

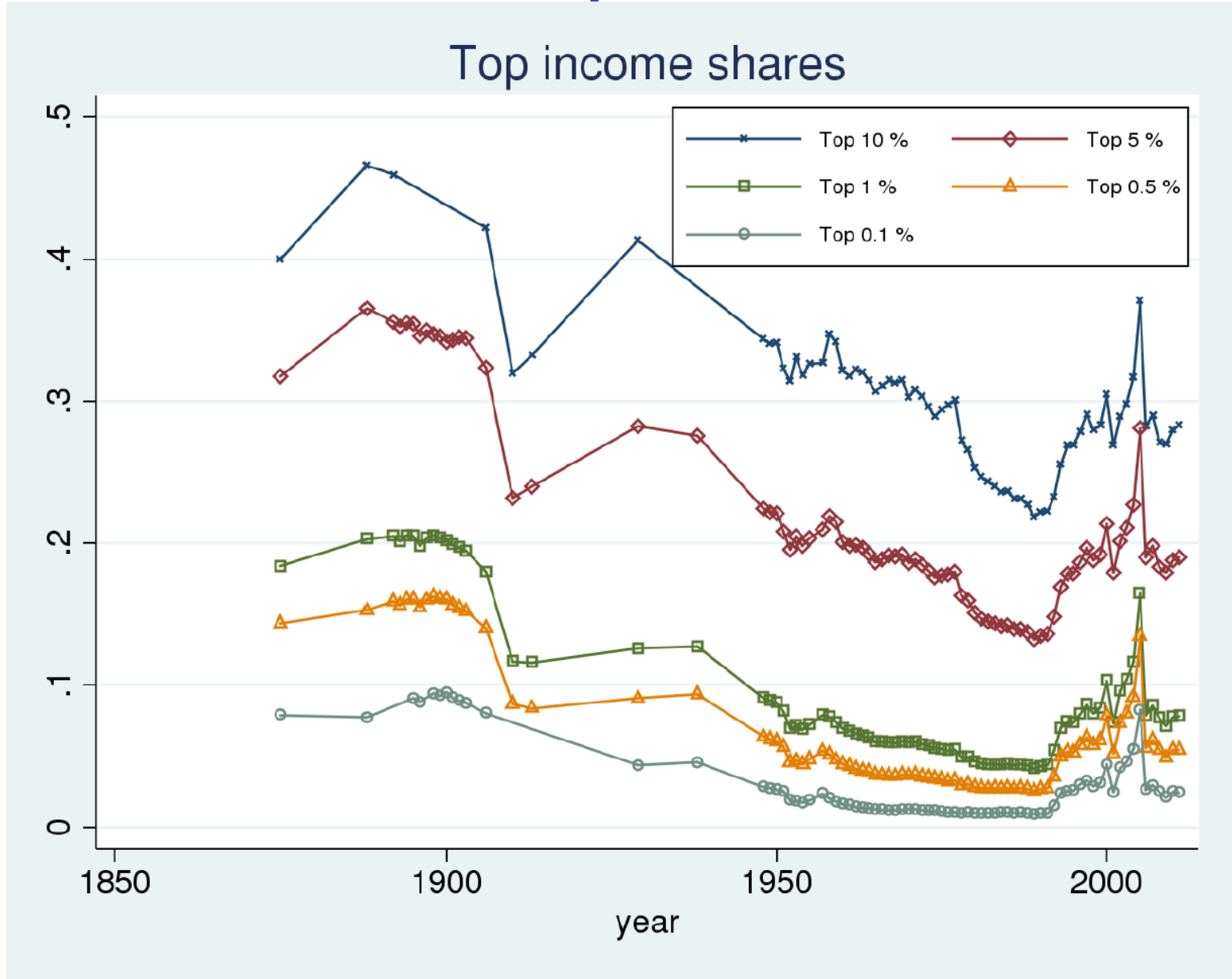
# The Ins and Outs of Top Income Mobility

