



A new method for identifying what Cupid's invisible hand is doing. Is it spreading color blindness while turning us more "picky" about spousal education?

Anna Naszodi

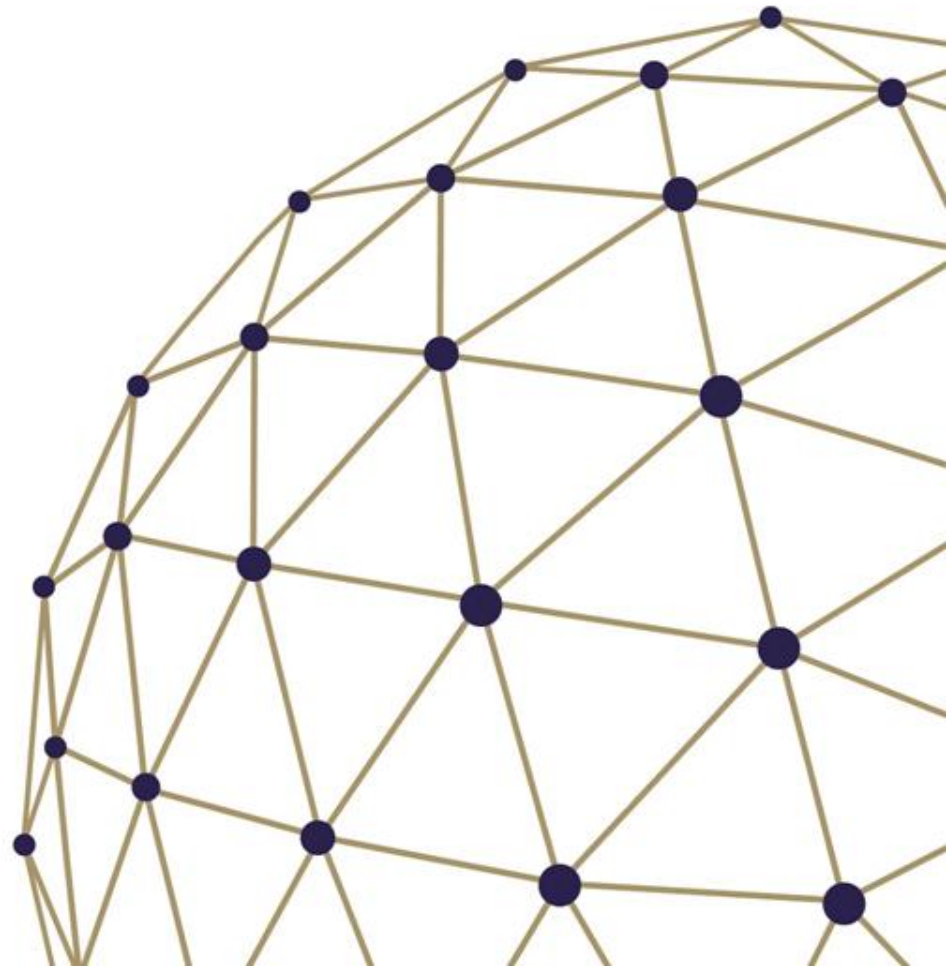
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(Francisco Mendonca)

EEA, Barcelona

28.Aug.2023.



Background papers

1. Naszodi A, Mendonca F (2021). A new method for identifying the role of marital preferences at shaping marriage patterns. *Journal of Demographic Economics*, (Coverage in Wikipedia and the New York Times)
2. Naszodi A, Mendonca F (2022). Changing educational homogamy: Shifting preferences or evolving educational distribution? *Journal of Demographic Economics*
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Follow-up papers

1. Naszodi, A., F. Mendonca (2019) Like marries like. JRC Science for Policy Briefs Series
2. Naszodi, A. (2021) Decomposition scheme matters more than you may think. Arxiv.org
3. Naszodi, A. (2023a) Direct comparison or indirect comparison via a series of counterfactual decompositions? Arxiv.org
4. Naszodi, A. (2023b) The iterative proportional fitting algorithm and the NM-method: solutions for two different sets of problems. Arxiv.org
5. Naszodi, A. (2023c) What do surveys say about the historical trend of inequality and the applicability of two table-transformation methods? Arxiv.org
6. Naszodi, A. (2023d) Historical trend of homophily: U-shaped or not U-shaped? Or, how would you set a criterion to decide which criterion is better to choose a criterion? Arxiv.org
7. Naszodi A, Cuccu L (2023). A new measure of relative intergenerational mobility. RR: *Journal of Applied Economics*.

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Introduction

Aim: to identify the historical trend of inequality in the US using data on couples.

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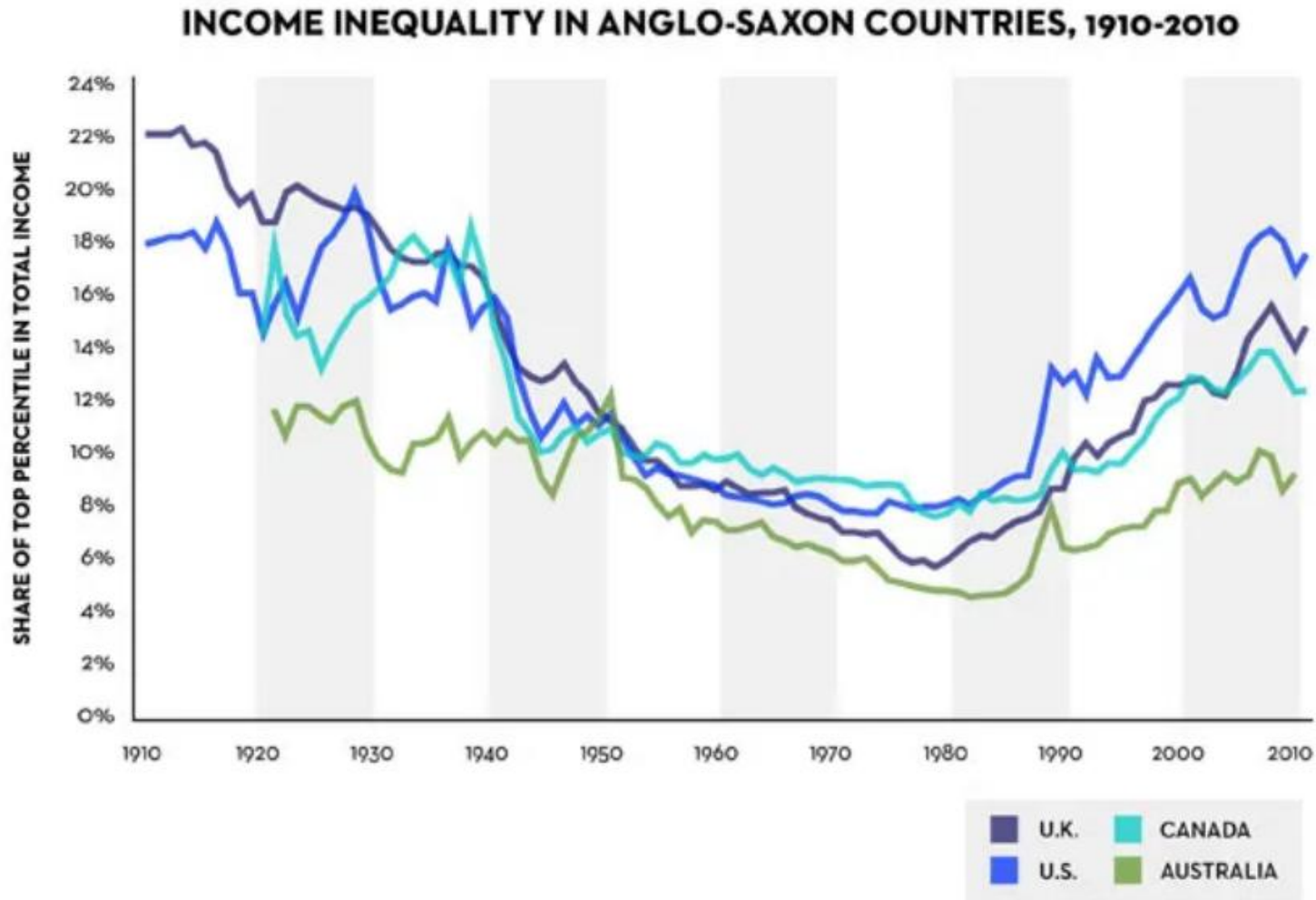
Idea: it is a sign of widening (/narrowing) social gap between different educational or racial groups if members of a given generation are less (/more) inclined to marry out of their own group relative to their peers in an older generation.

Stylized U-shaped trend of inequality, US, 20th century:

- tax-declarations – income and wealth inequality
- test score gap between high-SES and low-SES students
- longevity gap – health disparity

U-shaped trend in income inequality

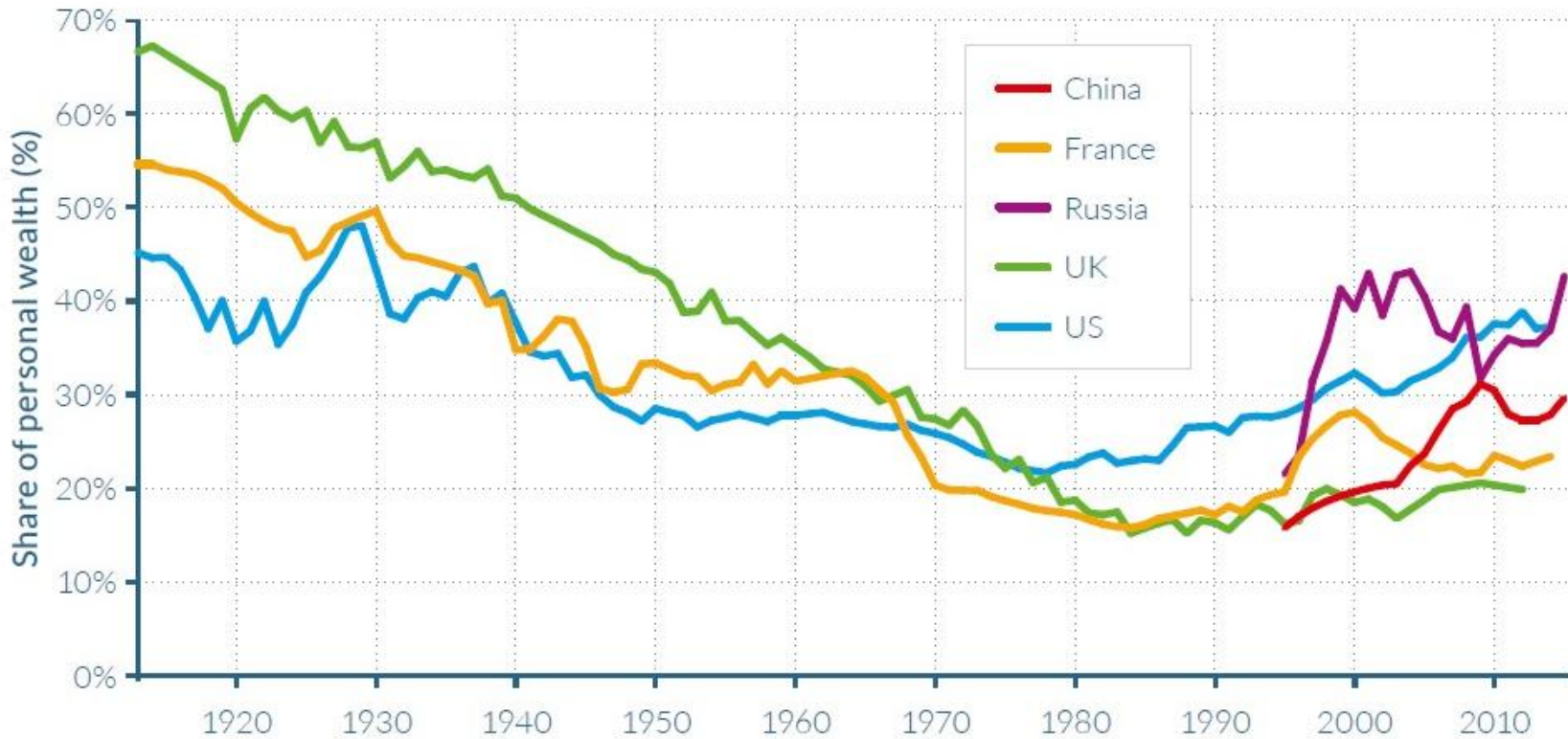
The fall and rise of the top 1% income share



