Change in Social Fluidity Over Birth Cohorts in France:
# Educational Expansion and Democratization of Education as Key Explanatory Mechanisms

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The twofold role of education at the individual level

- Sociological research on intergenerational mobility and the status attainment process has recognized for long that education has a twofold role in the development of individual socioeconomic trajectories.

- First, as level of education attained is the major variable mediating the association between class of origin and class position in adult life, education is the main vehicle of social reproduction across generations.

- Second, as level of education attained is not strictly determined by class of origin and other ascriptive criteria, education *also* is a key factor that promotes intergenerational social mobility.

- This contribution addresses the role of education at the societal level by examining to what extent historical change in social fluidity across cohorts is linked to, and produced by, two mechanisms that describe change across cohorts in the distribution and allocation of education: educational expansion on the one hand, reduction in inequality of educational opportunity (or equalization) on the other hand.

Analyzing the dynamics in the Origin (O) – Education (E) – Destination (D) triangle
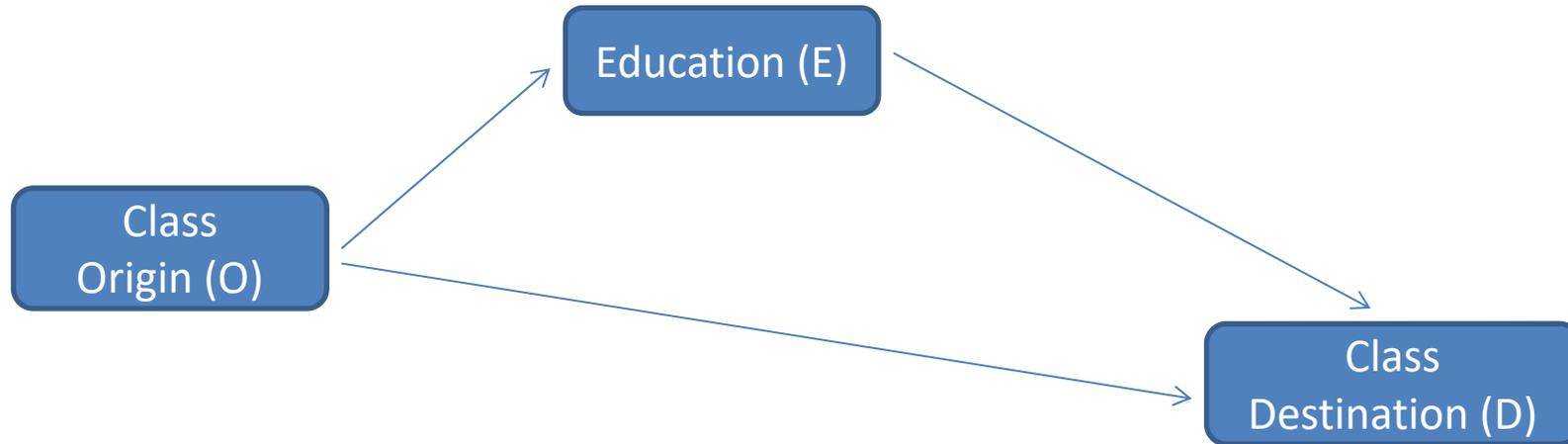
If level of education attained (E) is introduced as an intermediate variable, any change in the total association between class origin (O) and class destination (D) at the societal level may result from four elementary mechanisms:
- A change in the 'direct' link OD|E ('direct' effect of the class origin);
- A change in the OE link (inequality of educational opportunity);
- A transformation in the ED|O association between education and class destination, given class origin (returns of education);
- A compositional effect that, because of educational expansion, has increased the weight of more qualified groups for which it has been observed that the partial association OD|E tends to be weaker (Hout, 1988 for the US; Vallet, 2004 for France).

Aims of this contribution, data and population analysed

- Analysing trends in observed mobility and, more importantly, social fluidity in France by adopting a birth cohort approach
  - In order to know, in particular, whether any increase in social fluidity has occurred with the replacement of 'less fluid' old birth cohorts by 'more fluid' recent birth cohorts
- Revealing the contribution of the four elementary mechanisms to the variation of social fluidity over birth cohorts
  - In order to understand, in particular, the role of education in its two components, 'equalization' on one hand, 'expansion and compositional effect' on the other hand
- Source: the 1970, 1977, 1985, 1993 and 2003 FQP surveys
- Population analysed: in each survey, all men/women, French or foreigners, currently or formerly in employment, living in metropolitan France, aged between 30 and 64 at the date of the survey, and whose class origin, level of education and class destination are known (N = 64,801 (M)/46,079 (W))
- These variables are recoded in the CASMIN (or EGP) schemes:
  - 6 categories for Education (1ab, 1c, 2ab, 2c, 3a, 3b)
  - 7 categories for Class Origin and Destination (I, II, IIIa, IVab, IVc, V-VI, VIIab-IIIb)