Rolf Aaaberger

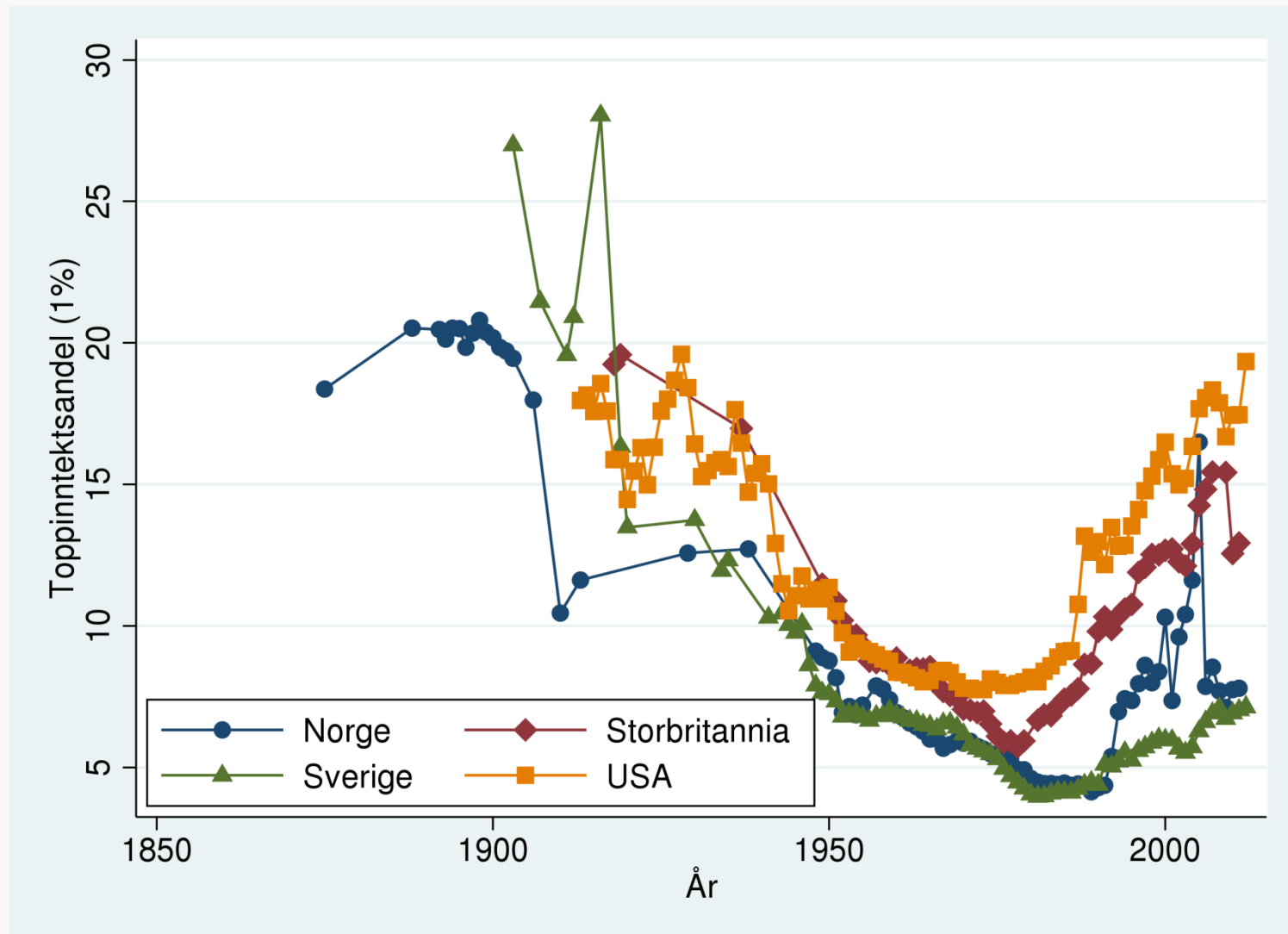
Research Department, Statistics Norway  
and ESOP, University of Oslo

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# Top income shares in Norway, 1875-2011



## Top 1 per cent in Norway, Sweden, UK and US, 1875-2012



Sources: Aaberge, R and A B Atkinson (2010): "Top Incomes in Norway". I: Atkinson og Piketty (red): "Top Incomes - A Global Perspective". Oxford University Press and Aaberge, R. og J. Modalsli (2014): "Fordelingen av inntekter I Norge fra 1875 til I dag", Plan Nr 3 - 4/2014.

## *Motivation*

- Those with the highest income might also have variable incomes (capital income, tax adjustments, etc)
- Could it be that some of the high top income shares are simply due to high gains being realized in any one year?
- The concentration of “power” argument depends on whether the same people are top income holders year after year
- A measure of top income mobility is needed to address these issues

# Definition of income mobility

*”If income mobility were very high, the degree of inequality in any given year would be unimportant, because the distribution of lifetime income would be very even” (Krugman, 1992)*

# This talk is based on results from

- Aaberge, R. And M. Mogstad (2013): Income Mobility as an Equalizer of Permanent Income, Discussion Paper No. 769, Statistics Norway.
- Aaberge, R., T. Atkinson and J. Modalsli (2013a): “The Ins and Outs of Top Income Mobility”, Discussion Paper No. 762, Statistics Norway.
- Aaberge R, A B Atkinson og J Modalsli (2013b): "Er rike mennesker alltid rike?" Økonomiske Analyser 4/2013.

# These papers

Proposes and applies a general framework for comparison of income distributions according to income and top income mobility

1. Introduces mobility curves representing the notions of income and top income mobility as equalizers of permanent income

- Similar role as the Lorenz curve in analysis of income inequality

2. Introduces dominance criteria for partial rankings

- 1 order dominance
- 2nd order upward and downward dominance

- Transfer principles provide normative justification

# Mobility curve

Let  $L_Z$  and  $L_{Z_R}$  denote the Lorenz curves for the distribution  $F_Z$  of the observed permanent income  $Z$  and the distribution  $F_{Z_R}$  of the hypothetical reference permanent income when there is no mobility

$$M(u) = L_Z(u) - L_{Z_R}(u)$$

- Equality in permanent income may be due to:
- Equality in the cross-sectional income distributions
  - Changes in relative incomes over time, i.e. income mobility



