

Higher education and earnings inequality: A gender-specific perspective

Petra Sauer

LISER & LIS

with

Philippe Van Kerm and Daniele Checchi

III/LIS Comparative Economic Inequality Conference
24/02/2023



Outline

- ▶ Motivation
- ▶ Theory & expectations
- ▶ Data
- ▶ Descriptive evidence
- ▶ RIF regression
- ▶ Results
- ▶ Summary & Discussion

Motivation

- ▶ Tertiary education has been expanding worldwide and particularly in high-income countries:
 - ▶ More than 50% of the population aged 25-34 has a tertiary degree in 13, and
 - ▶ more than 40% in another 13 out of 38 OECD countries in 2021.
- ▶ Societal relevance of HE raises questions about its implications for inequality
- ▶ Key role of education to reduce income inequality and to eliminate women's disadvantage?
 - ▶ Women tend to attain higher education levels than men
 - ▶ Gender segregation in HE (Ochsenfeld 2014) & gender gaps among HE graduates (Bar-Haim et al. 2018)

Motivation

- ▶ Existing research (based on male samples) finds HE to contribute to increasing income inequality (e.g. Alejo et al. 2014, Jaume 2021)
- ▶ This paper: factoring in the gender dimension
- ▶ Research questions
 - ▶ How does HE attainment determine the structure of earnings inequality?
 - ▶ Is the distributional effect of HE gender specific?
 - ▶ Does the distributional effect of HE differ across countries and over time?
- ▶ We use LIS data for 27 countries, and estimate the distributive effect of HE using RIF regression in two time points, 1995 and 2015.

Theory & expectations

- ▶ 3 factors determine how HE shapes the distribution of earnings
 - ▶ Relative educational attainment: The population proportion in each educational group
 - ▶ The HE premium - inequality *between* educational groups: How much HE graduates earn relative to low-educated workers, on average.
 - ▶ Inequality *within* educational groups

Between-group inequality

- ▶ HE graduates earn more than lower educated workers since HE makes them more productive (HC theory), or acts as signaling/screening device
- ▶ Existence of HE premium is empirically well established
- ▶ Gender-specific education premiums
 - ▶ Larger HE premiums for women than for men in the US (McCall 2001)
 - ▶ Reverse finding for more recent years (Mandel and Rotman 2021)
- ▶ We expect a positive effect of HE on earnings inequality, which is larger for women than for men.

Within-group inequality

- ▶ High relevance based on theories that treat education as positional good (Lucas 2001, Shavit and Park 2016)
 - ▶ if status groups secure their relative advantage through sorting into prestigious institutions and programs
 - ▶ while others gain access through (private) low-quality tracks
- ▶ Empirical evidence
 - ▶ Significant returns to HE quality (Borgen 2015)
 - ▶ Larger within-group inequality at higher education levels (Martins and Pereira 2005)

Within-group inequality

- ▶ Inequality among higher educated women?
 - ▶ Graduate gender gaps & the 1st moment of women's earnings distributions
 - ▶ Part-time work and occupational segregation driving the bottom
 - ▶ Glass ceilings and compressed earnings from the top
- ▶ We expect a positive effect of HE on earnings inequality, with no prior w.r.t. the women's distributions.
- ▶ Country-time variation: We expect the distributive effect to be larger in countries/time points with
 - ▶ larger education premiums
 - ▶ larger inequality among HE graduates
 - ▶ lower proportions of HE graduates

Luxembourg Income Study (LIS) Database

- ▶ Harmonized microdata from 52 countries in Europe, North America, Africa, Asia and Australasia, spanning 5 decades.
- ▶ Household- and person-level data on
 - ▶ labour & capital income
 - ▶ pensions & public social benefits
 - ▶ taxes & social security contributions
 - ▶ employment & socio-demographic characteristics

<https://www.lisdatacenter.org/our-data/lis-database/>

Sample

- ▶ 23 European countries, Canada, US, Australia, Japan
- ▶ Pooling

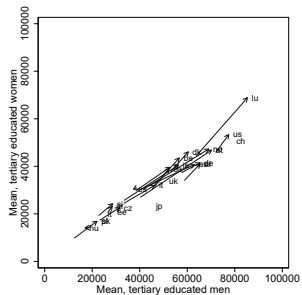
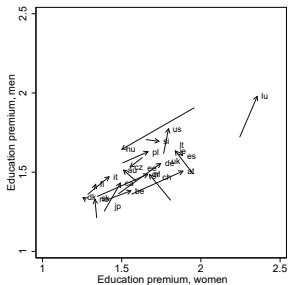
		'90s			'10s	
-2	1995	+2		-2	2015	+2