Source: Piketty (2014): Capital in the Twenty-First Century

U-shaped trend in wealth inequality

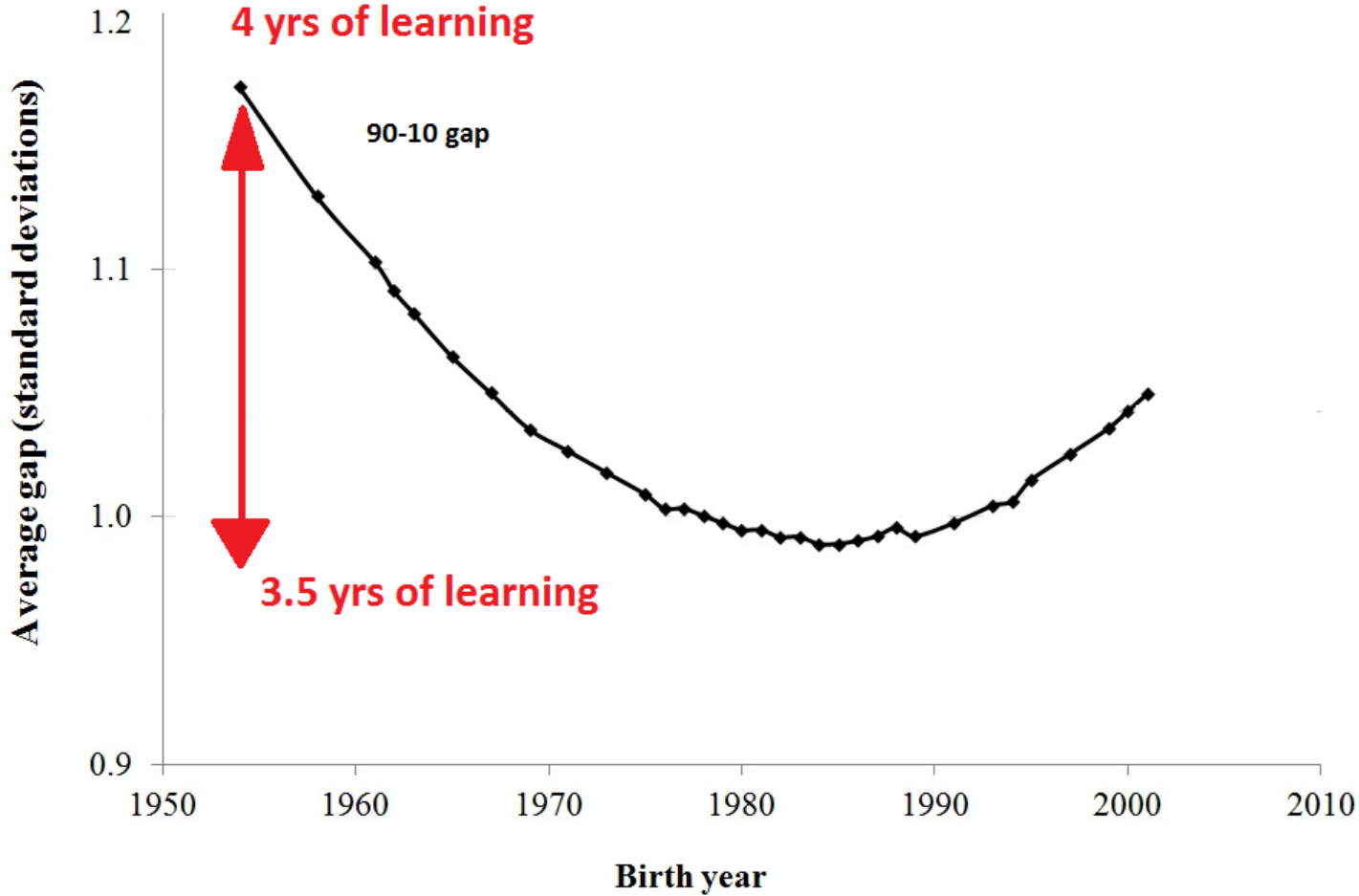
The fall and rise of the top 1% personal wealth share



Source: WID.world (2017). See wir2018.wid.world for data series and notes.

Source: Alvaredo et al (2018). World inequality report 2018. World Inequality Lab.

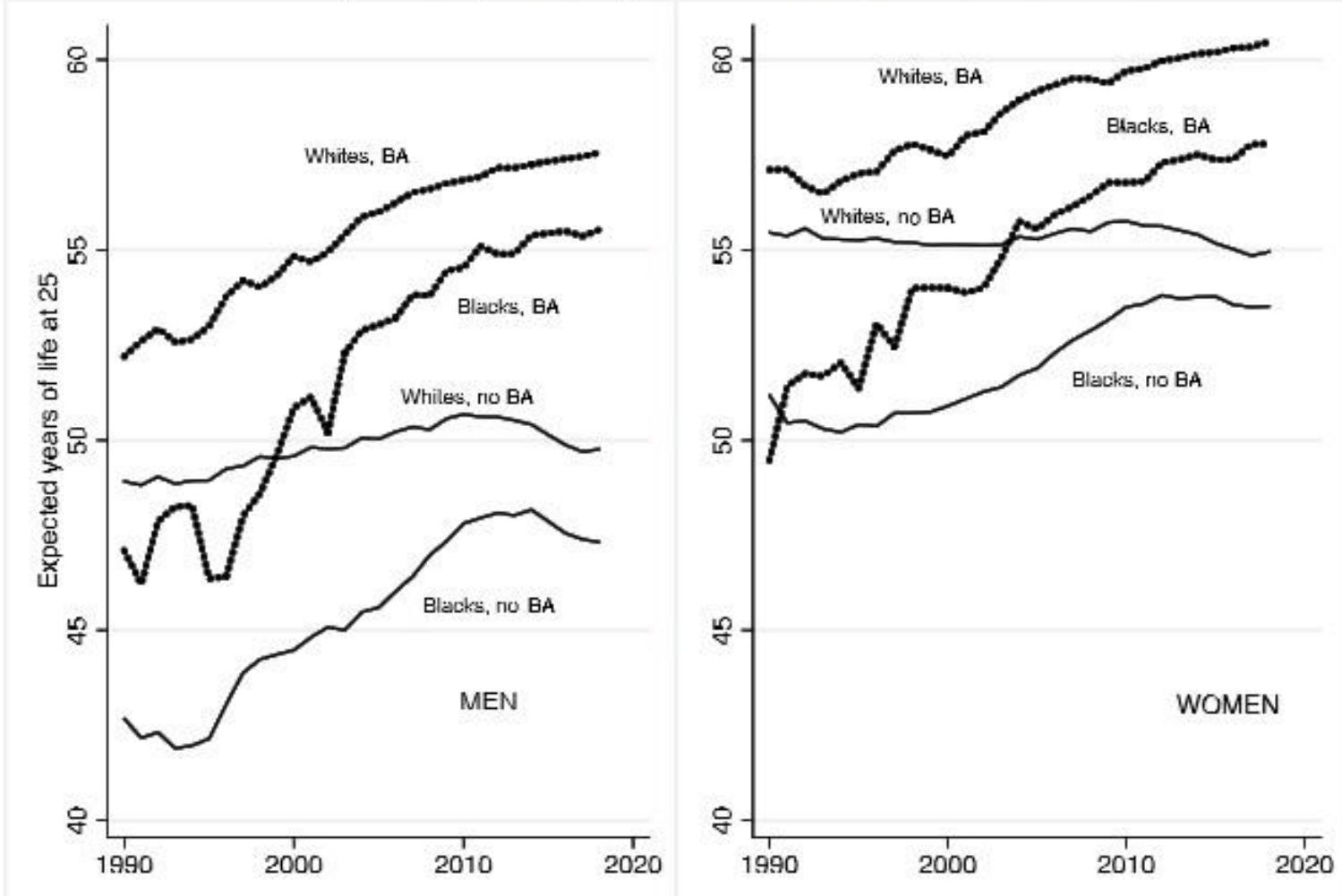
U-shaped trend in inter-generational mobility, US: Test-score gap btw high-SES and low-SES students (14-17 yrs)



Source: Hanushek, et al. (2019). [The achievement gap fails to close. *Education Next*.](#)
Replicated in Naszodi A, Cuccu L (2019). [A new measure of relative intergenerational mobility](#)

Trend in life expectancy gap between American college graduates and their peers with no college degree

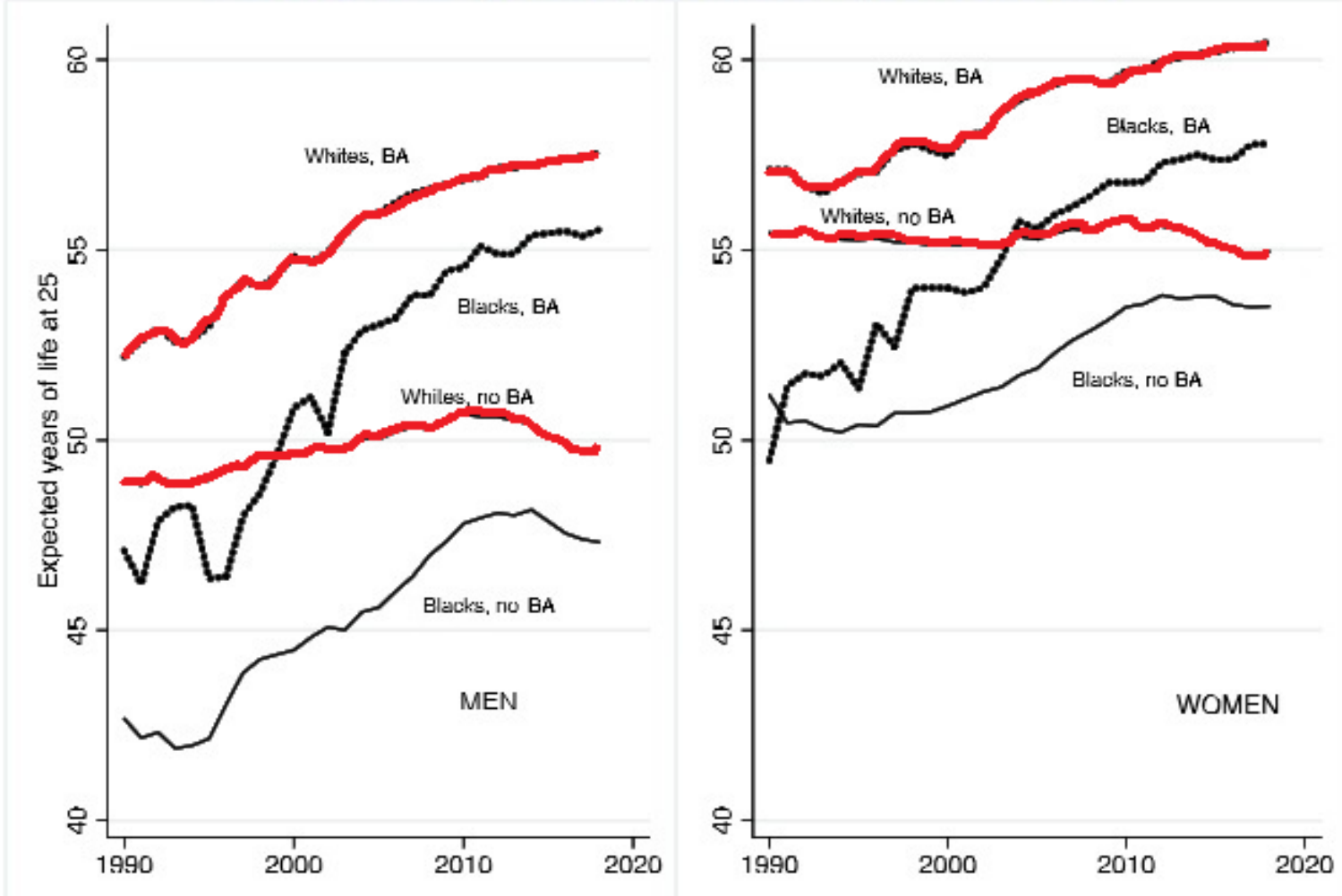
Life expectancy at 25 by race/sex/education



Source: Case and Deaton (2021) Life expectancy in adulthood...

Trend in life expectancy gap between American college graduates and their peers with no college degree

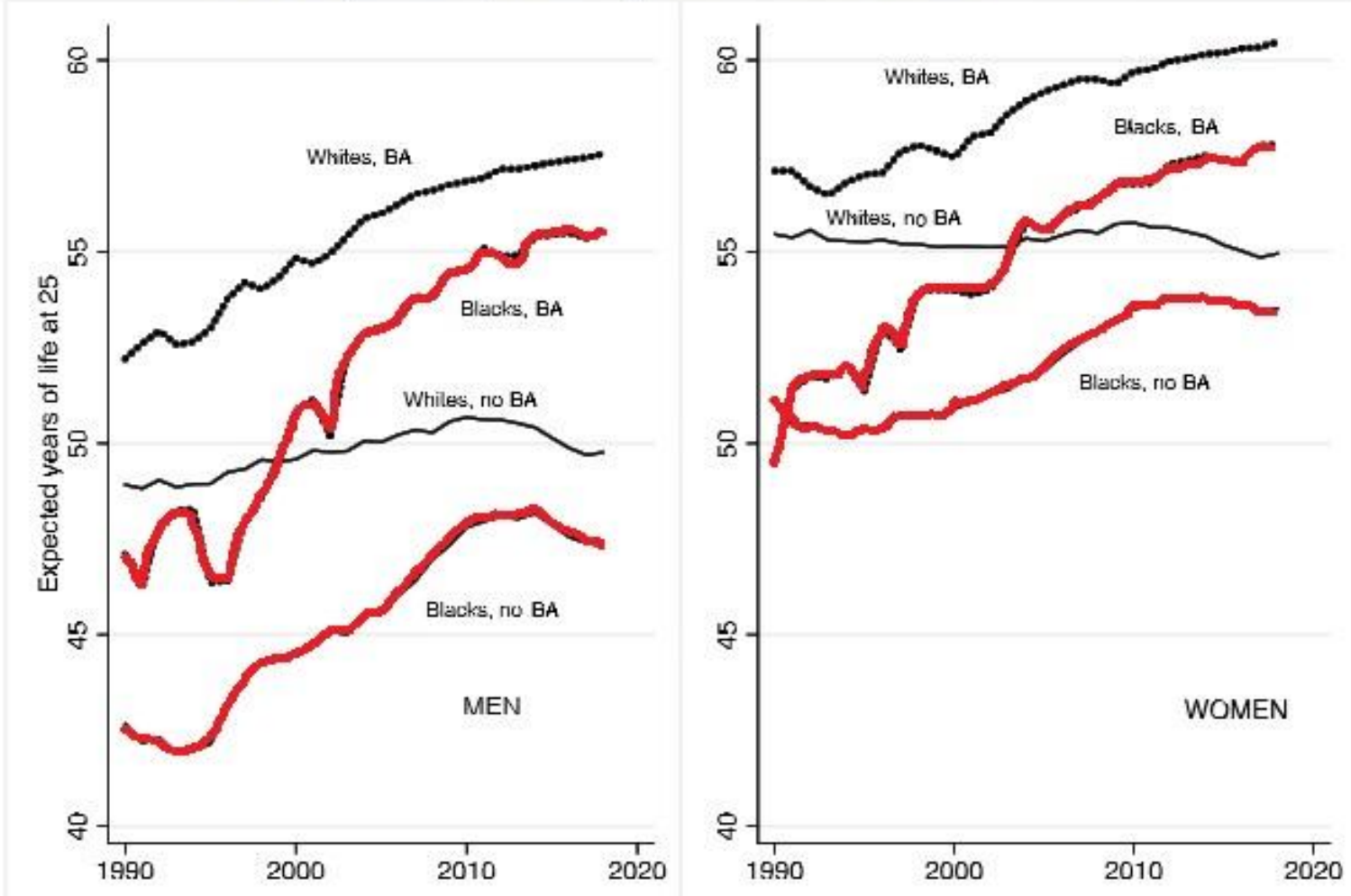
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Stylized U-shaped trend of inequality, US, 20th century:

- tax-declarations – income and wealth inequality
- test score gap between high SES and low SES students
- longevity gap – health disparity

Findings in the assortative mating literature:

- Typical: not-U-shaped trend in the inclination/degree of sorting/social norms/preferences... along the educational.
- U-shaped trend in Naszodi-Mendonca (2021, 2022, 2023) and Naszodi (2023)

Literature

Potential explanations for the diverse trends:

1. Number of educational categories distinguished (Eika et al. 2019)
 2. Singles (Dupuy and Weber 2018)
 3. Sorting along multiple dimensions or a single dimension (Rosenfeld 2008)
- ...