Figure 1:  
1947 Cohort

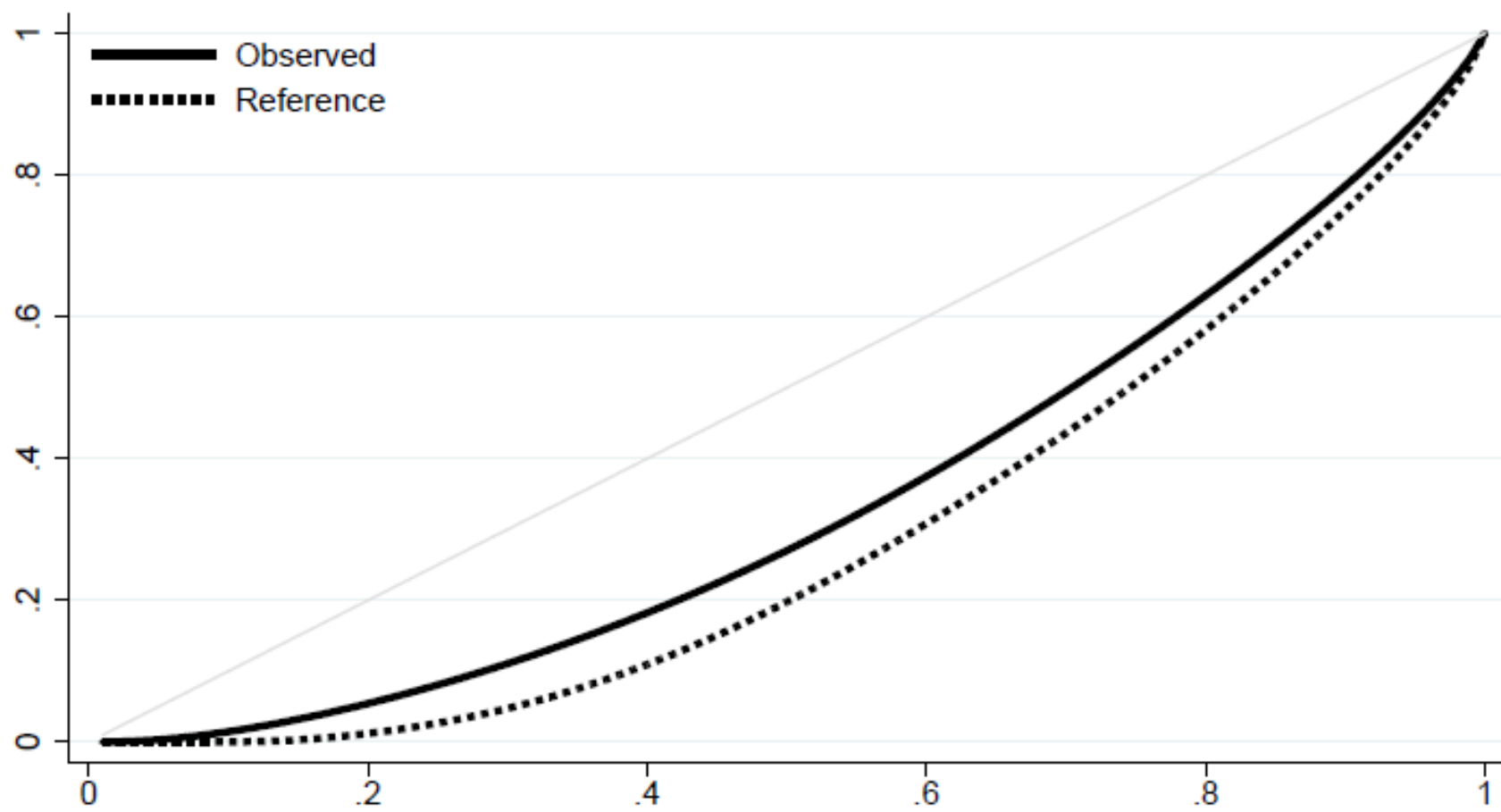
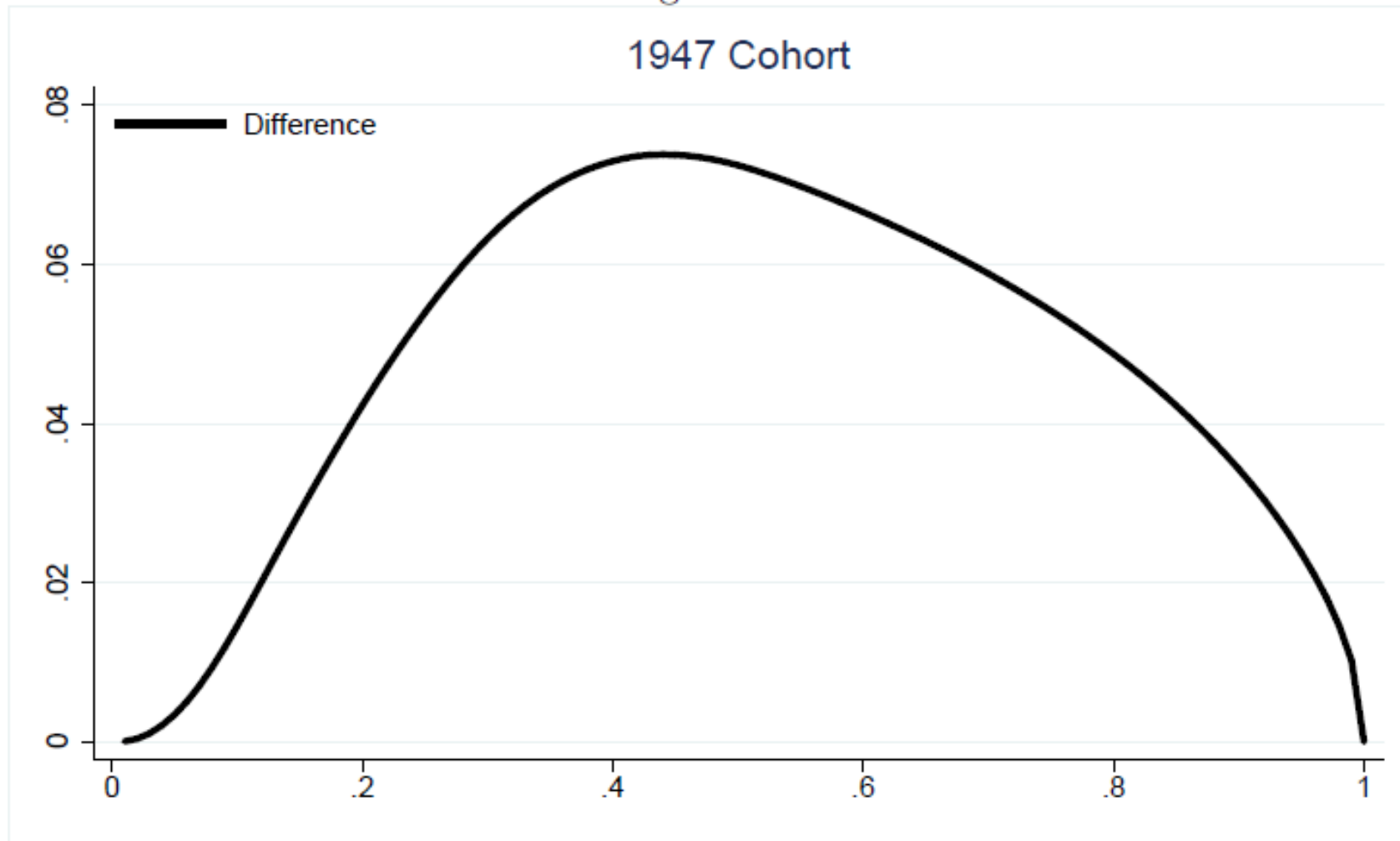


