Household income dynamics through the Great Recession

Philippe Van Kerm
Luxembourg Institute of Socio-Economic Research
(formerly CEPS/INSTEAD)

4th European User Conference for EU-Microdata
GESIS, Mannheim, March 5–6 2015
The Great Recession in EU

Source: Eurostat

Figure 1: GDP per capita (2005=100)
The Great Recession in EU

Source: Eurostat

Figure 2: Median household disposable income
The Great Recession in EU

Source: Eurostat

Figure 3: Gini coefficient of household disposable income
EU-SILC longitudinal

EU Statistics on Income and Living Conditions

- Micro-data source for EU social indicators (legally binding in all EU countries)
- Detailed household income information (register-based or survey-based) (but limited LM information)
- Annual income concept
- Panel dimension:
  - 4-year rotating panel structure: longitudinal component has (up to) 4 years of data
  - ... for a quarter of the cross-section sample size
  - heterogeneity in follow-up practices and subsequent attrition (cf. Iacovou & Lynn 2013; Jenkins & Van Kerm, 2014)
  - 2008–2011 release (income years 2007–2010 for most countries)
Magnitude and progressivity of income changes

- Change in person \( i \)'s income: \( \delta(x_i, y_i) = s \times (y_i - x_i) \)


- Social Evaluation Function (‘progressivity adjusted growth’):

\[
W(H) = \int_{z^-}^{z^+} \int_{z^-}^{z^+} \omega(r_x) \delta(x, y) dH(x, y)
\]

(Chakravarty, 1984, Van Kerm 2009, Jenkins & Van Kerm 2011)

- \( \omega(r_x) > 0 \) is a ‘social weight’ associated with rank of individuals at initial period
  - Preference for growth among low income people: \( \omega'(r_x) \leq 0 \)
  - With \( \int \omega(p)dp = 1 \), \( W(H) \) is a weighted average of individual income growth
Magnitude and progressivity of income changes

- Change in person $i$’s income: $\delta(x_i, y_i) = s \times (y_i - x_i)$


- Social Evaluation Function (‘progressivity adjusted growth’):

$$W(H) = \int_{z_-}^{z_+} \int_{z_-}^{z_+} \omega(r_x) \delta(x, y) dH(x, y)$$

(Chakravarty, 1984, Van Kerm 2009, Jenkins & Van Kerm 2011)

- $\omega(r_x) > 0$ is a ‘social weight’ associated with rank of individuals at initial period

  - Preference for growth among low income people: $\omega'(r_x) \leq 0$
  - With $\int \omega(p)dp = 1$, $W(H)$ is a weighted average of individual income growth
Magnitude and progressivity of income changes

- Change in person $i$’s income: $\delta(x_i, y_i) = s \times (y_i - x_i)$


- Social Evaluation Function (‘progressivity adjusted growth’):

  $$W(H) = \int_{z_-}^{z_+} \int_{z_-}^{z_+} \omega(r_x) \delta(x, y) dH(x, y)$$

  (Chakravarty, 1984, Van Kerm 2009, Jenkins & Van Kerm 2011)

- $\omega(r_x) > 0$ is a ‘social weight’ associated with rank of individuals at initial period
  - Preference for growth among low income people: $\omega'(r_x) \leq 0$
  - With $\int \omega(p)dp = 1$, $W(H)$ is a weighted average of individual income growth
Magnitude and progressivity of income changes

- Change in person $i$’s income: $\delta(x_i, y_i) = s \times (y_i - x_i)$


- Social Evaluation Function (‘progressivity adjusted growth’):

$$W(H) = \int_{z^-}^{z^+} \int_{z^-}^{z^+} \omega(r_x) \delta(x, y) dH(x, y)$$

(Chakravarty, 1984, Van Kerm 2009, Jenkins & Van Kerm 2011)

- $\omega(r_x) > 0$ is a ‘social weight’ associated with rank of individuals at initial period
  - Preference for growth among low income people: $\omega'(r_x) \leq 0$
  - With $\int \omega(p)dp = 1$, $W(H)$ is a weighted average of individual income growth
Return-to-progressivity measures

- Indices of ‘return-to-progressivity’:
  - Gain from progressivity on top of average growth:

\[
RTP^u = W^u - \bar{\delta}
\]
Income growth profiles
Income growth profiles
Income growth profiles

![Graph showing income growth profiles with expected real income change on the y-axis and percentile rank on the x-axis. The graph includes data for different years and trends are indicated.]
Income growth profiles

Expected real income change (in 2007 mean units)

Total income

Percentile rank

07-08
08-09
09-10
-07-08-
-09-10-
-08-09-

-.5
-.25
0
.25
.5
The size of income variations

Generally clear negative impact of GR on hh income variations!
The size of income variations

Expected income growth: Total income

Generally clear negative impact of GR on hh income variations!
The size of income variations

Generally clear negative impact of GR on hh income variations!
The progressivity (pro-poorness) of income variations

Progressive change throughout—more so in 2008–09 than 2007–08, but 2009-10 unclear!
Contribution of income components