## Observational design: age depending on birth cohort and survey

Survey (S) / Cohort (C)	1970	1977	1985	1993	2003
1906-1924	46-64	*53-64*	61-64	-	-
1925-1934	*36-45*	43-52	*51-60*	59-64	-
1935-1944	30-35	*33-42*	41-50	*49-58*	59-64
1945-1954	-	30-32	*31-40*	39-48	*49-58*
1955-1964	-	-	30	*30-38*	39-48
1965-1973	-	-	-	-	*30-38*

- Six birth cohorts are defined, from the oldest (1906-1924) to the most recent one (1965-1973).
- By construction, the oldest cohort is observed at a rather advanced age, but it is the case at a rather young age for the most recent cohort.
- We must therefore take into account the possibility of any change over age in the analysed statistical associations. As a consequence and considering the different diagonals, five age groups (A) are roughly defined (*middle, old, old+, young, young+*).
- For each cell, we observe the OED table. The whole analysis is therefore performed on the CSOED table or, equivalently and after a rearrangement of the cells, the CAOED table.
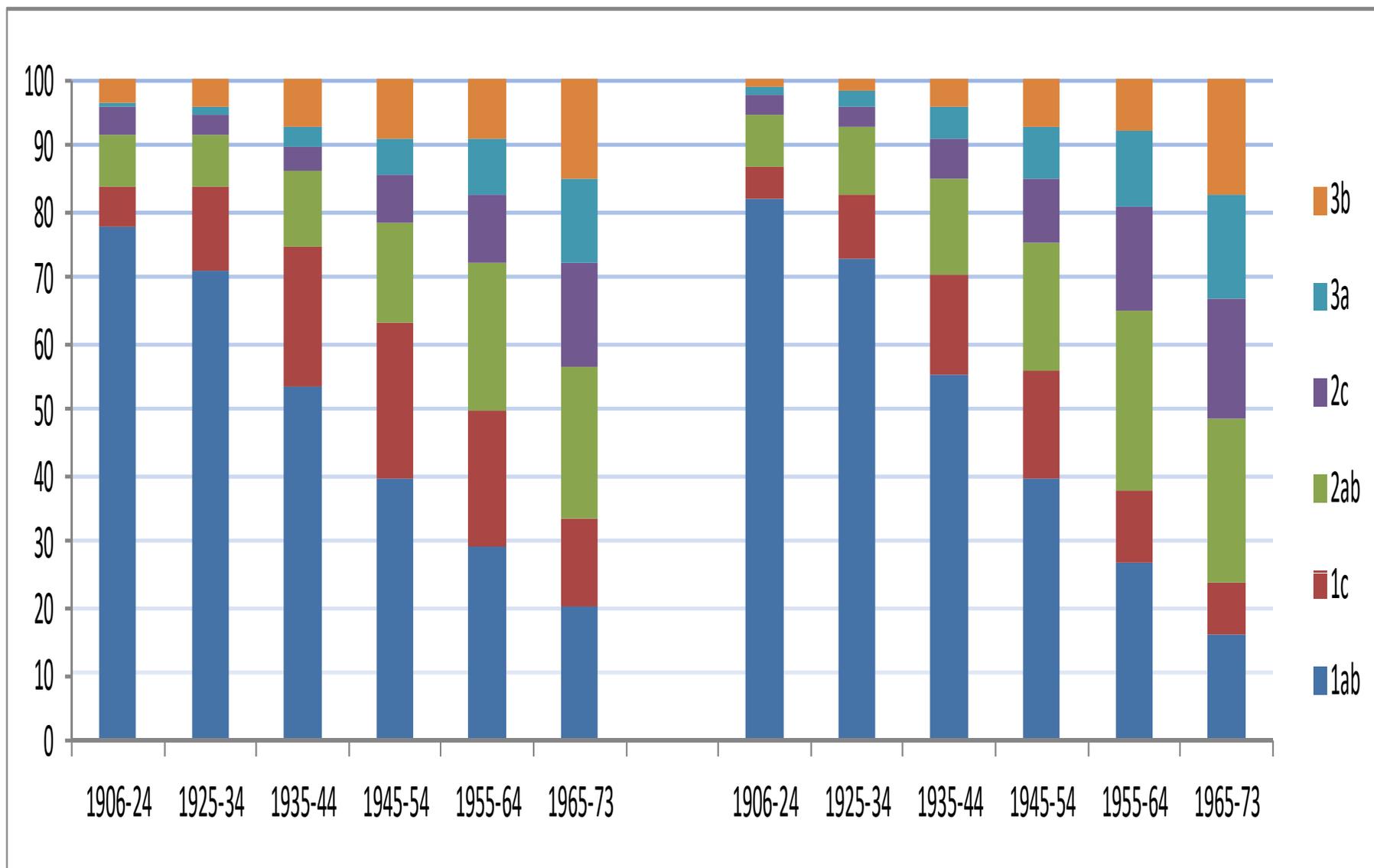
Trends in the distribution of class origins (Men (left) / Women (right))