Figure 2:  
1947 Cohort



# Outline

1

**TOP INCOME MOBILITY CURVE**

2

**SUMMARY MEASURES OF TOP INCOME MOBILITY**

3

**EMPIRICAL RESULTS**

## Conceptual framework

- ▶ Key concept: comparing the cross-section income distribution to a distribution of permanent income
- ▶ Denote income in period  $t$  as  $X_t$ , with mean  $\mu_t$  and Lorenz curve  $L_t$
- ▶ For  $r$  years, define permanent income  $X$  as

$$X = \sum_{t=1}^r X_t$$

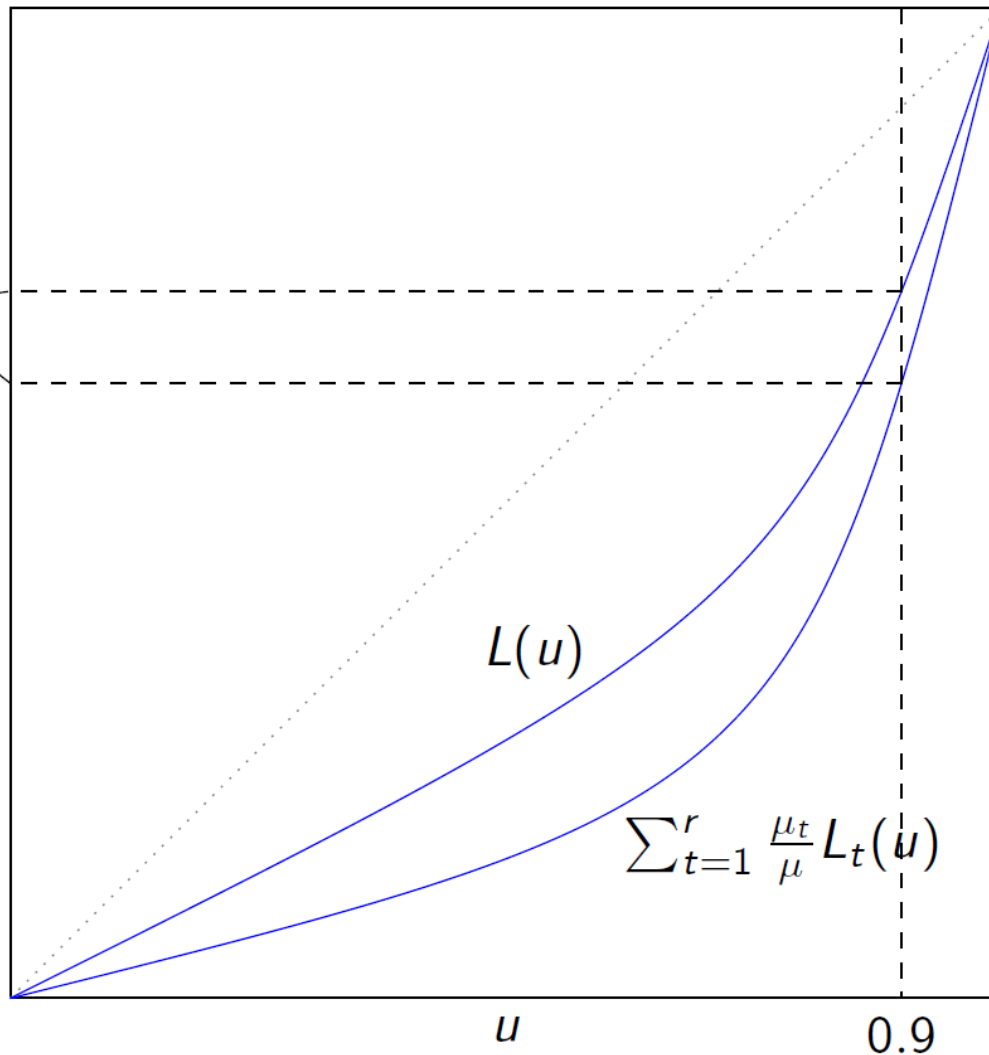
- ▶ with corresponding mean  $\mu$  and Lorenz curve  $L$
- ▶ For comparison, use the *sum of the cross-section income distributions* for the same  $r$  years

# Explanation: Top income and mobility

Top income mobility

at 0.9

$T(0.9)$



## Definition of top income mobility

$$\begin{aligned} T(u) &= \sum_{t=1}^r \frac{\mu_t}{\mu} (1 - L_t(u)) - (1 - L(u)) \\ &= \sum_{t=1}^r \frac{\mu_t}{\mu} (L(u) - L_t(u)) \end{aligned}$$

- ▶ Like top incomes, can be examined at specific points, for example  $u = 0.9$  for top 10%
- ▶ We will follow the convention of examining the distribution at the top 10%, 5%, 1%, 0.5% and 0.1%

# Derivative of the mobility curve

The derivative of the TIM curve provides information of the impact of top income mobility on different parts of the upper tail of the distribution of permanent income. The derivative of  $T$  is given by

$$(2.3) \quad T'(u) = \frac{F^{-1}(u) - \sum_{t=1}^T F_t^{-1}(u)}{\mu}, u \in [0,1].$$