Literature

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+ Naszodi (2023): shocks are IID or not

Empirical findings

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+ Naszodi (2023): shocks are IID or not

Once we depart from the IID assumption, the U-shaped trend

in inclination/degree of sorting/social norms/preferences... becomes robust to

- **Number of educational categories distinguished (Naszodi-Mendonca 2021)**
- **Singles (Naszodi-Mendonca 2022)**
- **Sorting along multiple dimensions (Naszodi-Mendonca 2023)**

...

Significance

Choice of the model influences what historical trend is identified, while the narrative of the past influences what future paths are believed to be possible.

- Models in the IID framework; not U-shaped trend; narrative: not even the welfare state could decrease inequality; increasing inequality in the future.
- Models outside the IID framework; U-shaped trend; narrative: the welfare state could effectively decrease inequality; it is possible to decrease inequality in the future.

Method outside IID

NM-method, Wikipedia

Empirical results for countries other than the US

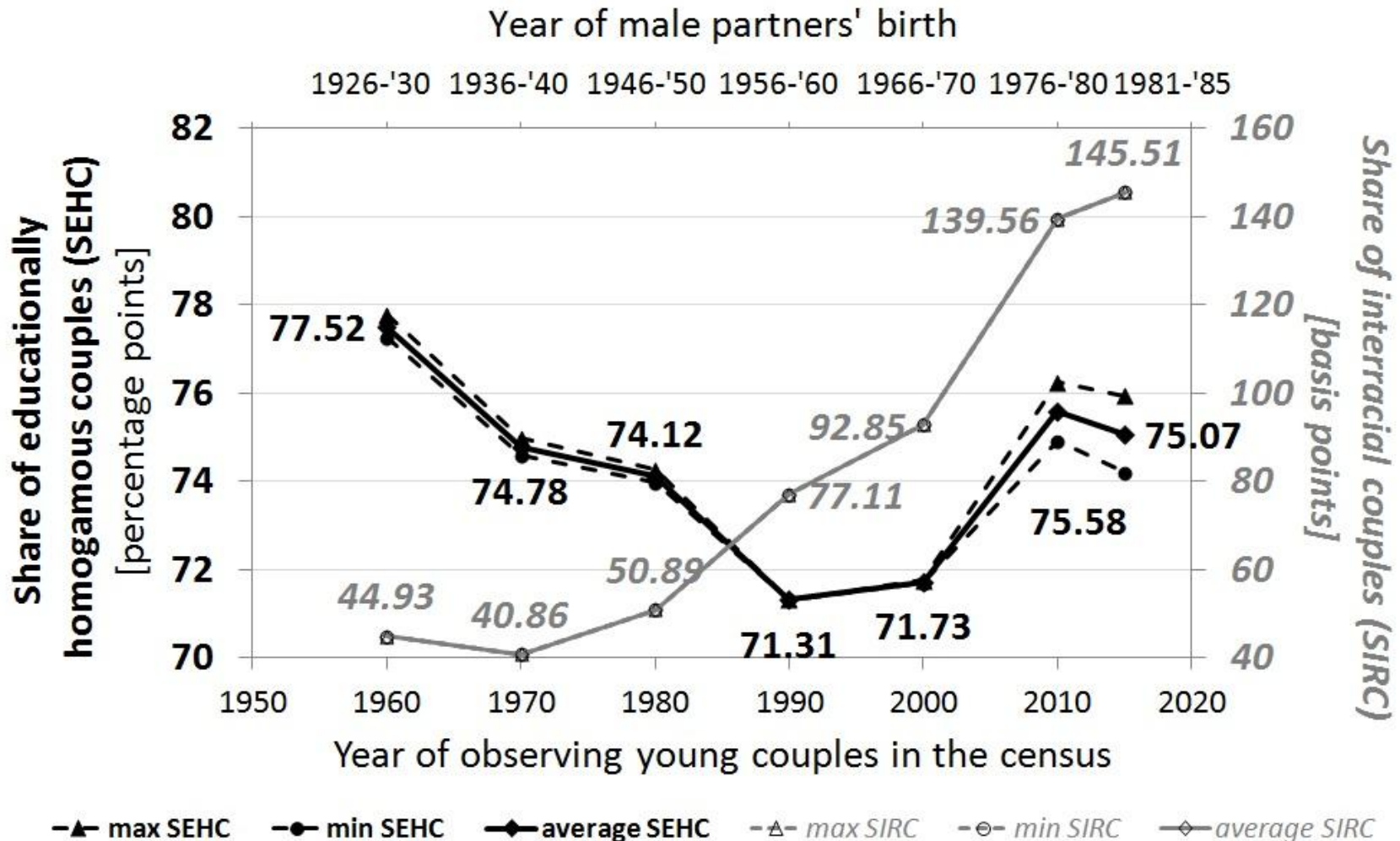
International Demographic Inequality Lab, WWW.IDIL.LI

78 countries representing 4 continents

Thank you for your attention

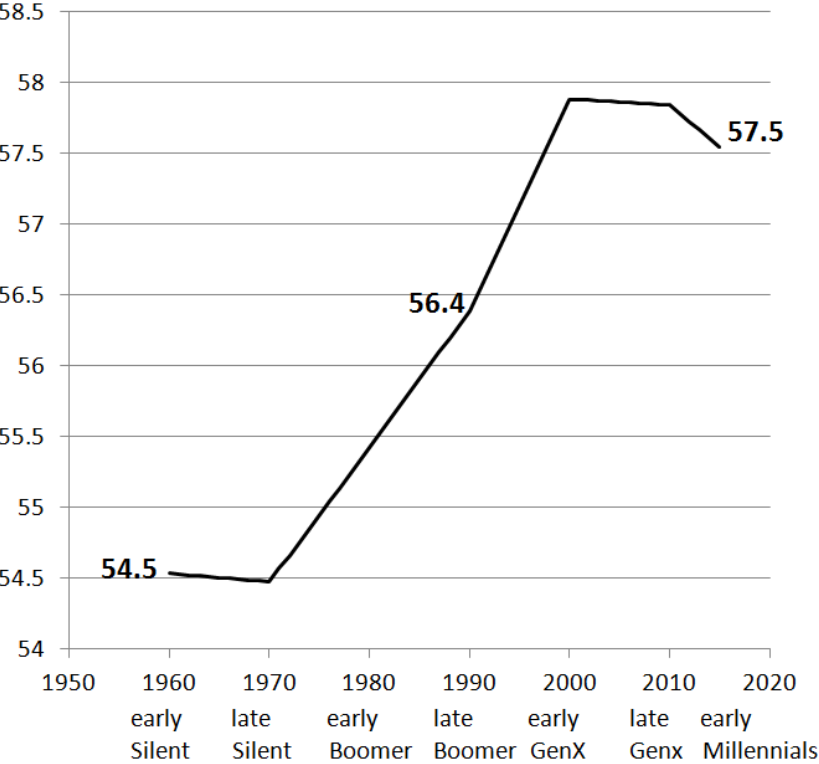
U-shaped ceteris paribus effect of changing preferences for educational homogamy

Naszodi-Mendonca (2023)

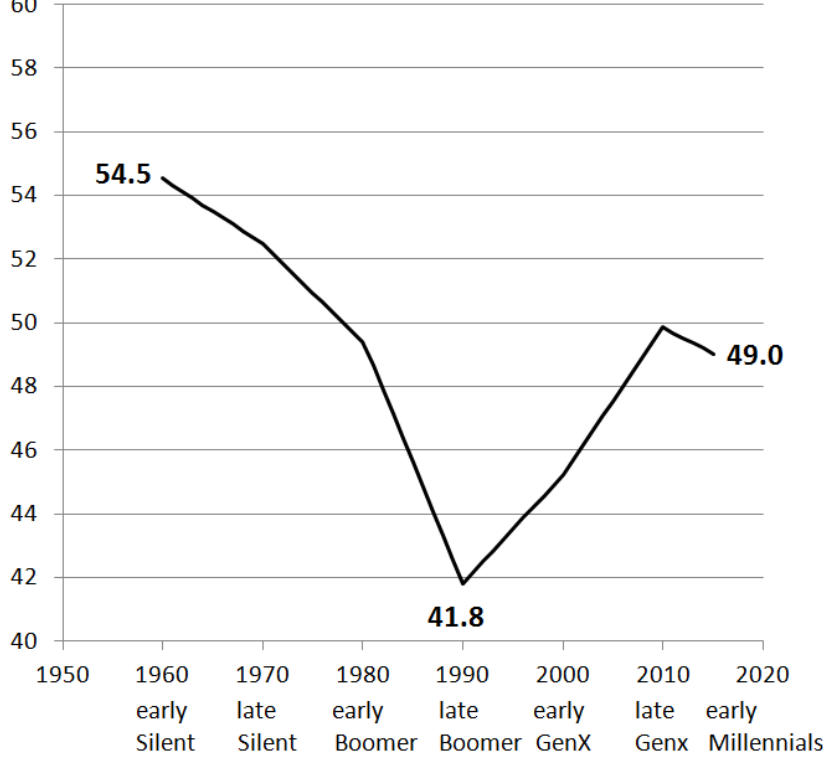


Source: Naszodi-Mendonca(2023).A new method for identifying what Cupid's invisible hand is doing.

Different trends in assortative mating, US



IPF-algorithm

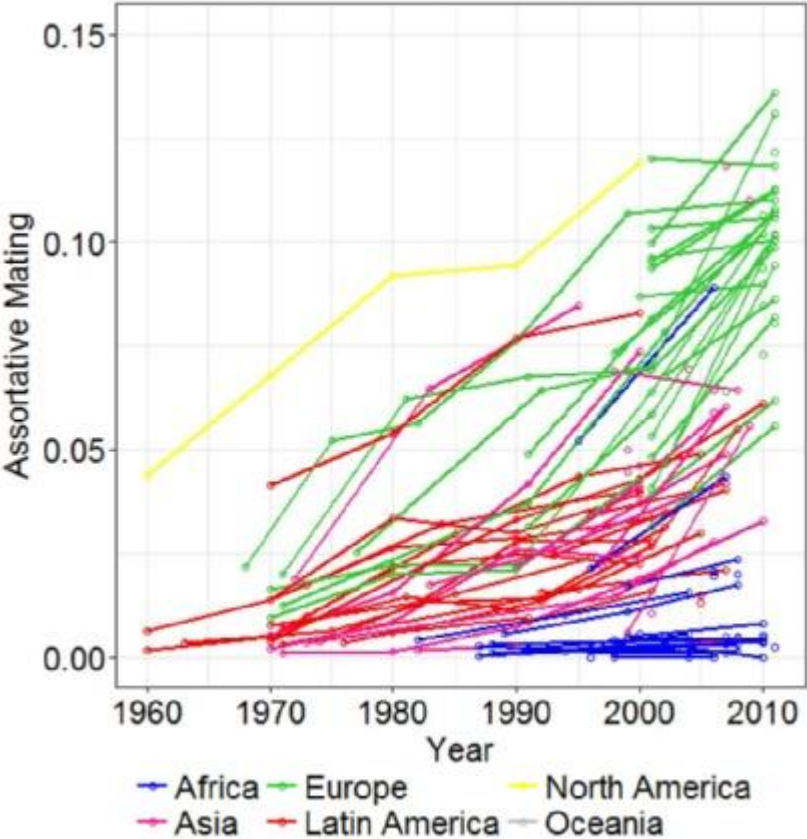


NM-method

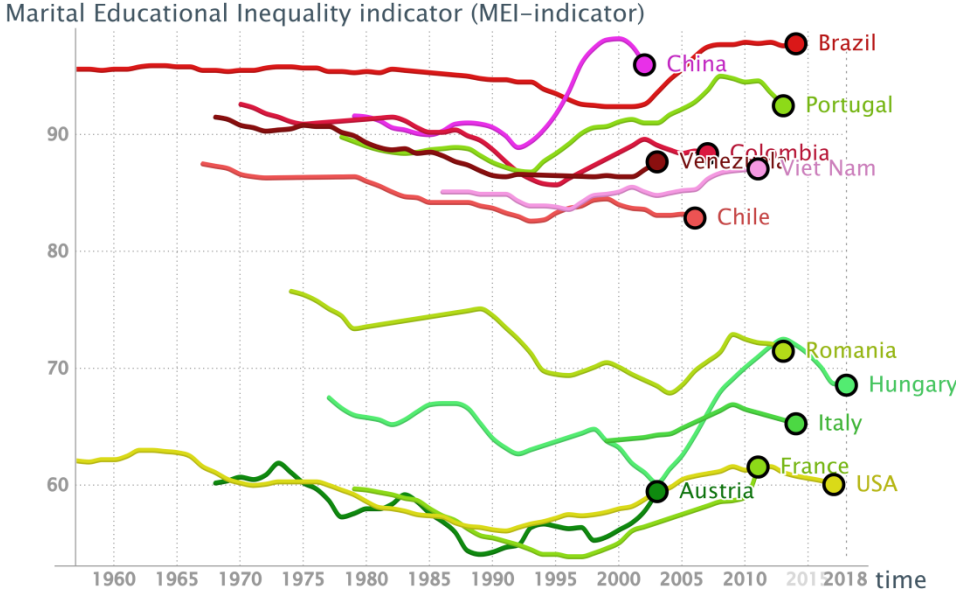
Source: Naszodi (2023a) Direct comparison or indirect comparison...