Trends in the distribution of class destinations (Men (left) / Women (right))
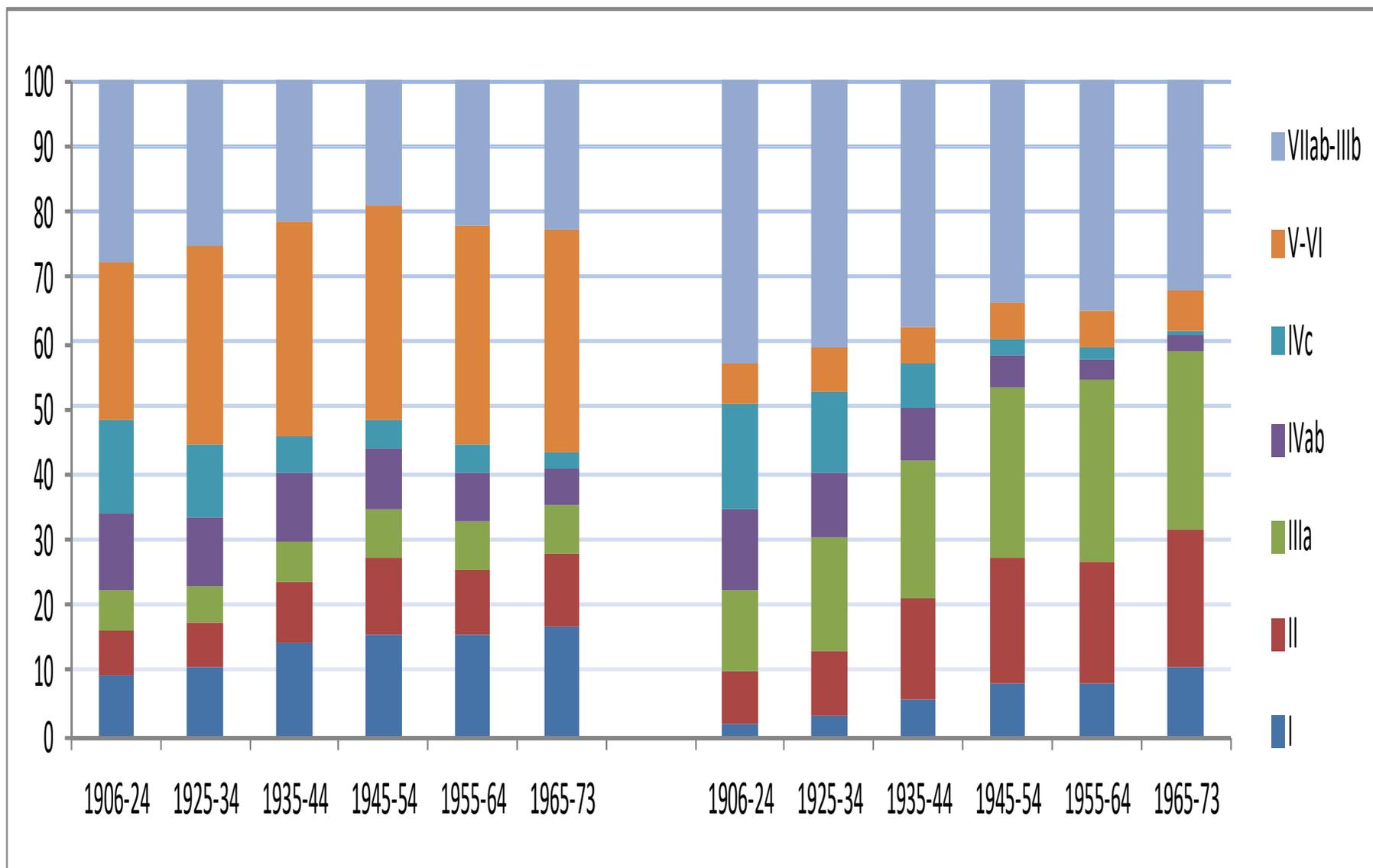
Trends in the distribution of education (Men (left) / Women (right))

Quality and homogeneity of the data – Observed mobility

- For the five cohorts that are observed in several surveys, we can check on the data that:
  - The distribution of class origins is basically 'fixed';
  - The distribution of levels of education (in initial schooling, including apprenticeship) is 'approximately fixed', except for a slight tendency to present oneself as more educated when age grows, i.e. in more recent surveys that have been conducted in a more educated society (Baudelot, 1989);
  - On the contrary, the distribution of class destinations markedly evolves across surveys or when age grows, as a consequence of change in the social structure and career mobility; for instance, for men in the 1935-1944 cohort, the share of Service class I increases from 8.1% in 1970 (age 30-35) to 20.3% in 2003 (age 59-64). So, taking age into account is really important! The same is also apparent for women, but less marked.

- In the paper, I briefly describe change over birth cohorts in absolute rates, more precisely:
  - Change in class destinations, given class origin (OD association);
  - Change in levels of education, given class origin (OE association);
  - Change in class returns to education (ED association).