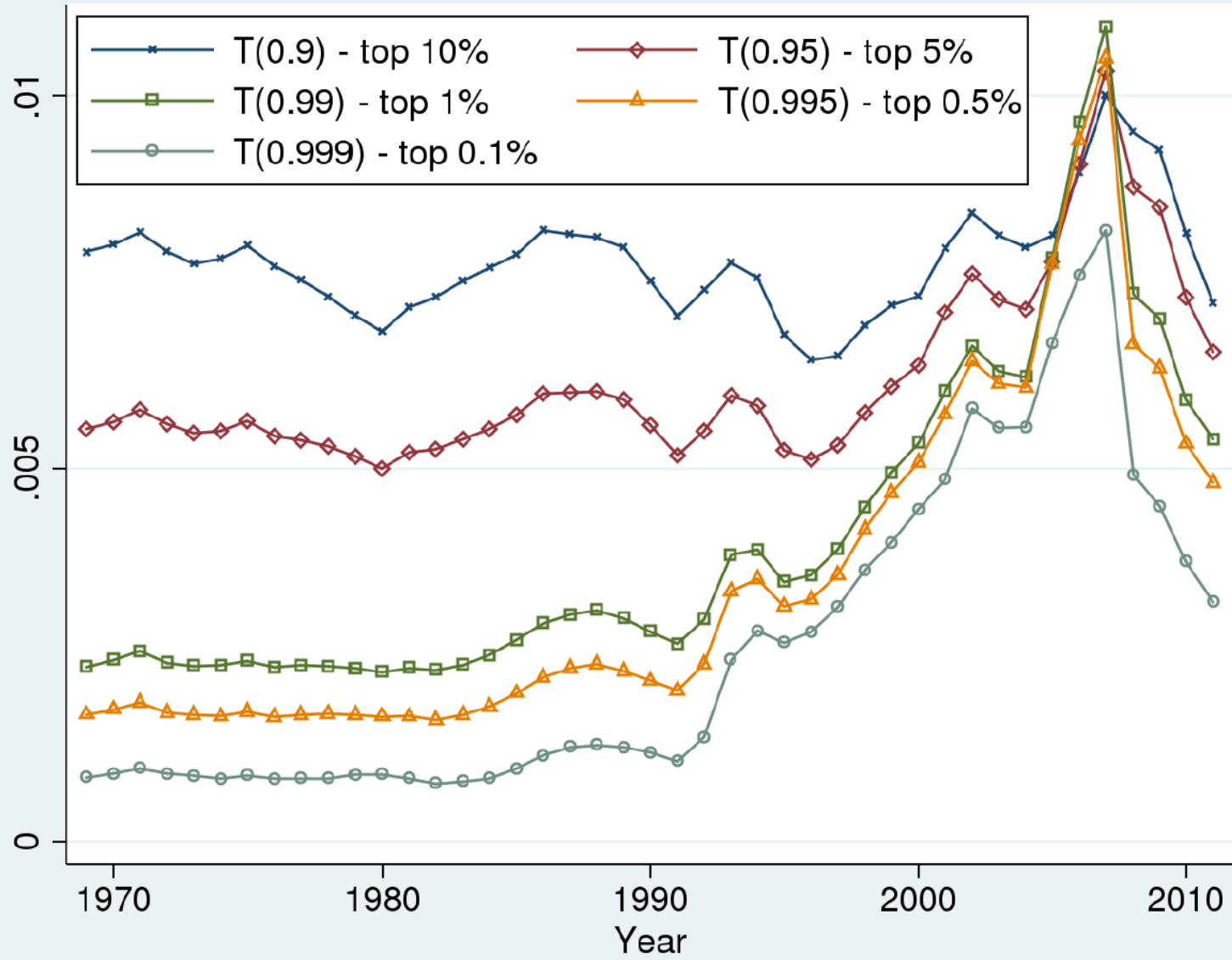
Individuals for which  $T'(u)$  is positive (negative) become better (worse) off because of income mobility: their incomes are higher (lower) than what they would have been in the absence of changes in relative incomes over time.