Notes: US census from IPUMS,
 age of wife/ female partner in [26,35],
 4 education levels (no high school degree, high school, some college, college),
 counterfactuals are constructed either with IPF-algorithm or the NM-method.

Different trends in assortative mating, multi-country



MDBA-algorithm



NM-method

Source: Permanyer et al (2019),
 Notes: survey data + census from IPUMS
 women are 25–34
 2 education levels (college, no college),
 counterfactuals are constructed either with MDBA or

IDIL.LI
 age of wife/ female partner is 30,
 3 education levels (no high school, hs., college)
 NM-method.

Main background paper

Naszodi A, Mendonca F (2021). A new method for identifying the role of marital preferences at shaping marriage patterns. *Journal of Demographic Economics* 1–27.

Inspiration from **sociology**:

changing **social cohesion/social gap** between different **education strata** reflected by changing **marital patterns**.

Economics:

Changes in **marital preferences** over the partner's **educational trait** can be identified from **changes in the equilibrium outcome in the marriage market** by controlling for other factors (such as the changes in the educational distributions of marriageable men and women).

Econometrics:

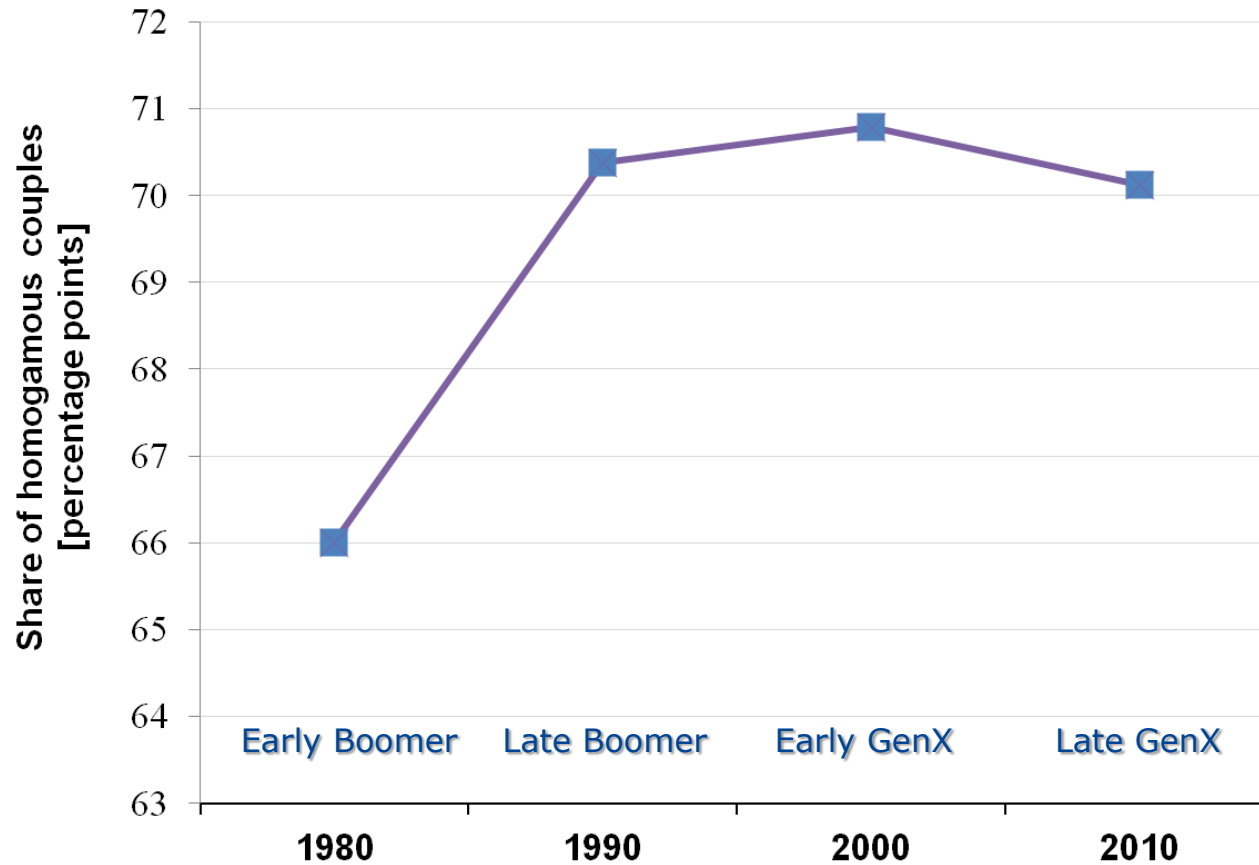
Change in the unobservable preferences ?

Change in the observed educational distributions

Change in **the share of**
homogamous couples



Prevalence of educational homogamy among young couples, US



Young couples: male partners' age in [30;34]

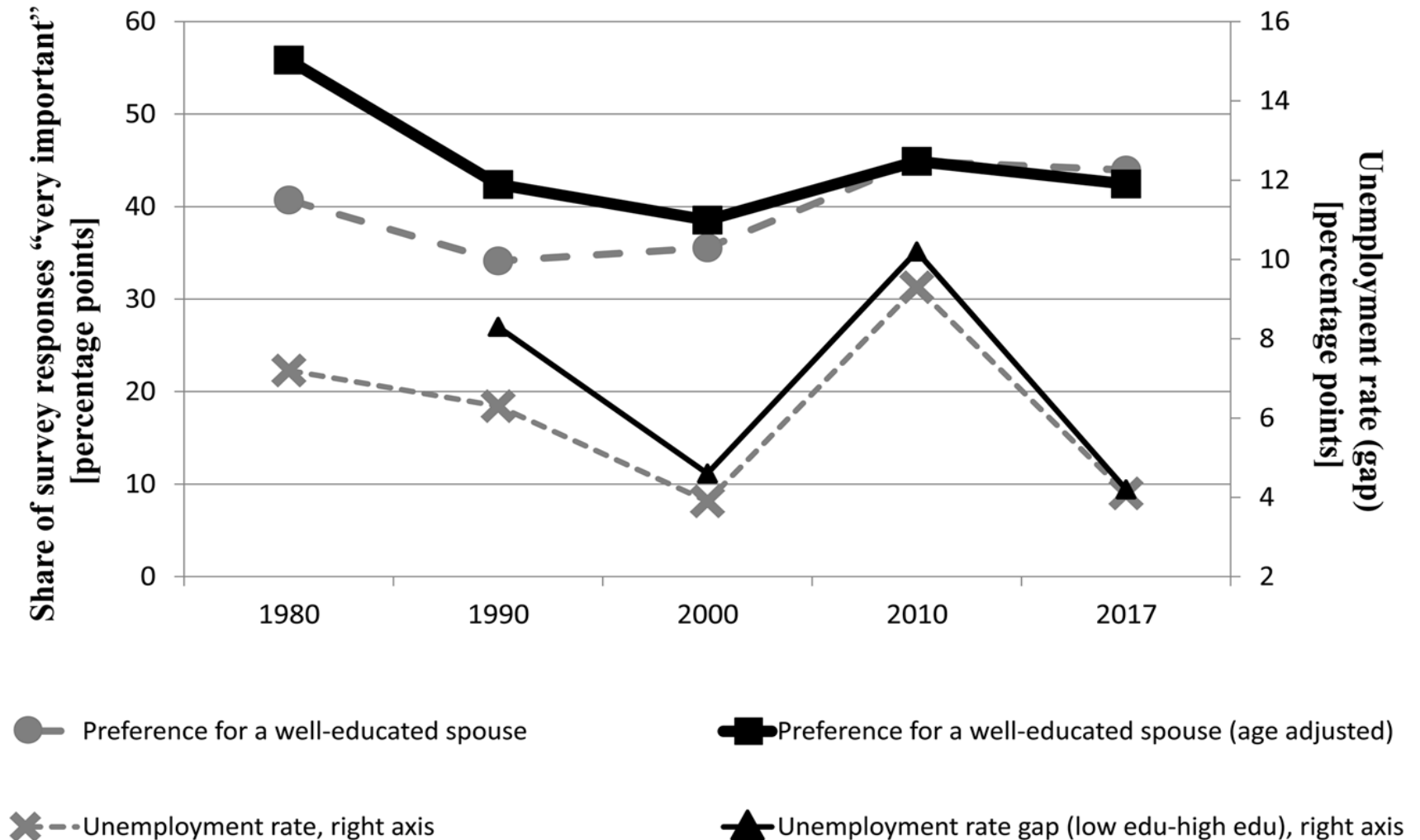
Educational categories:

H: \geq BA

M: =high-school

L: <high-school

Co-movement of labor market and marriage market, US



Source: Naszodi and Mendonca (2022) Changing educational homogamy: Shifting preferences or evolving educational distribution?

Reasons to believe in the the U-trend

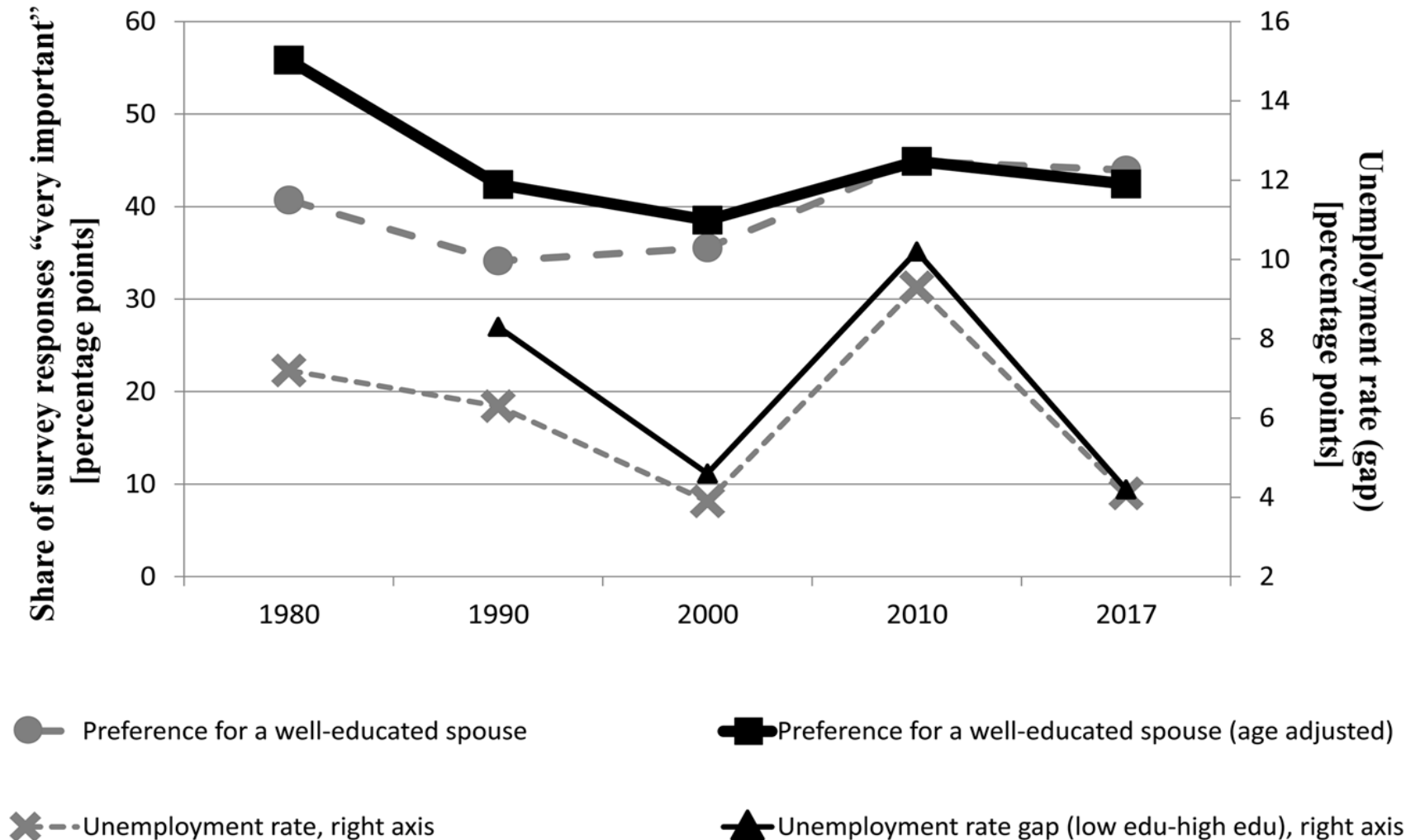
Empirical:

- U-shaped trend is robust to the choice of the input data (see next slides)
- Consistent with survey evidence (see next slides)
- Not sensitive to including single individuals into the analysis (see Naszodi and Mendonca, 2022)
- Comovement with other measures of inequality (see Naszodi and Mendonca, 2022)
- Not sensitive to taking into account sorting along race (see Naszodi and Mendonca, 2023)

Theoretical:

- The NM-method, which results in the U-shaped pattern, commutes with the operation of merging neighbouring categories
- The NM-fulfills a monotonicity condition: IGM and AM

Co-movement of labor market and marriage market, US



Source: Naszodi and Mendonca (2022) Changing educational homogamy: Shifting preferences or evolving educational distribution?