Absolute class mobility rates in the 1906-24 and 1965-73 cohorts

	Men		Women	
	1906-24 cohort (aged 46-64 in 1970)	1965-73 cohort (aged 30-38 in 2003)	1906-24 cohort (aged 46-64 in 1970)	1965-73 cohort (aged 30-38 in 2003)
Total mobility rate	**62.5**	**68.2**	**59.9**	**78.5**
Total non vertical mobility	19.1	13.0	20.1	17.7
Total vertical mobility	**43.4**	**55.2**	**39.9**	**60.8**
Total upward mobility	**31.4**	**34.0**	**20.0**	**32.2**
Total downward mobility	**11.9**	**21.2**	**19.9**	**28.6**
Long-range upward mobility	**4.0**	**4.2**	**1.9**	**5.3**
Long-range downward mobility	**0.6**	**2.4**	**0.7**	**2.6**

Log-multiplicative modelling to analyse change in statistical associations

- CAOD table as an example, i and i' two class origins, j and j' two class destinations, c a birth cohort, a an age group

- **{CAO CAD OD}** – **Constancy of the association between class origin and class destination, over birth cohorts and age groups**:

$$Log(m_{caij}) = \lambda + \lambda_c^C + \lambda_a^A + \lambda_i^O + \lambda_j^D + \lambda_{ca}^{CA} + \lambda_{ci}^{CO} + \lambda_{cj}^{CD} + \lambda_{ai}^{AO} + \lambda_{aj}^{AD} + \lambda_{cai}^{CAO} + \lambda_{caj}^{CAD} + \lambda_{ij}^{OD}$$

$$Log(OddsRatio_{ca}) = \lambda_{ij}^{OD} + \lambda_{i'j'}^{OD} - \lambda_{ij'}^{OD} - \lambda_{i'j}^{OD}$$

- **{CAO CAD β_COD}** – **Uniform change over birth cohorts in the association between class origin and class destination (Unidiff model)**:

$$Log(m_{caij}) = \lambda + \lambda_c^C + \lambda_a^A + \lambda_i^O + \lambda_j^D + \lambda_{ca}^{CA} + \lambda_{ci}^{CO} + \lambda_{cj}^{CD} + \lambda_{ai}^{AO} + \lambda_{aj}^{AD} + \lambda_{cai}^{CAO} + \lambda_{caj}^{CAD} + \beta_c \lambda_{ij}^{OD}$$

$$Log(OddsRatio_{ca}) = \beta_c(\lambda_{ij}^{OD} + \lambda_{i'j'}^{OD} - \lambda_{ij'}^{OD} - \lambda_{i'j}^{OD})$$

- **{CAO CAD $\beta_C\beta_A$OD}** – **Uniform, but independent, changes over birth cohorts and age groups in the association between class origin and class destination**:

$$Log(m_{caij}) = \lambda + \lambda_c^C + \lambda_a^A + \lambda_i^O + \lambda_j^D + \lambda_{ca}^{CA} + \lambda_{ci}^{CO} + \lambda_{cj}^{CD} + \lambda_{ai}^{AO} + \lambda_{aj}^{AD} + \lambda_{cai}^{CAO} + \lambda_{caj}^{CAD} + (1 + \beta_c + \beta_a)\lambda_{ij}^{OD}$$

$$Log(OddsRatio_{ca}) = (1 + \beta_c + \beta_a)(\lambda_{ij}^{OD} + \lambda_{i'j'}^{OD} - \lambda_{ij'}^{OD} - \lambda_{i'j}^{OD})$$

Change in the OD association between class origin and class destination (Men)
- More recent birth cohorts are generally observed as being 'more fluid' than more ancient birth cohorts;
- And the OD association also monotonically weakens when age grows.

Model			G^2	ddl	p	Δ(%)	Bic
1.	CO CD OD		451.90	180	.000	2.64	-1542.34
2.	CO CD β_COD		396.63	175	.000	2.40	-1542.21
	Difference 1-2		55.27	5	.000		
	β_C 1 (1906-24)	1.103 (.027)	1.022 (.026)	0.954 (.025)	0.965 (.030)	0.900 (.036)	
3.	CSO CSD OD		1147.06	684	.000	4.19	-6431.03
4.	CSO CSD β_COD		1090.18	679	.000	4.04	-6432.52
	Difference 3-4		56.88	5	.000		
	β_C 1 (1906-24)	1.105 (.027)	1.030 (.026)	0.958 (.025)	0.961 (.030)	0.897 (.036)	
5.	**CSO CSD $\beta_C\beta_A$OD**		**1033.20**	**675**	**.000**	**3.93**	**-6445.18**
	Difference 4-5		**56.98**	**4**	**.000**		
	β_C **0 (1906-24)** **(deviation)**	**+0.072**	**-0.029**	**-0.108**	**-0.089**	**-0.191**	
	β_A **0 (middle)** **(deviation)**	**-0.019 (old)**	**-0.097 (old+)**	**+0.073 (young)**	**+0.187 (young+)**		
6.	CSO CSD $\beta_C\beta_A\beta_S$OD		1030.05	671	.000	3.92	-6404.01
	Difference 5-6		3.15	4	ns		
7.	CSO CSD β_{CA}OD		1020.85	665	.000	3.90	-6346.74
	Difference 5-7		12.35	10	ns		

Change in the OE association between class origin and level of education:
- The reduction of inequality of educational opportunity was essentially concentrated in cohorts born between 1935 and 1954.

Change in the ED association between education and class destination:
- This association has weakened, particularly for cohorts born after 1934.
- It also monotonically weakens when age grows.