- ▶ Dependent employees and self-employed aged 31-65 with completed education
- ▶ Inequality based on personal labour income
 - ▶ Bottom coded at zero, top coded at 99th decile
- ▶ Tertiary education includes short-cycle, BA, MA and PhD degrees

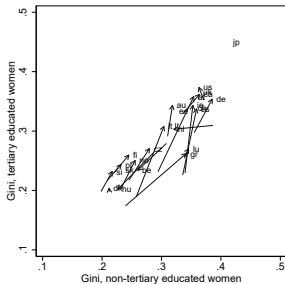
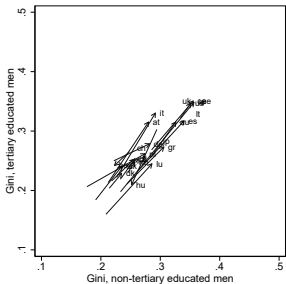
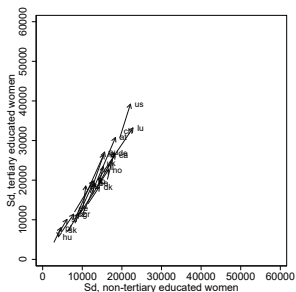
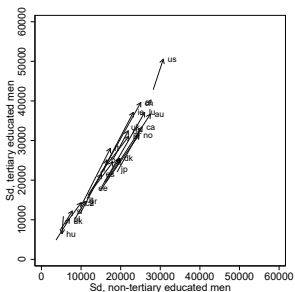
Descriptive results: population proportions

Country	code	1995		2015	
		male	female	male	female
Italy	it	10	16	16	25
Austria	at	10	13	19	21
Hungary	hu	22	23	18	24
Czech Republic	cz	13	10	20	21
France	fr	22	25	n/a	n/a
Slovakia	sk	n/a	n/a	21	27
Poland	pl	12	15	23	38
Slovenia	si	18	20	24	38
Luxembourg	lu	20	17	29	29
Sweden	se	26	30	n/a	n/a
Greece	gr	22	29	32	41
Germany	de	33	27	37	31
Lithuania	lt	n/a	n/a	33	47
Spain	es	25	36	38	49
Denmark	dk	24	29	33	45
Netherlands	nl	28	26	39	41
Norway	no	17	16	35	46
Switzerland	ch	n/a	n/a	45	36
Australia	au	26	24	41	48
Estonia	ee	n/a	n/a	32	54
Finland	fi	33	35	39	55
United Kingdom	uk	n/a	n/a	43	48
Belgium	be	33	43	45	55
Japan	jp	n/a	n/a	47	42
United States	us	38	37	47	55
Ireland	ie	27	27	53	61
Canada	ca	54	53	66	71
Mean		24	26	35	42

Descriptive results: premiums & gender gaps



Descriptive results: within-group inequality



Method: RIF regression

- ▶ Effect of changes in the proportion of tertiary education graduates on labour income inequality?
 - ▶ measured by the Gini index
 - ▶ in each countries, and in each time period
 - ▶ by gender
- ▶ Shifting density mass from the lower to the higher education distribution
- ▶ 3 factors:
 - ▶ *Location*: Average income differences between educational groups
 - ▶ *Dispersion*: Income distribution within educational groups
 - ▶ *Size*: Population share in each group

Method: RIF regression

$$RIF(y_i, v(F_Y)) = \alpha + \mathbf{e}\beta_e + \mathbf{Z}\delta + \epsilon; \quad E(\epsilon_i) = 0$$

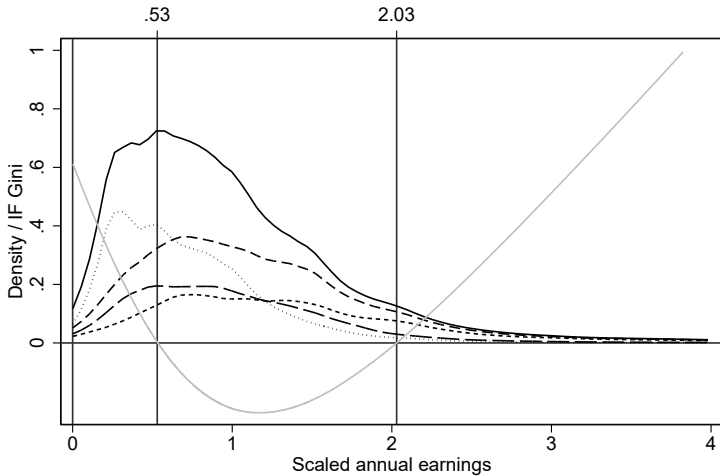
$$RIF(y_i, v(F_Y)) = v(F_Y) + IF(y_i; v(F_Y))$$

$$IF(y_i; v(F_Y)) = \lim_{\epsilon \rightarrow 0} \frac{v((1 - \epsilon)F_Y + \epsilon\Delta_{y_c}) - v(F_Y)}{\epsilon}$$