Path to the Holly Grail

Gyalog Galopp: A Halál Hídja, avagy egy királynak értenie kell mindenhez

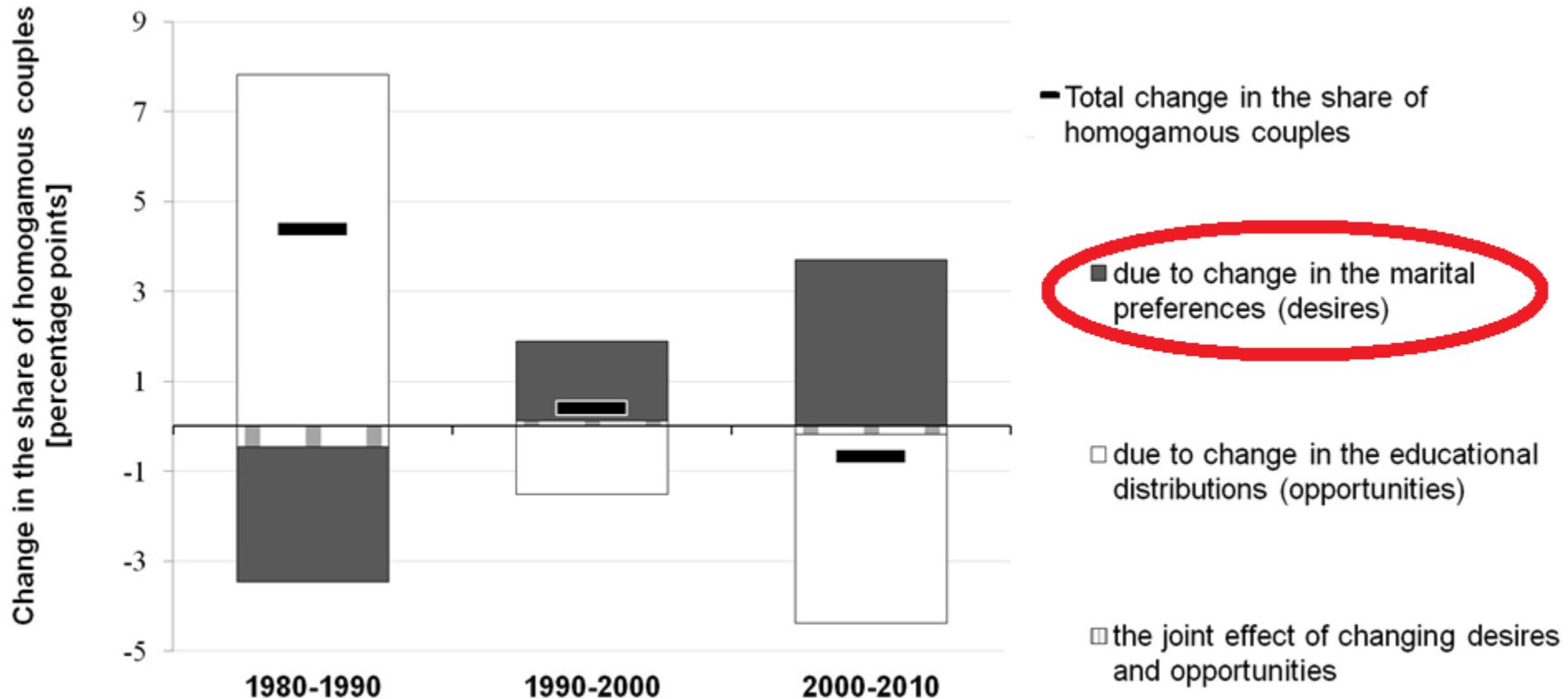


1. What is your name?
2. What are you looking for?
3. What is your favorite color?
4. What is the capital of Sri Lanka?
5. What is the airspeed velocity of an unladen swallow?

Path to our results

1. What indicator to use to quantify the strength of marital preferences?
2. What decomposition scheme to use?
3. What age group?
4. How to validate our empirical results?
5. How many educational categories to use?
6. How to transform a matrix-valued indicator into a scalar?
7. How to construct counterfactuals?
8. Shall we use decent methods (where strong assumptions force the method to deliver what is in line with our prior – e.g. logit model), or do we prefer models relying on less strong assumptions that let the data speak even if the findings are non sense – e.g. Linear probability model)?
9. ...

I. Decomposition, US



Young couples: male partners' age in [30;34]

Educational categories:

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Early Baby Boomer

Early GenX

1950 1960 1970 1980 1990 2000 2010

Late Boomer

Late GenX

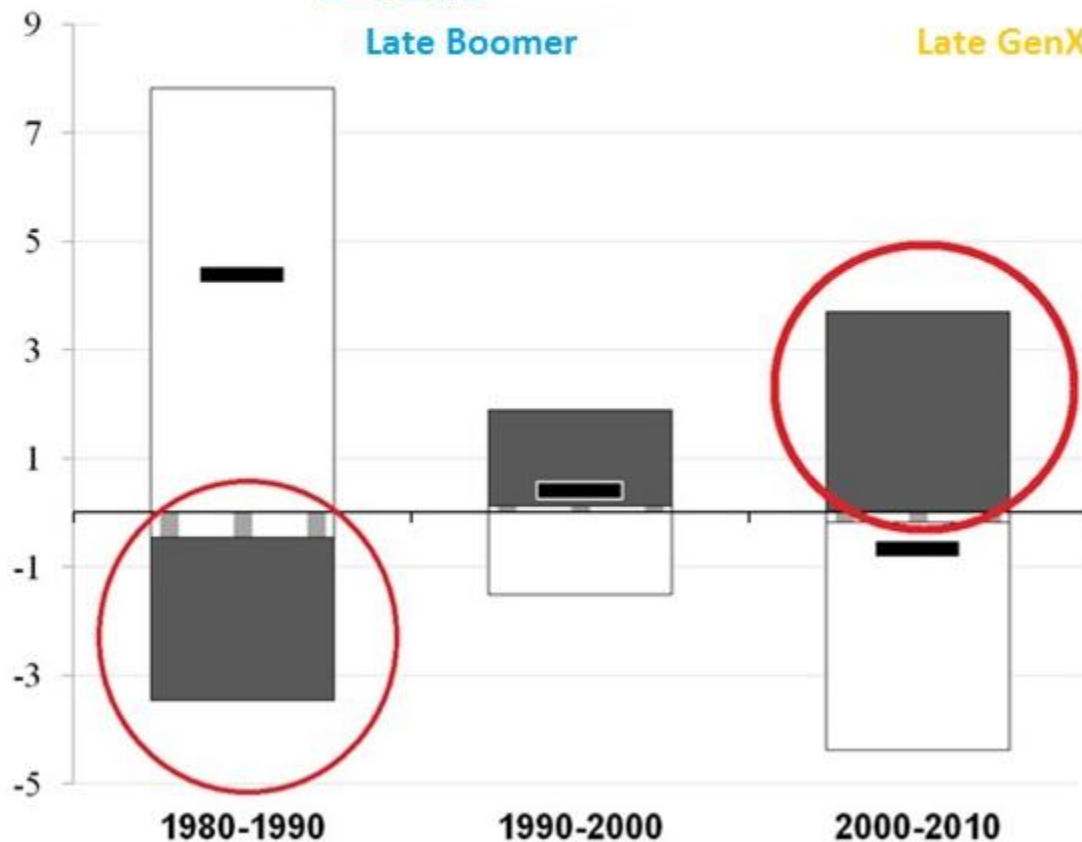
— Total change in the share of homogamous couples

■ due to change in the marital preferences (desires)

□ due to change in the educational distributions (opportunities)

□ the joint effect of changing desires and opportunities

Change in the share of homogamous couples [percentage points]



Young couples: male partners' age in [30;34]

Educational categories:

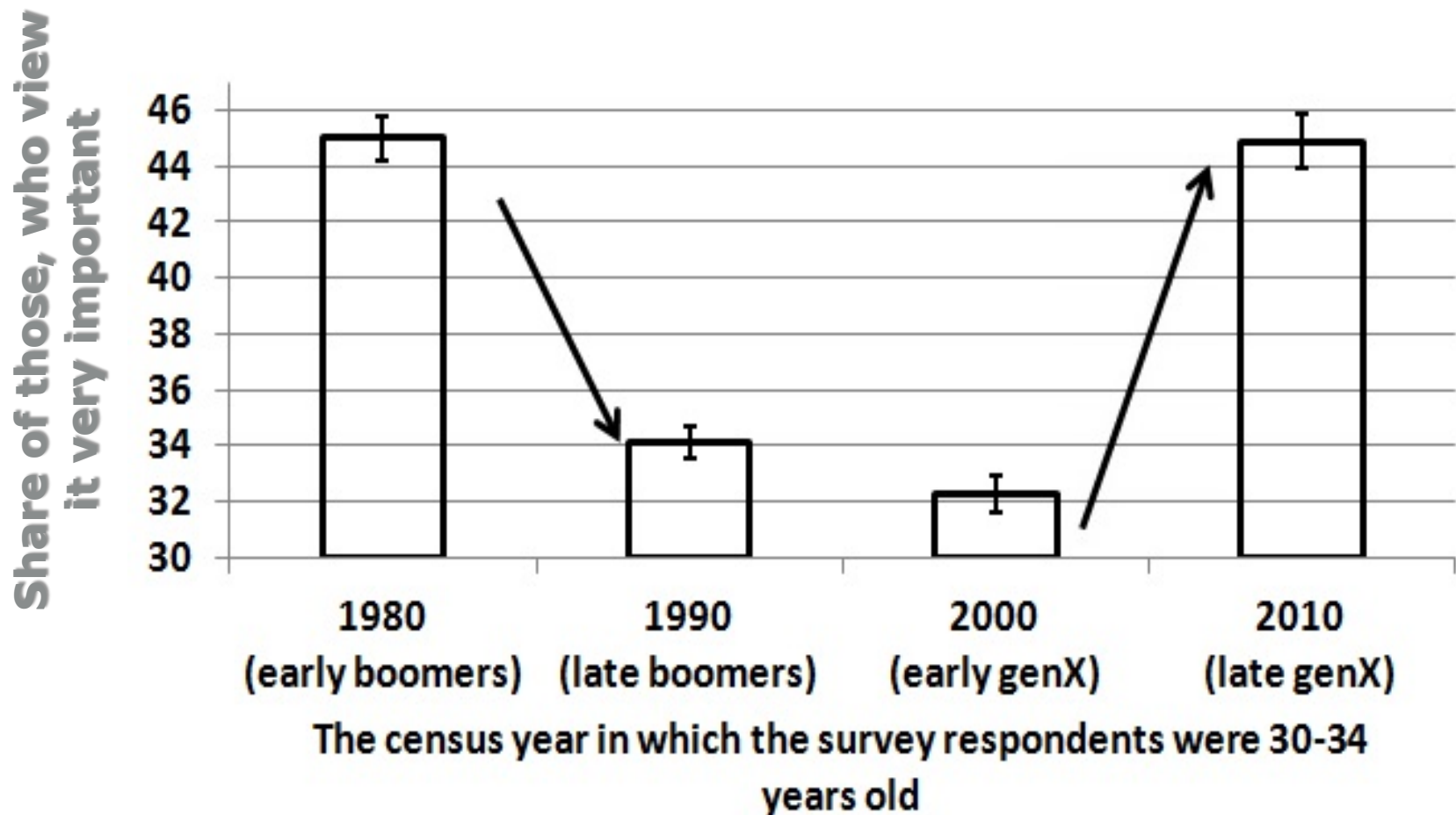
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II. Supplementary analysis for validation: Pew survey, 2010