Interaction between O, E and D (see the table):
- We do observe that the 'direct' OD association is weaker in more educated groups. As the educational expansion has enlarged the size of these groups, a compositional effect has likely contributed to the total increase in social fluidity.

Model		G^2	ddl	p	Δ(%)	Bic
1.	COE CD	45201.85	1476	.000	31.09	28849.13
2.	COE CD OD	23437.83	1440	.000	19.61	7483.96
3.	COE CD ED	16082.45	1446	.000	15.82	62.10
4.	COE CD OD ED	2653.32	1410	.000	5.62	-12968.18
5.	**COE CD β_EOD ED**	**2579.14**	**1405**	**.000**	**5.54**	**-12986.96**
	Difference 4-5	74.18	5	.000		
	β_E 1 (1ab)	0.913 (1c)	0.879 (2ab)	0.730 (2c)	0.774 (3a)	0.585 (3b)
		(.027)	(.029)	(.039)	(.060)	(.060)

Revealing the contribution of the four explanatory mechanisms to the increase in social fluidity (1)

- We start from a two-equation model (Goodman, *Biometrika*, 1973) that includes age effects but assumes that no variation related to the cohorts and the explanatory mechanisms has intervened (Baseline):
  - Equation 1: level of education only depends on class origin;
  - Equation 2: class destination depends on birth cohort and it also depends on class origin, level of education attained and their interaction.
- `* Baseline model of no interesting change over cohorts (no C change)`
- `* mod E|CAO {AOE}`
- `*     D|CAOE {CAD AOED}`
  - On the estimated COD table, we fit the Unidiff model, i.e. we simulate the consequences of the Baseline hypotheses for change in social fluidity over birth cohorts.

- Model 2 (Expand) adds the CE association in the first equation, i.e. it takes the educational expansion into account:
- `* In addition, there is educational expansion over cohorts (add CE)`
- `* mod E|CAO {AOE CE}`
- `*     D|CAOE {CAD AOED}`
  - We again fit the Unidiff model on the estimated COD table, i.e. we simulate the change in social fluidity which is only due to the educational expansion.

*Revealing the contribution of the four explanatory mechanisms to the increase in social fluidity (2)*

- Model 3 (Equalize) adds the COE interaction in the first equation, i.e. it takes the reduction in inequality of educational opportunity into account:
  - `* In addition, there is educational equalization over cohorts (add COE)`
  - `* mod E|CAO {AOE COE}`
  - `*      D|CAOE {CAD AOED}`
    - Following the same strategy, we reveal the additional variation in social fluidity which is due to the decline in inequality of educational opportunity.

- Model 4 (EducReturn) adds the CED interaction in the second equation, i.e. it authorizes a variation over cohorts in the association between education and class destination:
  - `* In addition, there is change in educational returns over cohorts (add CED)`
  - `* mod E|CAO {AOE COE}`
  - `*      D|CAOE {CAD AOED CED}`
   - Here, we reveal the additional variation in social fluidity which is due to this sole effect.

Revealing the contribution of the four explanatory mechanisms to the increase in social fluidity (3)

- Model 5 (OriginReturn) adds the COD interaction in the second equation, i.e. it authorizes a variation over cohorts in the 'direct' association between class origin and class destination:
- *** In addition, there is change in (direct) origin-destination association over cohorts (add COD)**
- *** mod E|CAO {AOE COE}**
- ***   D|CAOE {CAD AOED CED COD}**
  - Here, we reveal the additional variation in social fluidity which is due to this sole effect.