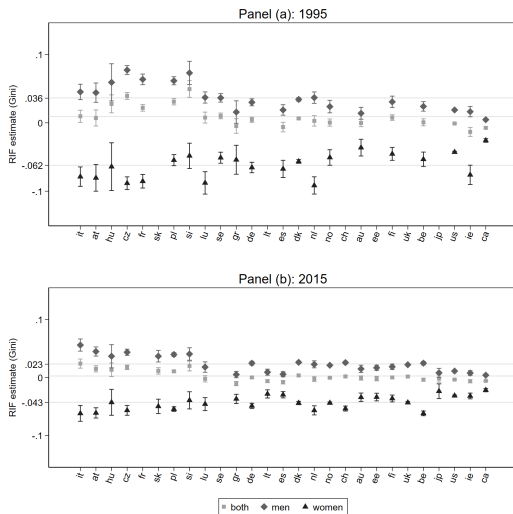
where

- ▶ y_i is the outcome variable of interest
- ▶ F_Y is the cdf of y
- ▶ $v(F_Y)$ is a functional used to estimate a distributional statistic of y , e.g. quantiles, quantile ratios, Gini, Theil, ect.
- ▶ \mathbf{e} ... tertiary education dummy $\rightarrow \beta_e$ is the UPE
- ▶ \mathbf{Z} ... survey fixed effects, age, age^2

ie 10s



Main results



Explaining cross-country variation

	(1)	(2)	(3)	(4)	(5)
Tertiary	-0.00047 (0.00400)	-0.00077 (0.00400)	0.00366 (0.00426)	0.00062 (0.00396)	-0.02114*** (0.00457)
Tertiary (f)					0.01937*** (0.00360)
Premium		-0.00297 (0.00249)	-0.00654*** (0.00245)	0.00464* (0.00242)	0.01212*** (0.00282)
Premium (f)					-0.00263 (0.00215)
Dispersion _{Ter}			0.00000*** (0.00000)	0.09258*** (0.01696)	0.13933*** (0.02167)
Dispersion _{Ter} (f)					0.03718** (0.01468)
Dispersion _{NoTer}			-0.00000*** (0.00000)	-0.12406*** (0.01824)	-0.16057*** (0.02393)
Dispersion _{NoTer} (f)					-0.06127*** (0.01595)
Female	-0.02440*** (0.00108)	-0.02405*** (0.00111)	-0.02596*** (0.00110)	-0.02254*** (0.00093)	-0.01362** (0.00521)
Constant	0.00882*** (0.00142)	0.01338*** (0.00407)	0.02284*** (0.00410)	0.01055*** (0.00345)	0.00343 (0.00417)
Observations	92	92	92	92	92
Adjusted R ²	0.853	0.854	0.889	0.903	0.953

Summary & Discussion

- ▶ Main insight
 - ▶ No such thing as an average distributive effect exists
 - ▶ The distributive effect is gender-specific
 - ▶ Different locations and shapes of women's and men's earnings distributions
- ▶ Implications
 - ▶ HE can neither be seen as a certain tool to reduce income inequality,
 - ▶ nor as key to eliminate women's disadvantage
 - ▶ Importance of going "...beyond the gender wage gap as the central indicator for women's economic status." (McCall 2001)
 - ▶ More research to understand gender-specific education premiums (cross-country perspective)
 - ▶ More research to understand how earnings are distributed among HE women

Summary & Discussion

- ▶ Implications for policy - potential trade offs
 - ▶ Policies aimed at reducing overall (vertical) inequality would favor expanding female education only if the location and dispersion of their returns remains constant.
 - ▶ Policies aimed at reducing (horizontal) gender inequality would entail e.g. to reduce glass-ceiling dynamics so that women enter the top.
 - ▶ Policies that compress earnings from the top for both, women and men, would reduce vertical and horizontal inequality simultaneously.

Thank you!
petra.sauer@liser.lu