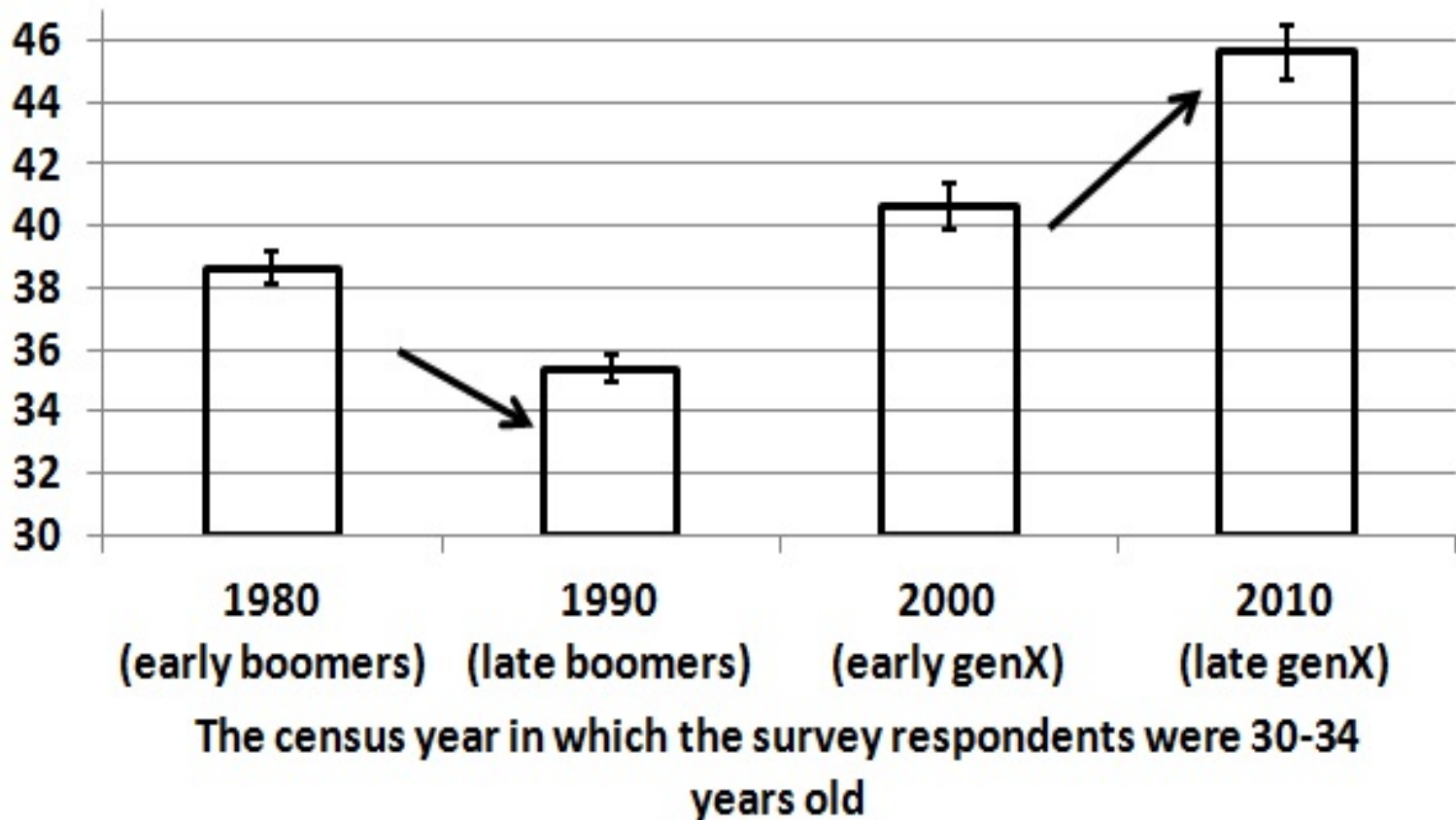
Is it important for a **woman** to be well-educated to become a good wife/partner?
(**Male** respondents)



II. Supplementary analysis for validation: Pew survey, 2010

Is it important for a **man** to be well-educated to become a good husband/partner?
(**Female** respondents)

Share of those, who view
it very important



II. Controlling for age-effects

Pew survey, 2010 and 2017

Generation (Year of birth)	Survey year	Num. of responses	Num. of responses "very important"	Share of "picky" respondents* (in %)	Estimated population share** (in %) [60% conf. interval]	Generation-effect with age-effect (younger-older) (in p.p.) [60% conf. interval]	Age-effect (older-younger) (in p.p.) [60% conf. interval]	Net generation-effect (younger-older) (in p.p.) [60% conf. interval]
	(1)	(2)	(3)	(4)=(3)/(2)	(5)	(6)	(7)	(8)=(6)+(7)×10yrs/7yrs
Male respondents	Late Boomer (1956-1960)	2010	75	25	33.3	33.5 [28.9;38.1]	} -11.2 [-18.4;-4.0]	-24.2 [-31.7;-16.6]
	Early Boomer (1946-1950)	2010	56	25	44.6	44.7 [39.2;50.3]		
	Boomer (1946-1964)	2010	271	104	38.4	38.4 [35.9;40.9]	} -9.1 [-10.7;-7.5]	
	Boomer (1946-1964)	2017	754	221	29.3	29.3 [27.9;30.7]		
Female respondents	Late Boomer (1956-1960)	2010	92	32	34.8	34.9 [30.7;39.1]	} -3.3 [-9.4;2.8]	-6.6 [-13.1;-0.2]
	Early Boomer (1946-1950)	2010	84	32	38.1	38.2 [33.8;42.6]		
	Boomer (1946-1964)	2010	302	116	38.4	38.4 [36.1;40.8]	} -2.3 [-3.8;-0.8]	
	Boomer (1946-1964)	2017	809	292	36.1	36.1 [34.7;37.5]		

Source: Naszodi A (2021). [A note on what surveys say about the applicability of the IPF algorithm](#)

II. Controlling for age-effects

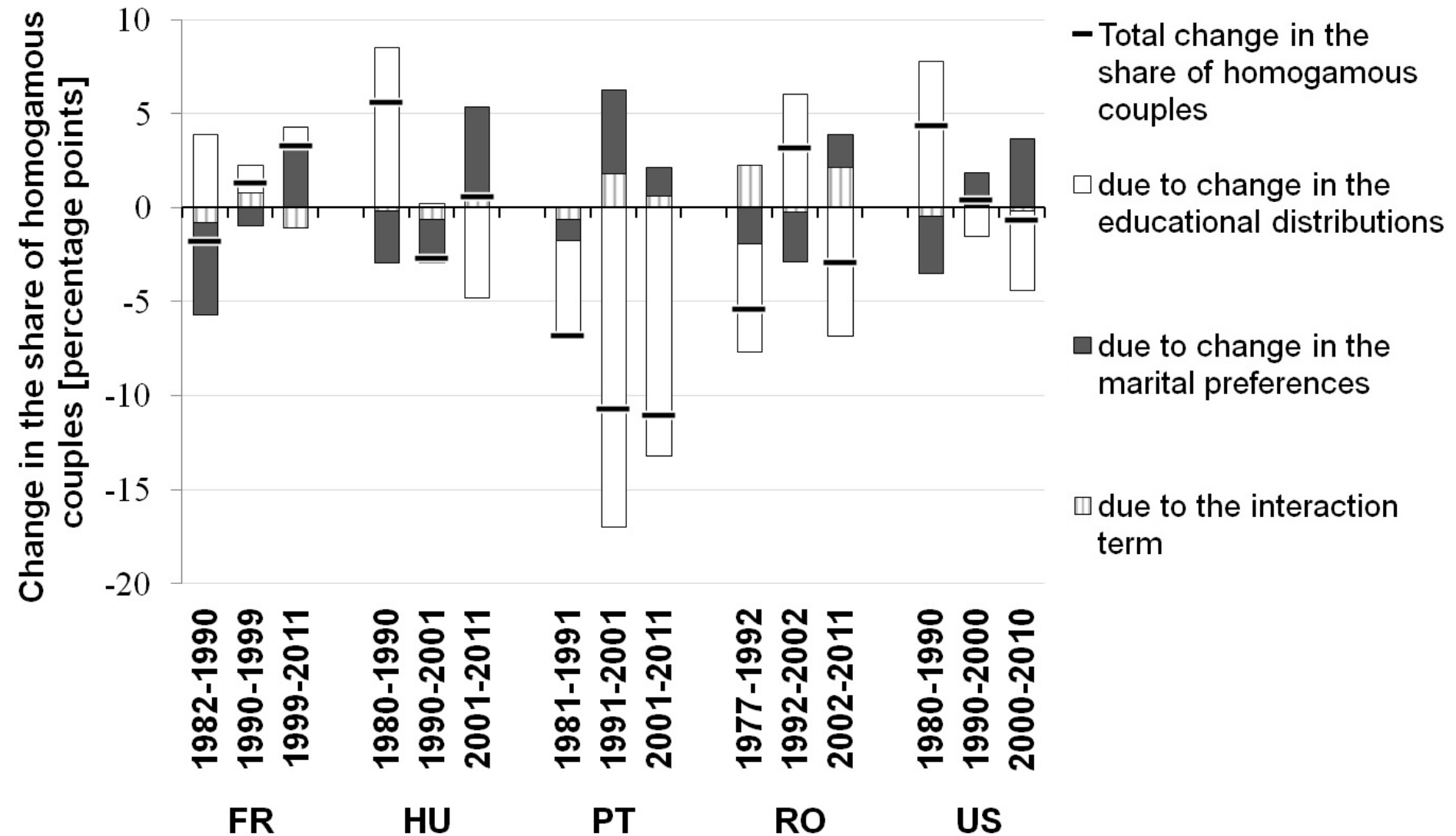
Pew survey, 2010 and 2017

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	(Year of birth)	(1)	(2)	(3)	(4) = (3)/(2)	[60% conf. interval] (5)	[60% conf. interval] (6)	[60% conf. interval] (7)	(8) = (6) + (7) × 10yrs / 7yrs
Male respondents	Late GenX (1976-1980)	2010	45	20	44.4	44.5 [38.3;50.7]	} 13.2		9.8
	Early GenX (1966-1970)	2010	61	19	31.1	31.4 [26.4;36.3]			
	GenX (1965-1980)	2010	176	67	38.1	38.1 [35;41.2]	} -2.4		
	GenX (1965-1980)	2017	756	270	35.7	35.7 [34.3;37.2]			
Female respondents	Late GenX (1976-1980)	2010	53	24	45.3	45.3 [39.6;51.1]	} 5.2		2.7
	Early GenX (1966-1970)	2010	60	24	40.0	40.1 [34.8;45.4]			
	GenX (1965-1980)	2010	188	78	41.5	41.5 [38.5;44.5]	} -1.8		
	GenX (1965-1980)	2017	715	284	39.7	39.7 [38.2;41.3]			