- The last model (Saturated) saturates the effects included in both equations:
- *** Finally, the saturated model**
- *** mod E|CAO {CAOE}**
- ***   D|CAOE {CAOED}**
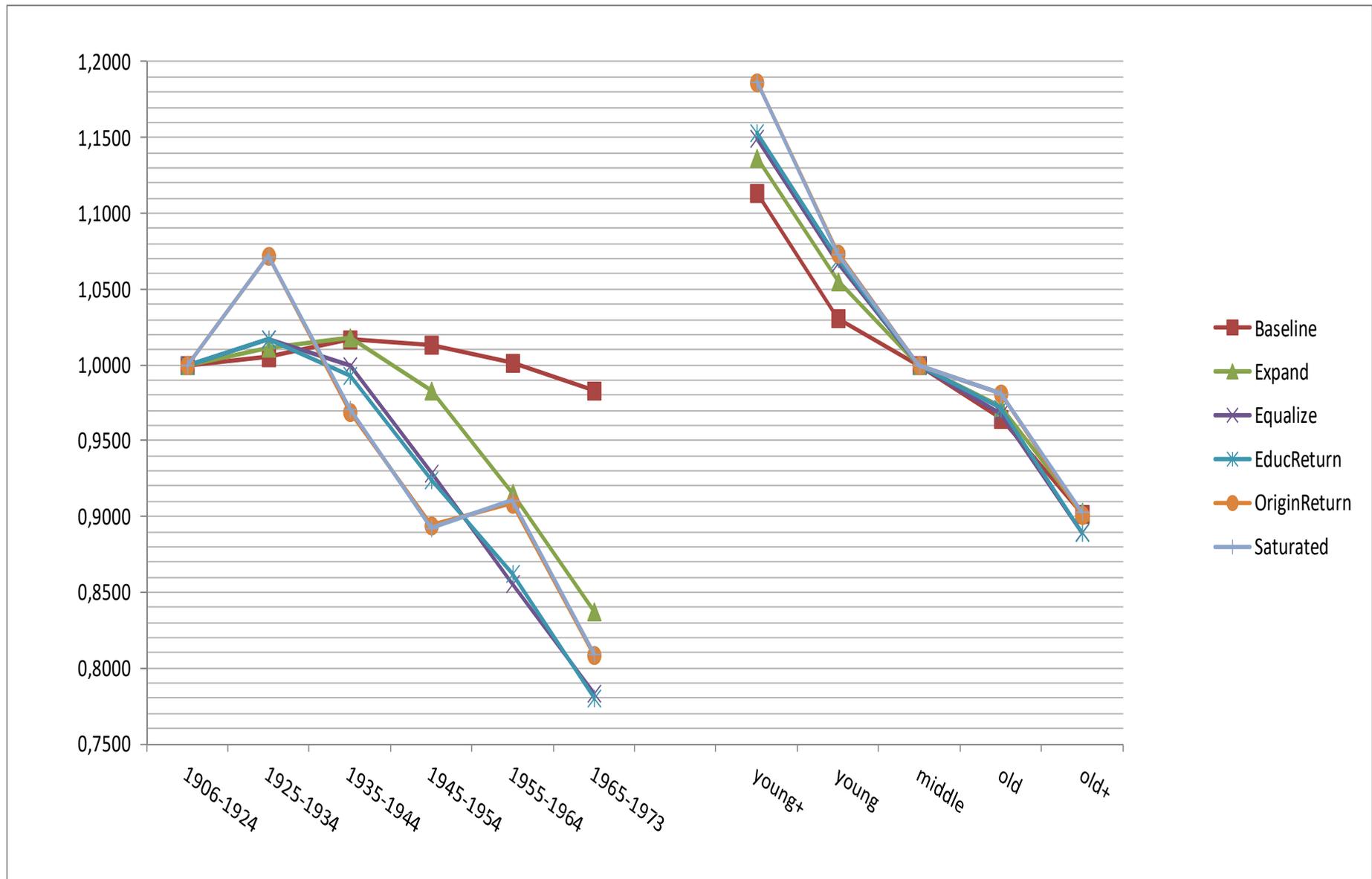 - We reveal the TOTAL and OBSERVED variation in social fluidity over birth cohorts.

