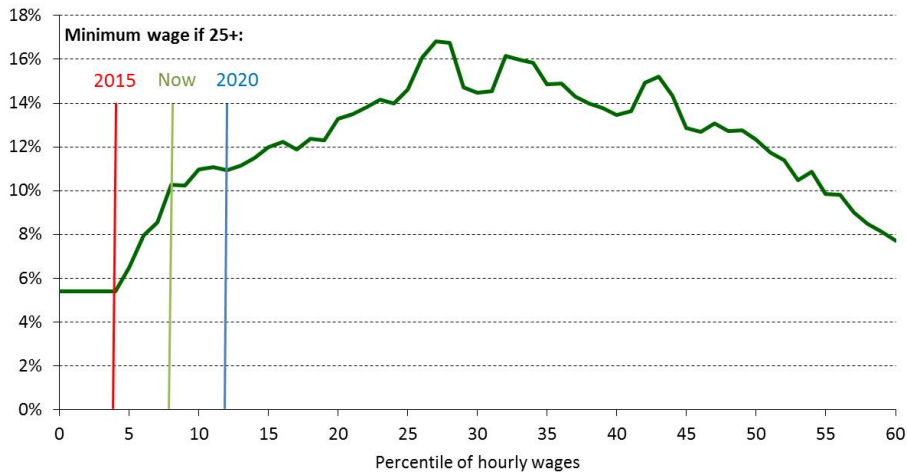Data used is UK FRS 1994-95 and 2015-16.

Impact of min wage reforms to 2020

Source: Blundell, Joyce, Norris Keiller and Ziliak (2018)
Data used is UK LFS.

Proportion of employees aged 25+ in the most "automatable" jobs (top 10% of routine task intensity")

CONSUMPTION IN THE NORWEGIAN REGISTER DATA

Following earlier work in Denmark, we combine several sources for the period 1994-2014

- Tax records on income and wealth
- Real estate transactions from Norwegian Land Register
- Transactions in listed and unlisted stocks from Norwegian Registry of Securities.

The initial sample covers all households where the household's oldest is at least 18 years old, everyone above 17 years has filed a tax return

- The number of household-year observations in the initial panel is 44,302,000.
- In each year, we keep only households with a male head, age 30 - 60, cohort 1945 - 1975, with non-missing information on schooling and location.

Detailed description of the dataset and consumption measurement in Eika, Mogstad and Vestad (2018).