## Application: Norway 1967-2011

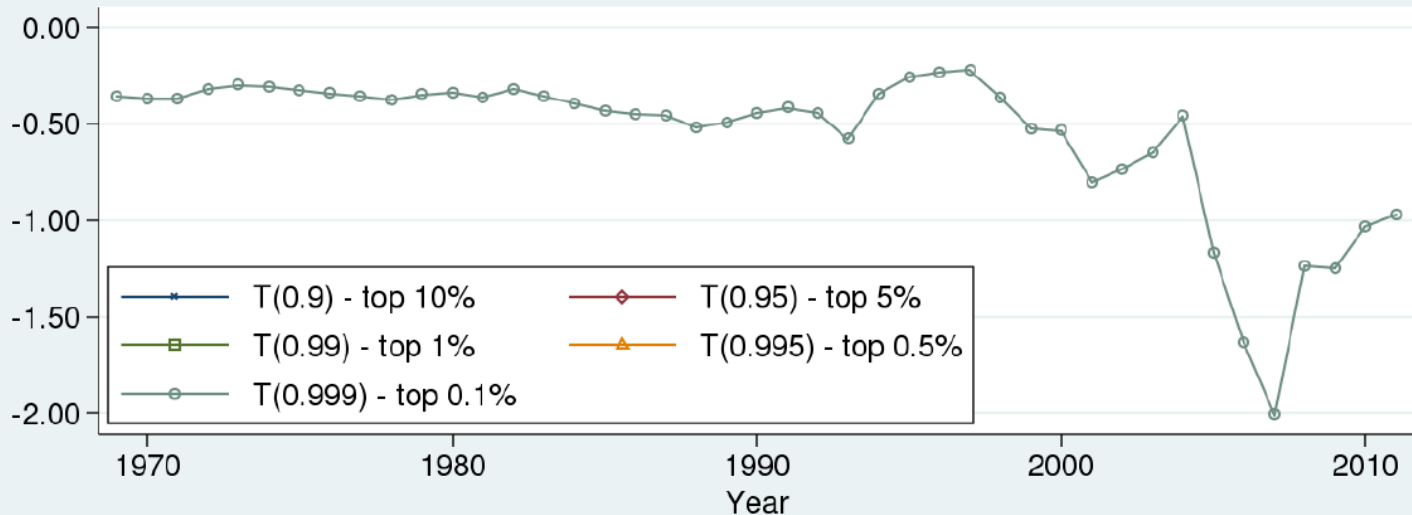
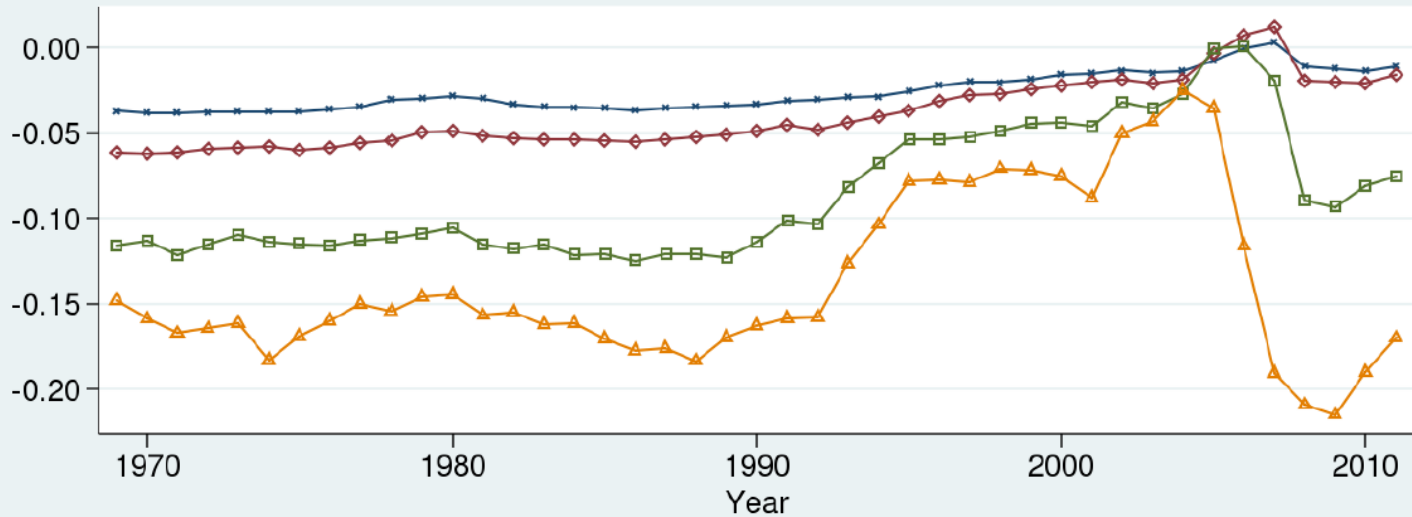
- ▶ Income data for the entire Norwegian working population
- ▶ Administrative data from tax authorities, linked to population register
- ▶ Income definition: Ordinary income (“Alminnelig inntekt”): income less basic deduction
- ▶ Permanent income duration: 3 years ( $r = 3$ )
- ▶ Population used here: All adults resident in Norway for rolling 3-year windows
- ▶ Notation: “1969” on axis means incomes for 1967, 1968 and 1969
- ▶ Sample size 1969: 2.6 million individuals; 2011: 3.7 million



# $T(u)$ : Top income mobility



# The derivative of $T$ : "Losses" from mobility



## Summary measures of top income mobility

- ▶ To compare mobility across the entire upper half of the distribution, we integrate downwards:

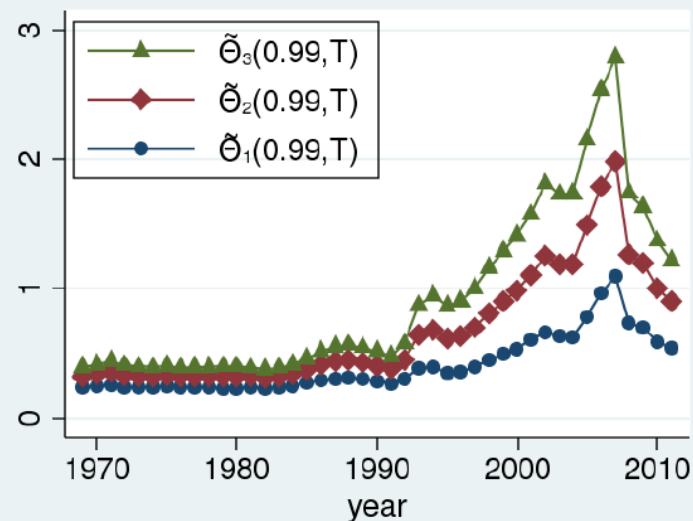
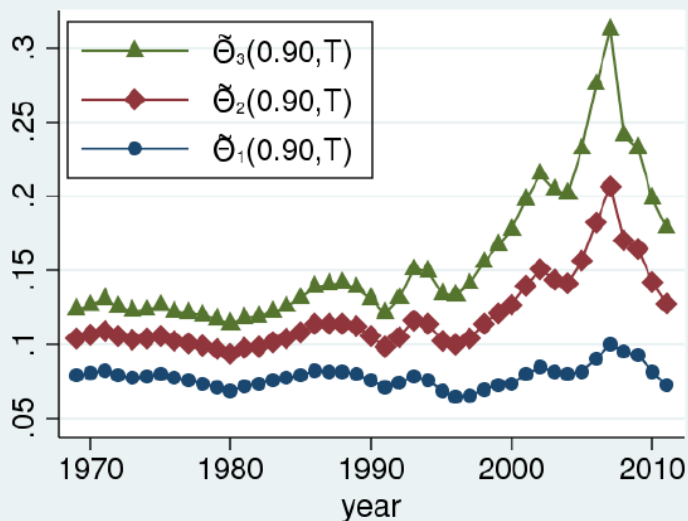
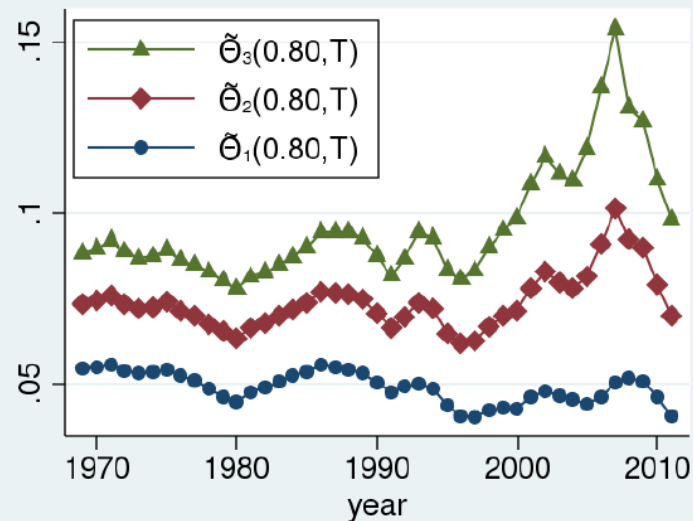
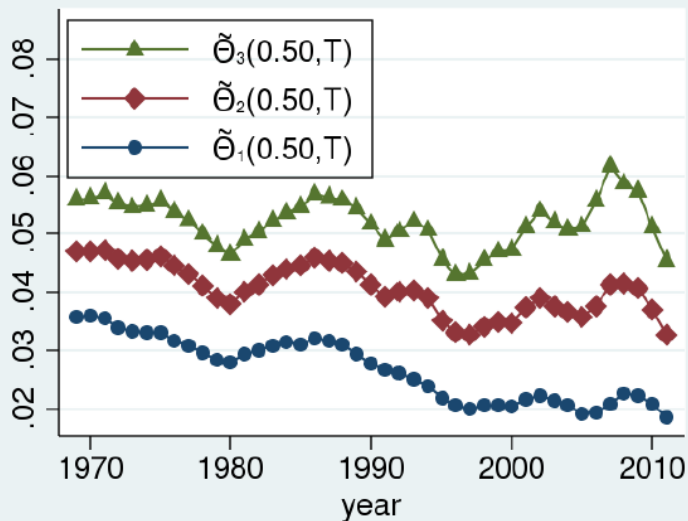
$$\tilde{\Theta}_k(a; T) = \frac{k}{(1-a)^k \mu} \int_a^1 (s-a)^{k-1} \left( \sum_{t=1}^r F_t^{-1}(s) - F^{-1}(s) \right) ds, \quad k = 1,$$

- ▶ For  $k = 1$ , this is the differences in permanent and average cross-section expected income, conditional on being in the upper half of the distribution:

$$\tilde{\Theta}_1(a; T) = \frac{1}{\mu} \left[ \sum_{t=1}^r E \left( X_t \mid X_t \geq F_t^{-1}(a) \right) - E \left( X \mid X \geq F^{-1}(a) \right) \right]$$

- ▶  $\tilde{\Theta}$  with higher  $k$  incorporate terms for the spread as well, giving higher weight to the upper end of the distribution.

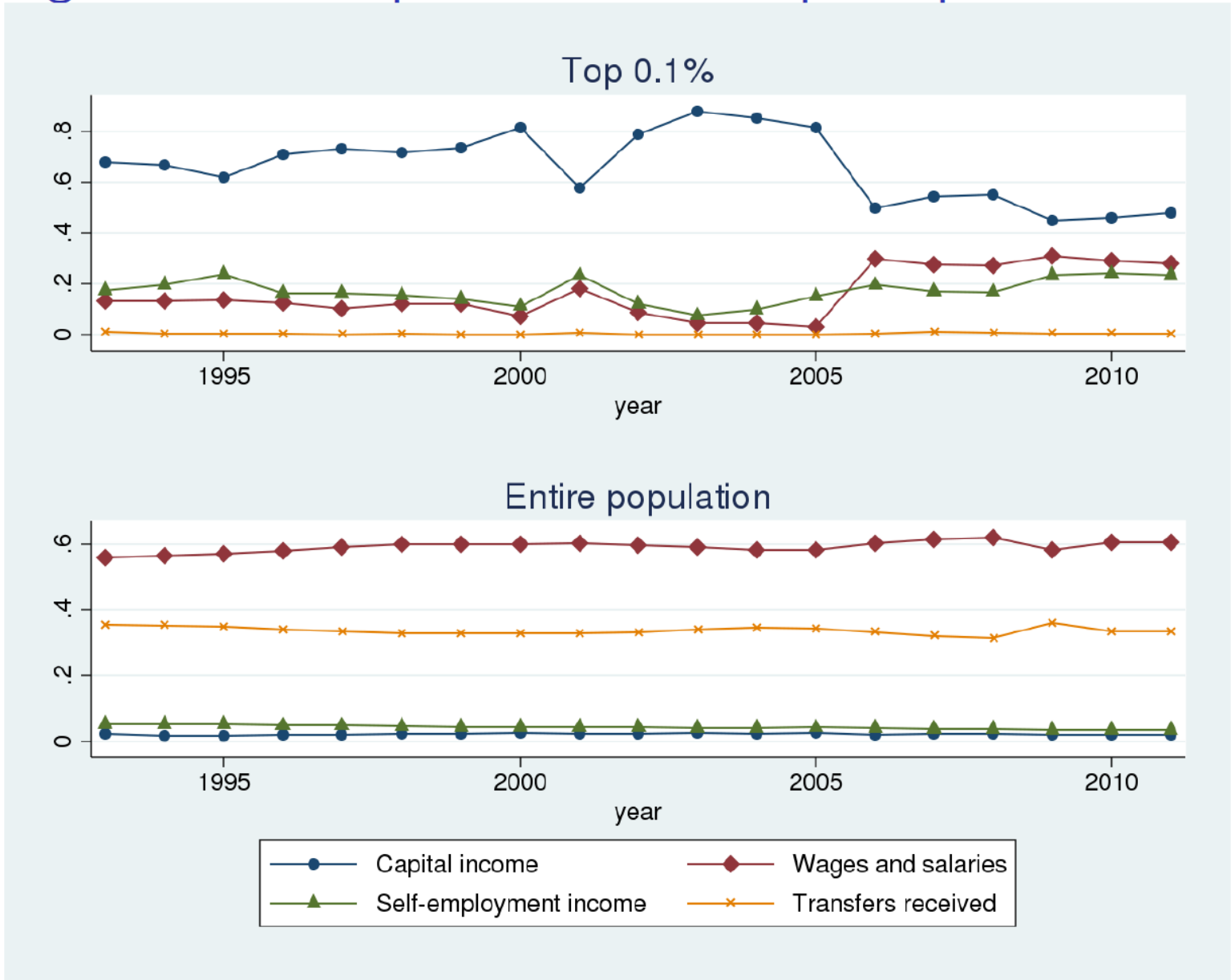
# Summary measures of top income mobility