Men – On the CAOED table, i.e. allowing age effects, and Unidiff on COD
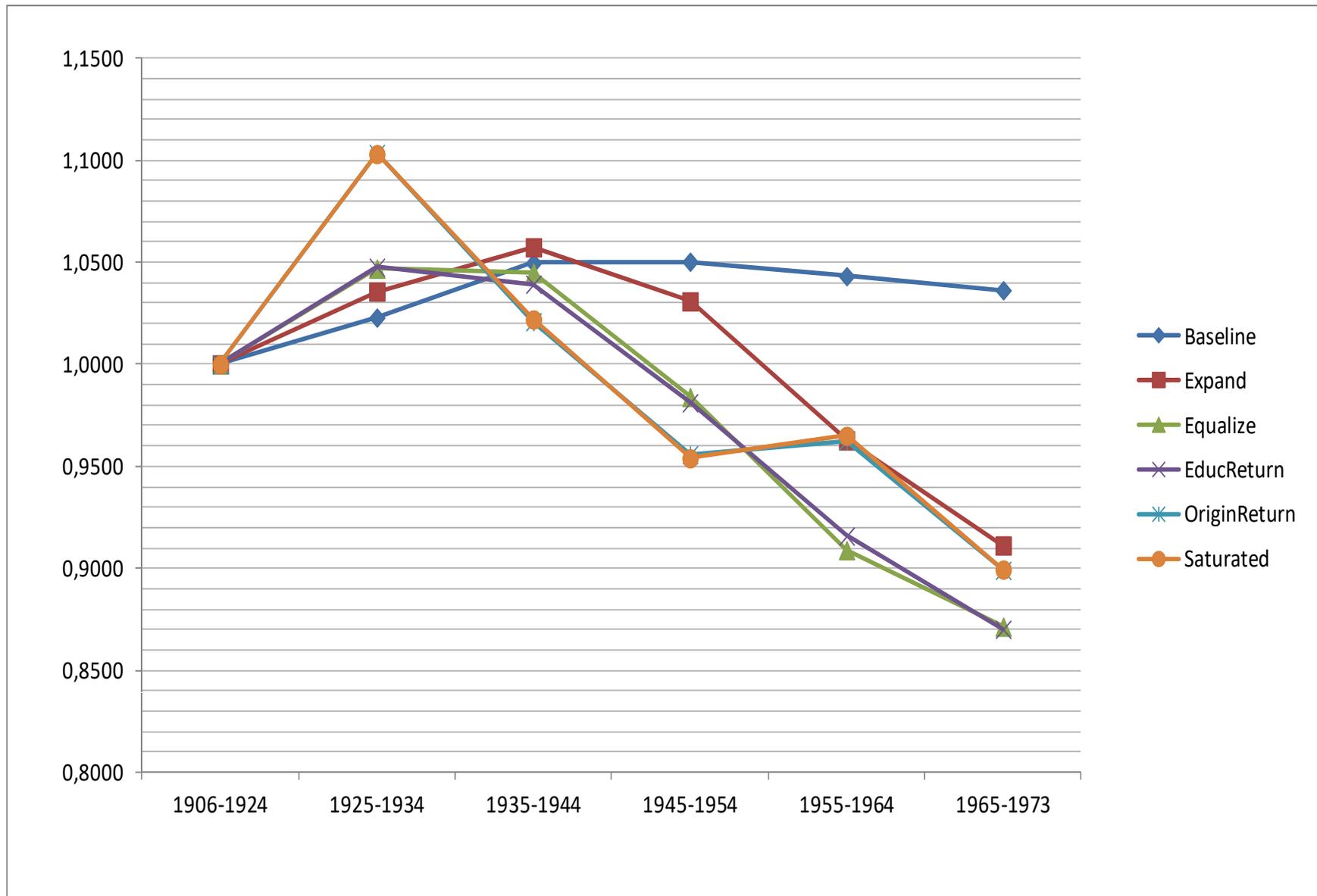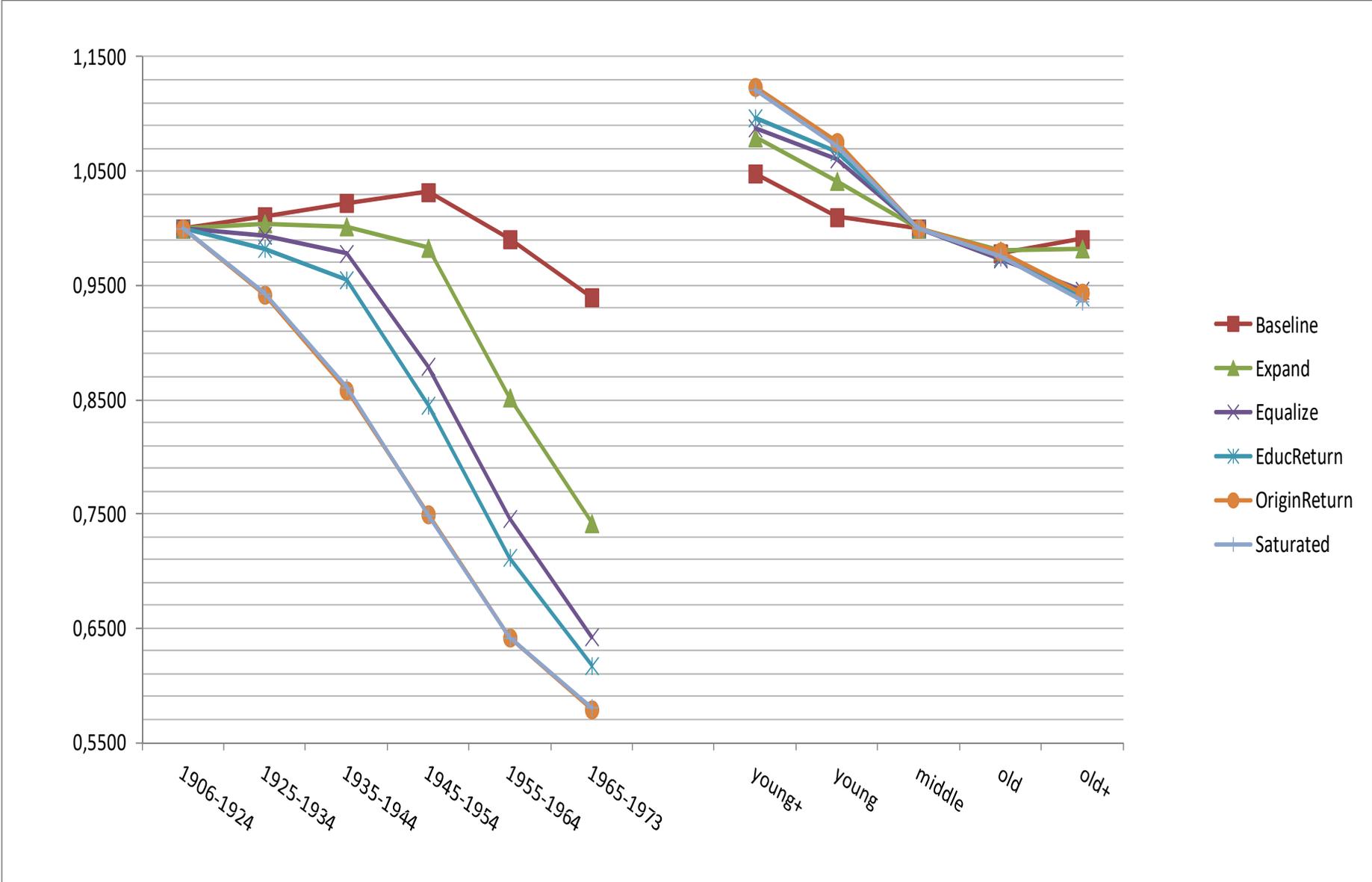
Women – On the CAOED table, i.e. allowing age effects, and Unidiff on COD
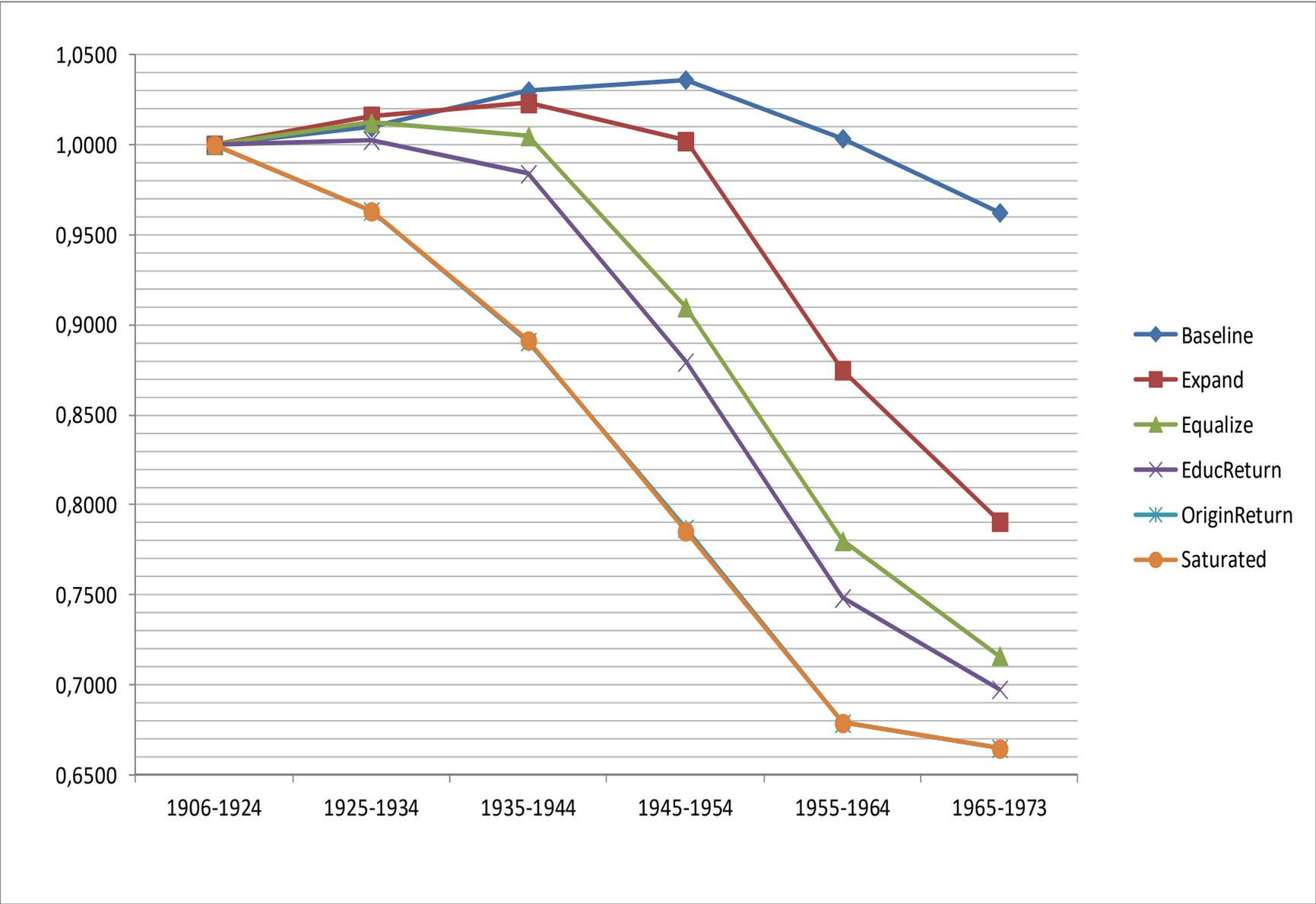
Men - On the CAOED table, i.e. allowing age effects, and Unidiff on CAOD

Women - On the CAOED table, i.e. allowing age effects, and Unidiff on CAOD

Thank you for your attention!

Using the 1970, 1977, 1985, 1993 and 2003 *Formation – Qualification Professionnelle* (INSEE) surveys, this article analyzes how intergenerational social mobility and social fluidity have evolved in France for men and women born between 1906 and 1973.

It demonstrates that the statistical association between class of origin and class of destination has become weaker in recent cohorts than in older ones, and also shows that the same association diminishes with age, that is to say, along the occupational career.

Finally, it demonstrates that change in education has played a key role in the process of increasing social fluidity. In the 1945-54 cohort, the reduction in inequality of educational opportunity is the main factor and the educational expansion is the secondary factor for explaining the reduction of the association between class of origin and class of destination, but the relative importance of these two factors is reversed in the 1955-64 and 1965-73 cohorts.