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III. Robustness

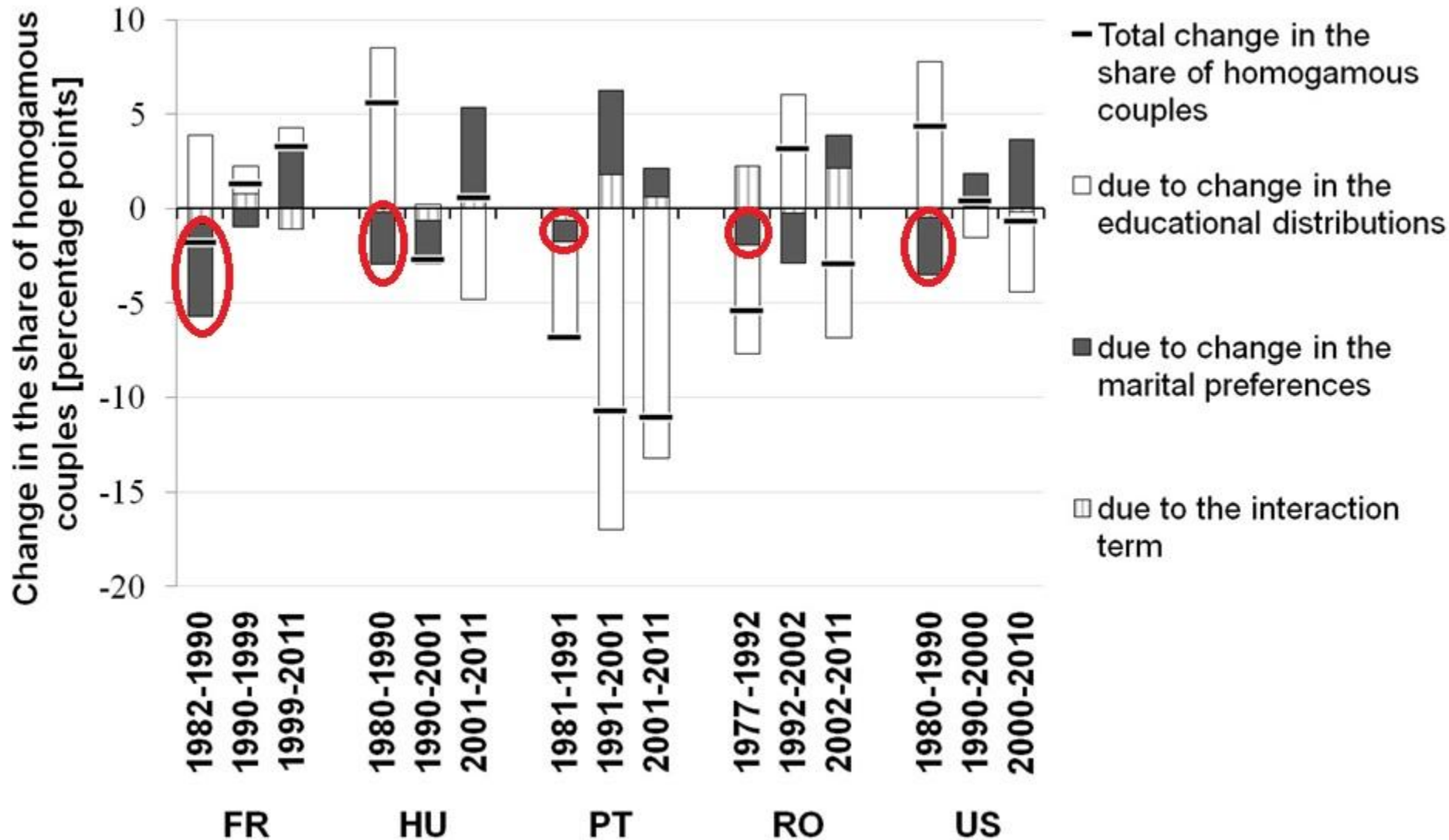
4 European countries



Source: Naszodi A (2021). Decomposition scheme matters more than you may think

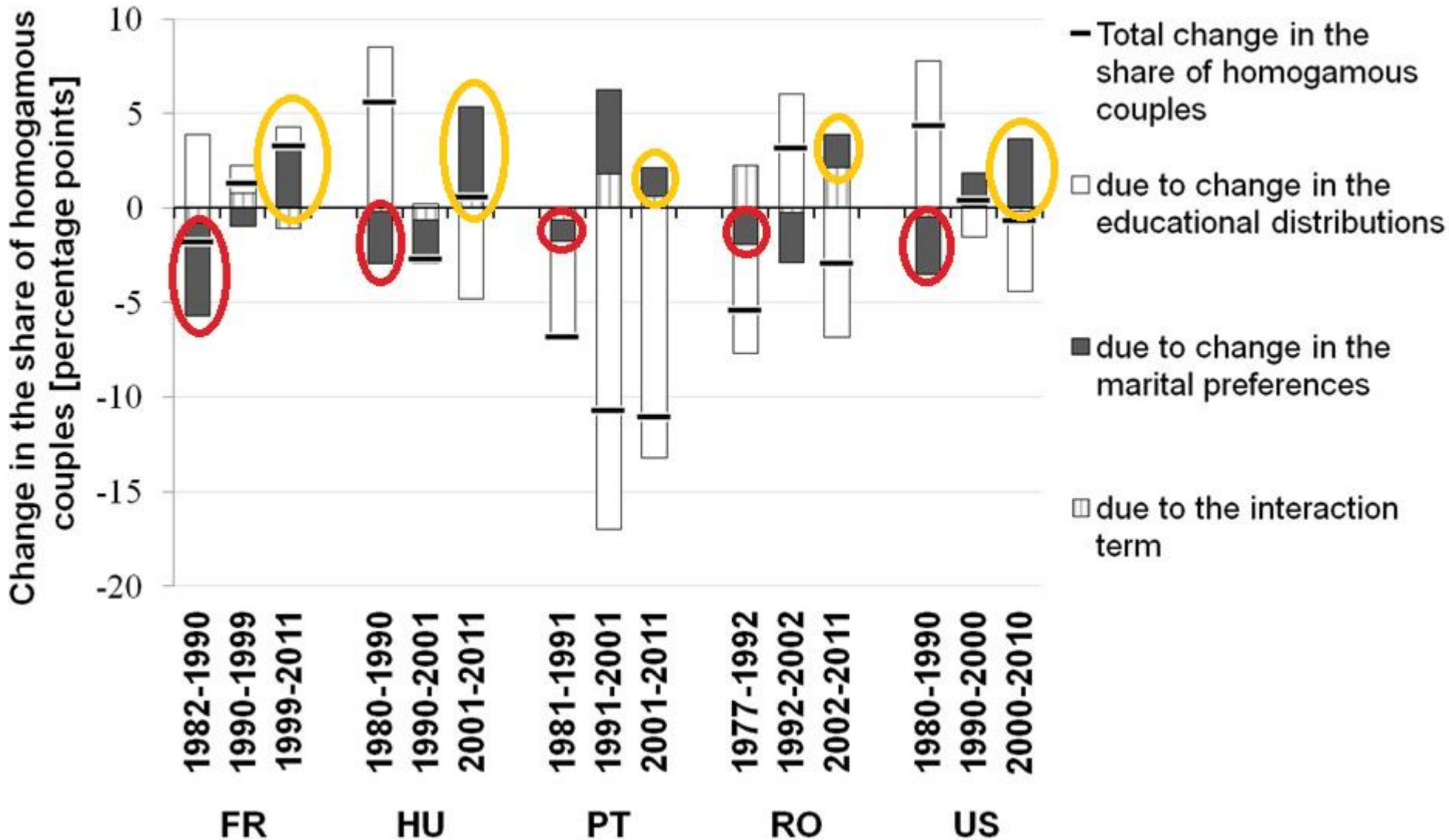
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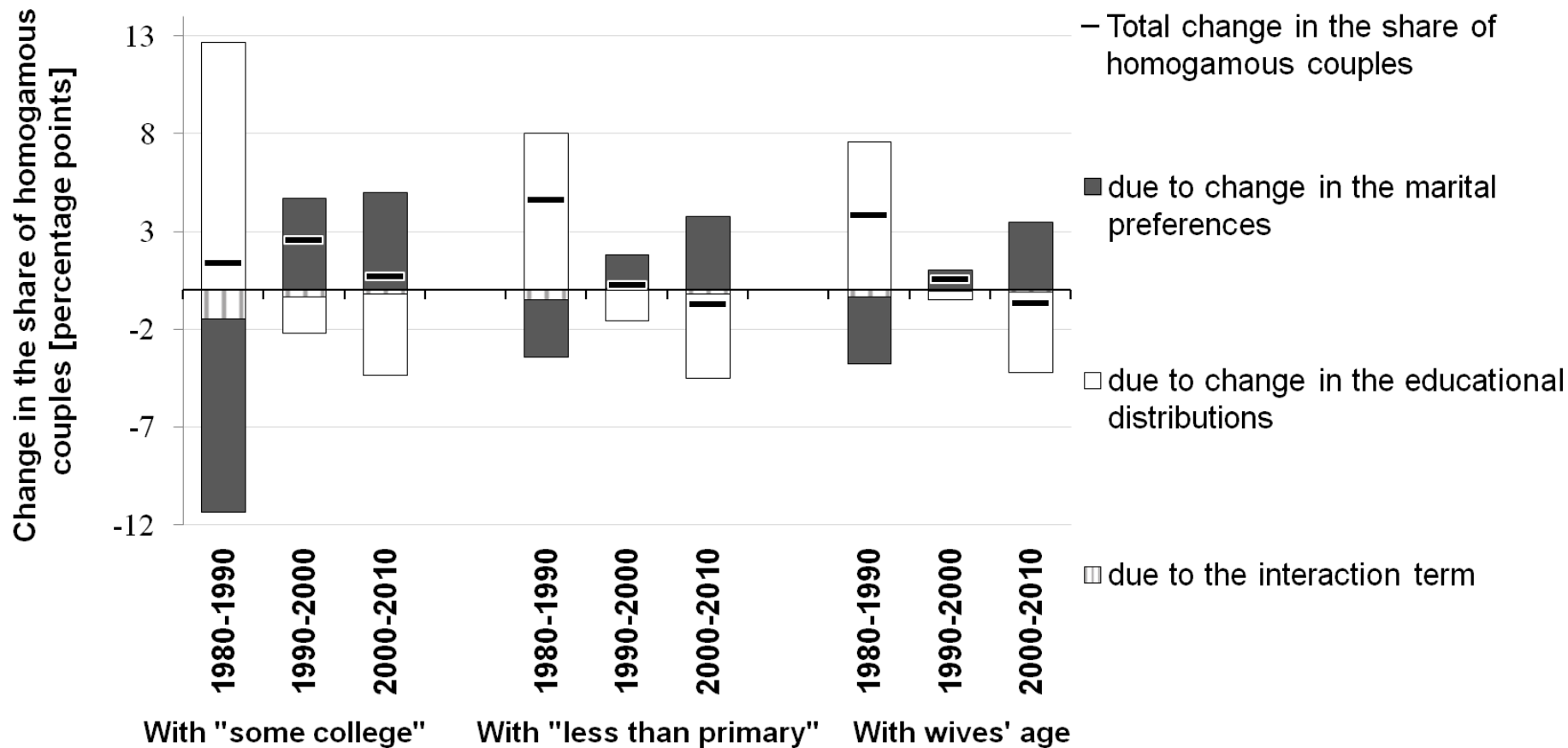


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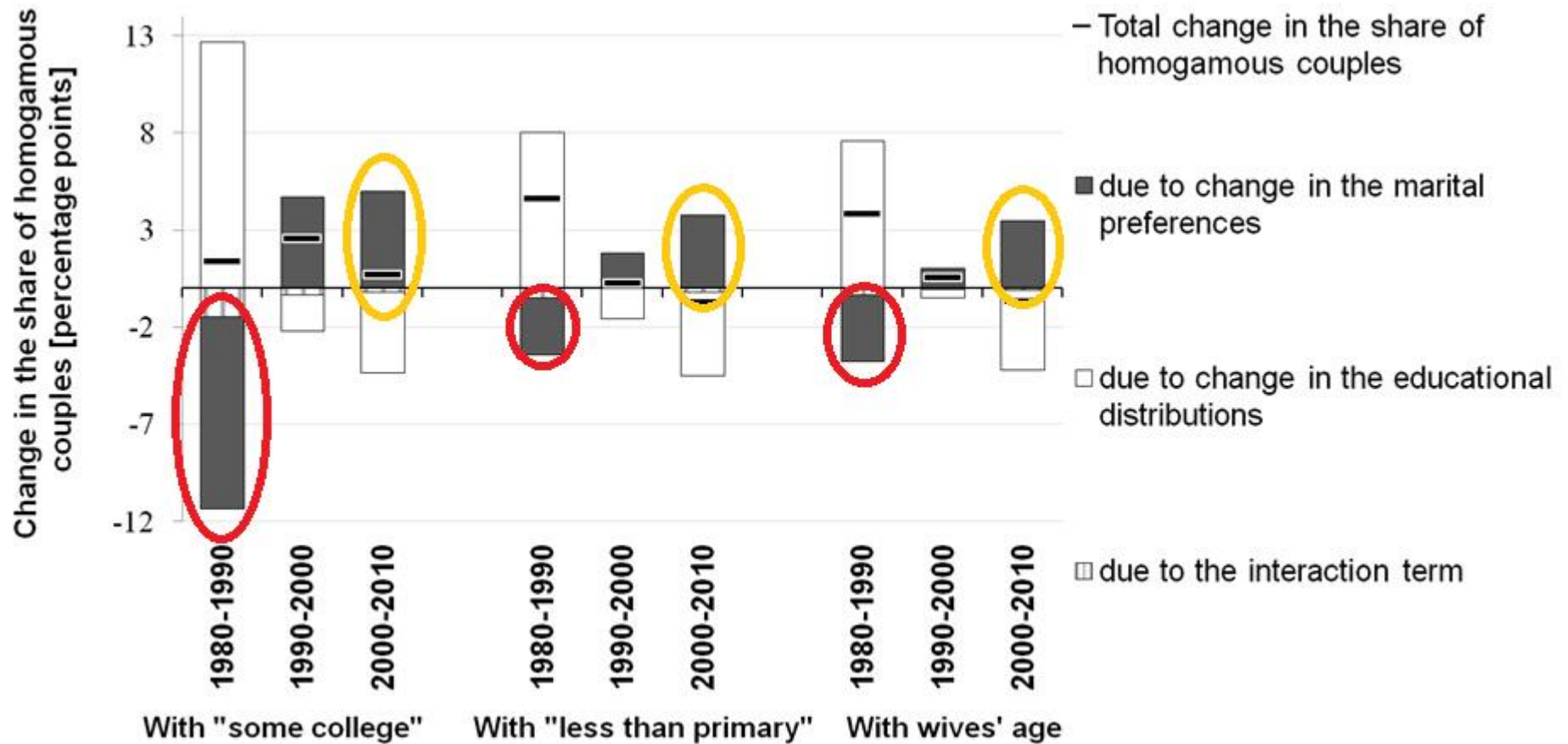
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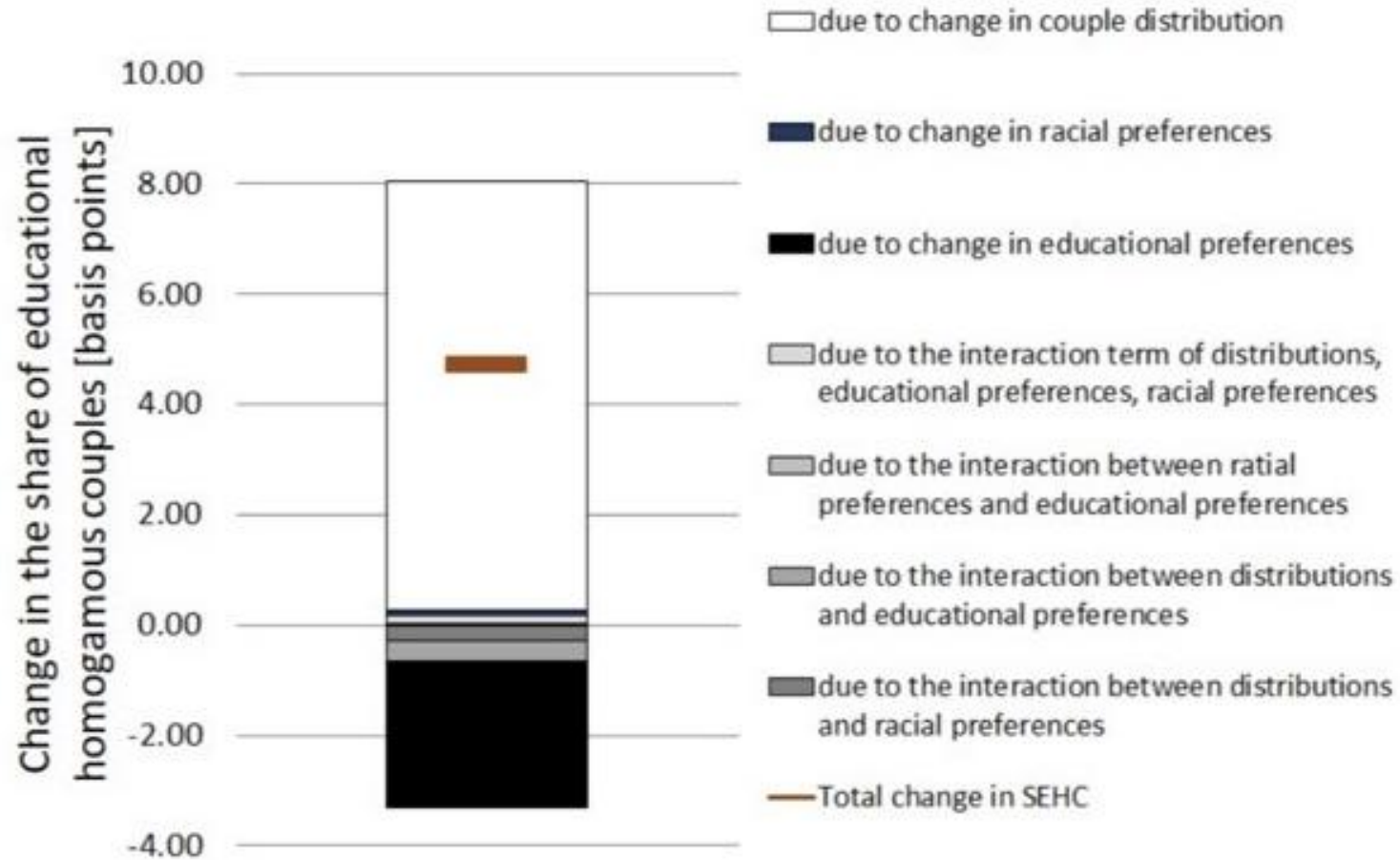
III. Robustness, US educational categories, definition of young couples