# The composition of incomes among individuals

- ▶ Composition of the top income holders: Group individuals by their **predominant source of income**
  - ▶ Capital income
  - ▶ Wages and salaries
  - ▶ Self-employment income
  - ▶ Transfers received

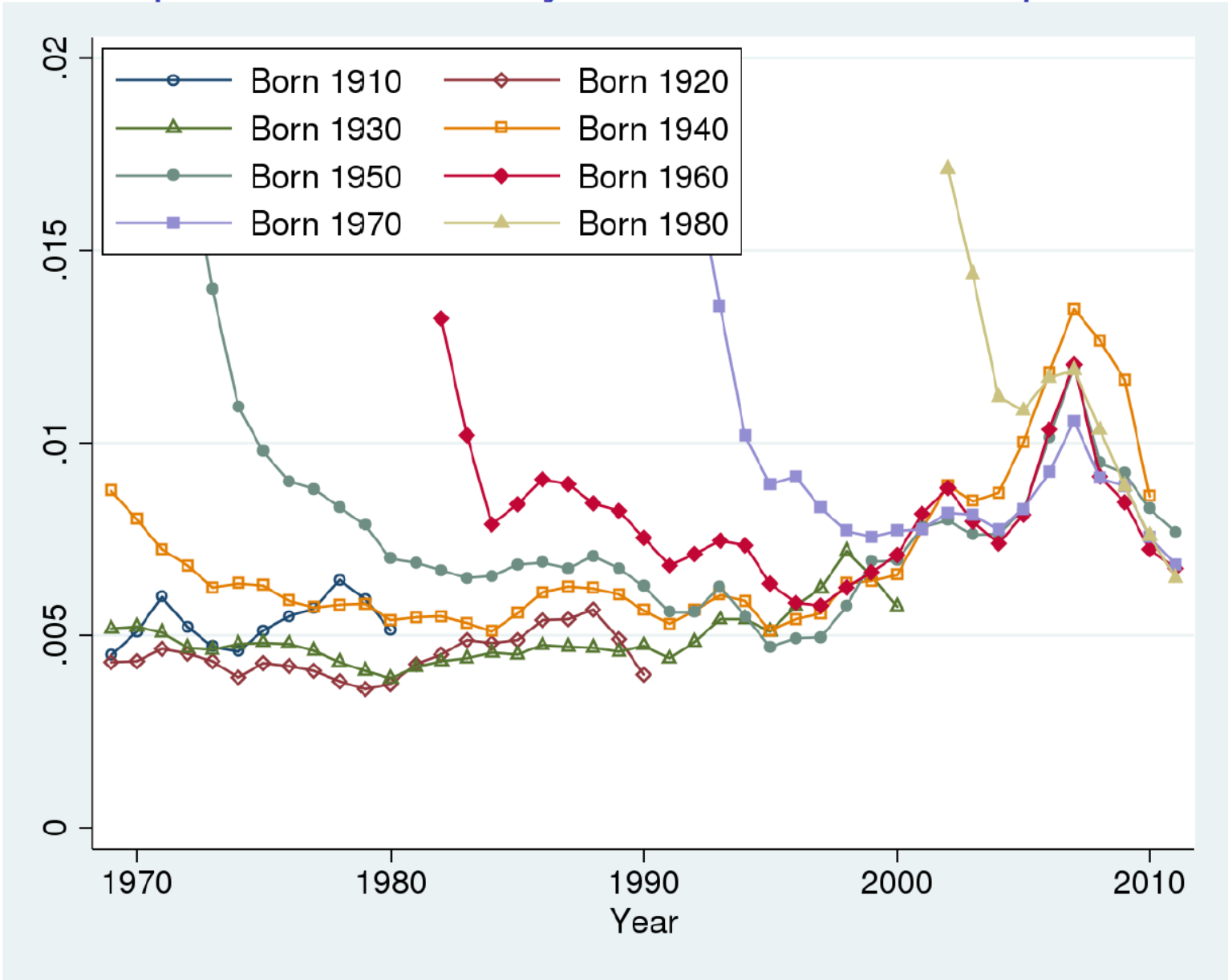
# Changes in the composition of the top 0.1 per cent



# Conclusions

- ▶ Top income mobility can be defined using the “equalization of permanent income” paradigm
- ▶ Large changes in top income mobility over time, driven by structural effects as well as short-term reforms
- ▶ However, low mobility
  - The people at the top have very high incomes even when we increase the time horizon
- ▶ A strong life cycle profile in mobility; however, demographic forces do not drive the aggregate trend in top income mobility

# Extra: Top income mobility within cohorts: Top 5%





# Extra: Top income mobility within cohorts: Top 0.1%