Linearity in $W(H)$ makes it easy to identify contribution of changes in sources to change in total income: (gross labour income (of all members), private transfers, pensions, benefits, capital income, (minus) taxes paid

\[ W(H) = \sum_{k=1}^{K} \int_{0}^{1} \omega(p) m^k(p) dp \]

where $m^k(p)$ is an ‘income growth profile’ for a particular source $k$ (say, benefits) and $p$ is rank in initial distribution of total income

- Contribution to progressivity:
  \[ RTP = \sum_{k=1}^{K} RTP^k \]
Income growth profiles by source
Income growth profiles by source

LV 2008-09

Change in expected total income, taxes and benefits for unit expected change in labour income

Percentile rank

-0.5 -0.25 0 0.25 0.5

Total income
Labour income
Pension income
Benefits
K income
Inter-hh transfer
Taxes
Income growth profiles by source

The graph shows the change in expected total income, taxes, and benefits for a unit expected change in labour income across different percentile ranks. The data is labeled as LV 2009-10.
Income growth profiles by source

Expected real income change (in 2007 mean units)

Composition

Percentile rank

Total income
Labour income
Pension income
Benefits
K income
Inter-hh transfer
Taxes

ES 2007-08
Income growth profiles by source

Change in expected total income, taxes and benefits for unit expected change in labour income

Percentile rank

Total income
Labour income
Pension income
Benefits
K income
Inter-hh transfer
Taxes

ES 2008-09
Income growth profiles by source

- Total income
- Labour income
- Pension income
- Benefits
- K income
- Inter-hh transfer
- Taxes

ES 2009-10
Income growth profiles by source

![Chart showing expected real income change by source and percentile rank.]

Legend:
- Total income
- Labour income
- Pension income
- Benefits
- K income
- Inter hh transfer
- Taxes
Income growth profiles by source

![Graph showing income growth profiles by source with different income types represented by distinct lines on the graph. The x-axis represents the percentile rank, while the y-axis shows the change in expected total income, taxes, and benefits for a unit expected change in labor income. The graph highlights the distribution of different income sources such as total income, labor income, pension income, benefits, K income, inter-hh transfer, and taxes.]
Income growth profiles by source
The size in the change of various sources

Labour incomes!
The size in the change of various sources

Labour incomes!
The size in the change of various sources

Labour incomes!
The size in the change of various sources

Labour incomes!
Household income dynamics in the EU

The size in the change of various sources

Labour incomes!
The size in the change of various sources

Labour incomes!
The size in the change of various sources

Labour incomes!
Contribution to progressivity by sources

Return to progressivity: Total income

- 2007-08
- 2008-09
- 2009-10
Household income dynamics in the EU
Evidence

Contribution to progressivity by sources

Return to progressivity: L income

2007-08  2008-09  2009-10
Household income dynamics in the EU
Evidence

Contribution to progressivity by sources

Return to progressivity: Pensions

- 2007-08
- 2008-09
- 2009-10
Contribution to progressivity by sources

- LV
- AT
- RO
- EE
- ES
- DK
- IT
- HU
- BG
- BE
- PL
- PT
- CZ
- NL
- LU
- FI
- LT

Return to progressivity: K income

- 2007-08
- 2008-09
- 2009-10
Contribution to progressivity by sources

Return to progressivity: Transfers

-0.05 0 0.05 0.1 0.15 0.2

- 2007-08  O 2008-09  X 2009-10
Contribution to progressivity by sources

Return to progressivity: Benefits

- 2007-08
- 2008-09
- 2009-10
Contribution to progressivity by sources

Return to progressivity: Taxes paid

-0.05 0 0.05 0.1 0.15 0.2

- 2007-08  ○ 2008-09  × 2009-10
Summary

- Overall results consistent with expectations (surprisingly?)
- Big fall in (real) income growth in 2008–09 compared to 2007–08 (esp. in ‘new’ MS), heterogeneous recovery 2009–10
- Income growth pattern progressive overall (in growth and somewhat more so in initial contraction)—but does not imply inequality reduction!
- Labour income by far most important determinant of income variations (at all initial income levels)
  - cushioning effect of taxes
  - effect of benefits seems often short-lived
  - pensions stable (but not pro-poor)
  - negligible effect of capital income (at the top)
Household income dynamics in the EU

Evidence

Issues

- Data limitations
  - small longitudinal samples
  - attrition, idiosyncrasies in follow up?
  - measurement error (imputations and register-survey differences)... with single income measurements, small time frame
  - yet results seem credible overall

- Is there a structure in the patterns across countries?
  - Nature of GDP shock? Tax-Benefit structure?
Income growth profiles and $W(H)$

Straightforward graphical instrument

- Evaluation function $W(H)$ expressed as

$$W(H) = \int_{0}^{1} \omega(p) m(p) dp$$

- where $m(p)$ is an ‘income growth profile’ (IGP) plotting mean $\delta$ against initial rank $p = r_X$
Attrition

Heterogeneous in size