III. Robustness, US educational categories, definition of young couples



III. Robustness to controlling for sorting along race Decomposition, US, 1980-1990



Source: Naszodi A (2021). [A new method for identifying changing marital preferences for race and education level.](https://arxiv.org/abs/2103.06991)
<https://arxiv.org/abs/2103.06991>

I., II., III. Summary

I. Result of the benchmark decomposition:

*Evidence for a **structural break** in the process of the social gap between different educational groups.*

II. Validated by using survey data (U-shape)

III. Robustness

(1) to the sample

- countries,
- educational categories,
- definition of young couples

(2) - to controlling for sorting along race;

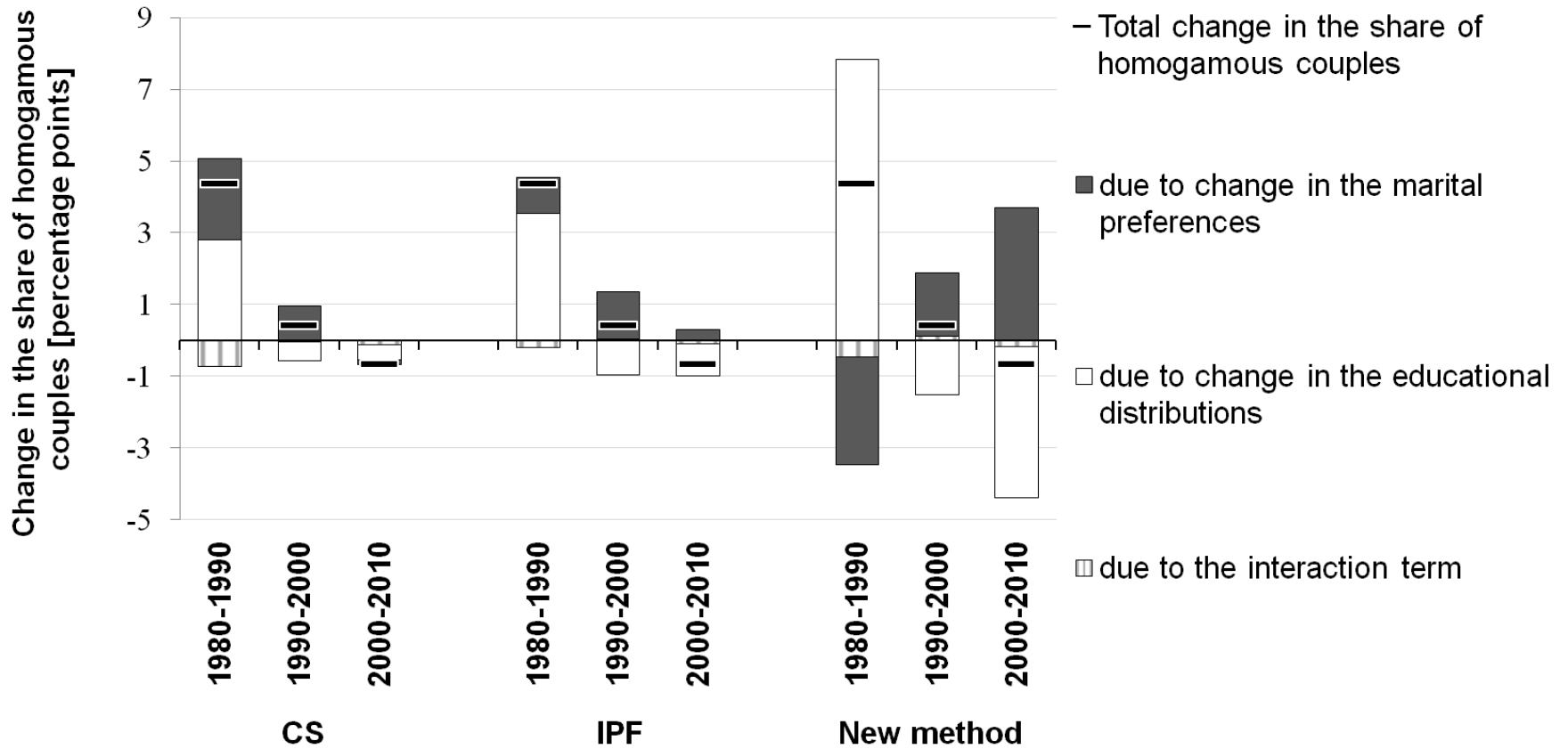
- having singels in the model

(3) Robust to the method:

Does the main finding change if we perform the analysis with a commonly applied method? **YES**

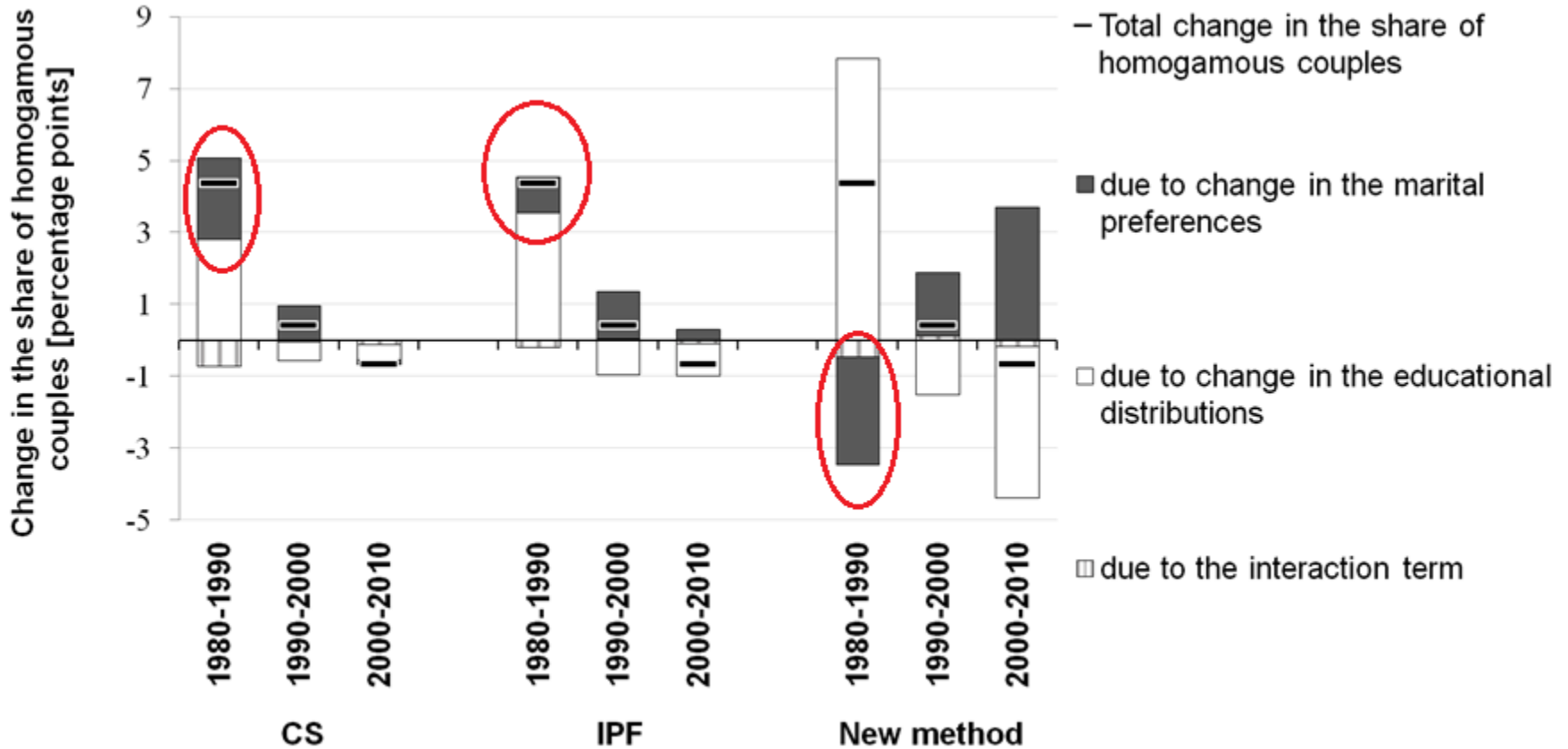
III/3 NOT robust to the choice of the model

Choo-Siow model, Iterative Proportional Fitting=RAS



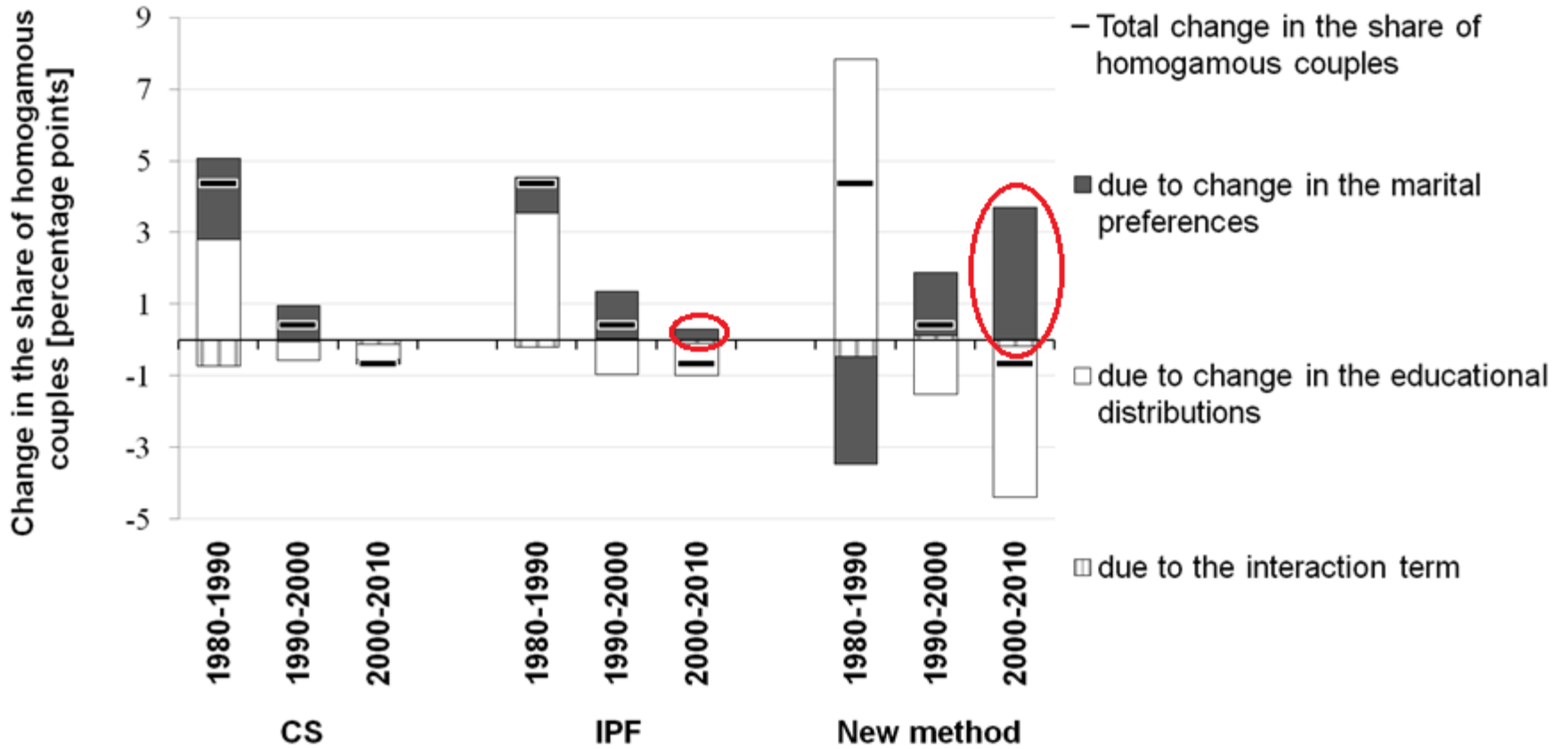
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Choo-Siow model, Iterative Proportional Fitting=RAS



III/3 NOT robust to the choice of the model

Choo-Siow model, Iterative Proportional Fitting=RAS



III/3 Some remarks on model uncertainty

1. Paul Rulkens: " Why the majority is always wrong" TEDxMaastricht

2. Validation with state-of-the art approach:

Athey, Susan, and Guido W. Imbens. 2017. "The State of Applied Econometrics: Causality and Policy Evaluation." *Journal of Economic Perspectives*, 31 (2): 3-32.

3. Additional supporting evidence in the literature:

-Inter-generational mobility:

- Hanushek, E.A., and Peterson, P.E., and Talpey, L.M., and Woessmann, L. (2019): The achievement gap fails to close. *Education Next*.

- Wealth inequality:

- Alvaredo, F., Chancel, L., Piketty, T., Saez, E., & Zucman, G. (Eds.). (2018). World inequality report 2018. World Inequality Lab.