Gender Divergence in Sectors of Work

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NBER SI Gender in the Economy 2025

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2. Can this divergence explain the persistence of the gender earnings gap?
   - **No. Changing preferences reduce the earnings gap.**

Literature

- Gender *convergence*

  Goldin 2014 (pay, human capital, LFPR), Hsieh et al. 2019 (occupations), Albanesi 2020 (hours, prod.)

- Fixed gender differences in sectoral choice

  Olivetti and Petrongolo 2014/2016 + Ngai and Petrongolo 2017 (rise of services)

- Gender wage gap

  Blau and Kahn 2000, Goldin 2014 (greedy occupations), Kleven et al. 2018 (child penalty), Biasi and Sarsons 2022 (bargaining), Morchio and Moser 2023 (amenities), Arellano-Bover et al. 2024 (age structure)

- Macro implications of household labor supply

  Doepke and Tertilt 2016, Albanesi and Sahin 2018, Alon et al. 2020, Fukui et al. 2021, Alon et al. 2021, Coskun and Dalgic 2023, Ellieroth 2023, Kuhn et al. 2024, Ellieroth and Michaud 2024

- Gender *divergence* and gender equality paradox

  Breda et al. (2020) (college majors)

Outline

1. Gender Segregation in the Data
2. Model of Sectoral Choice
3. Segregation and Earnings Gap Counterfactuals
4. Possible Mechanisms

Gender Segregation by Sector: U.S.

$$S_{gc} = \frac{\sum_i |p_{igc} - p_{imc}|}{2}$$

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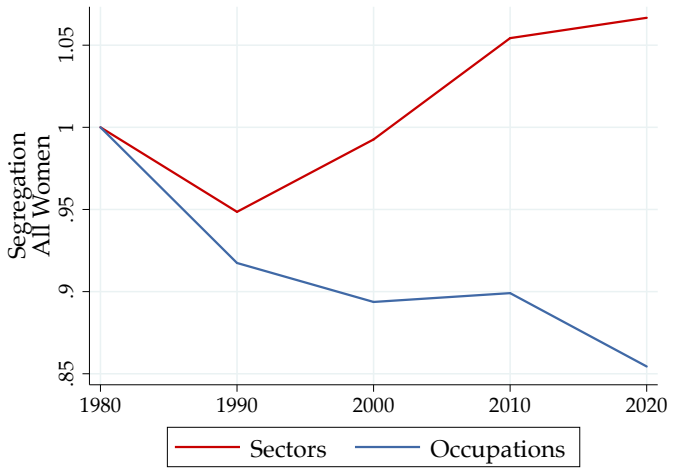
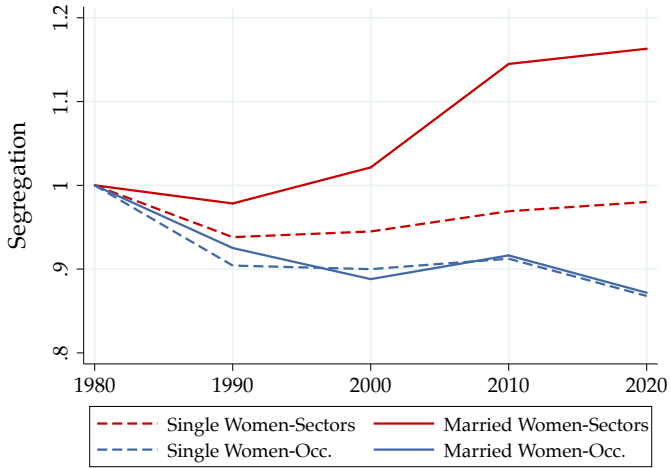
Measurement:

- CPS: employment, hours, earnings, gender, marital status, age
- Focus on 5 cohorts ages 25-34, 1975-2019
- 11 sectors

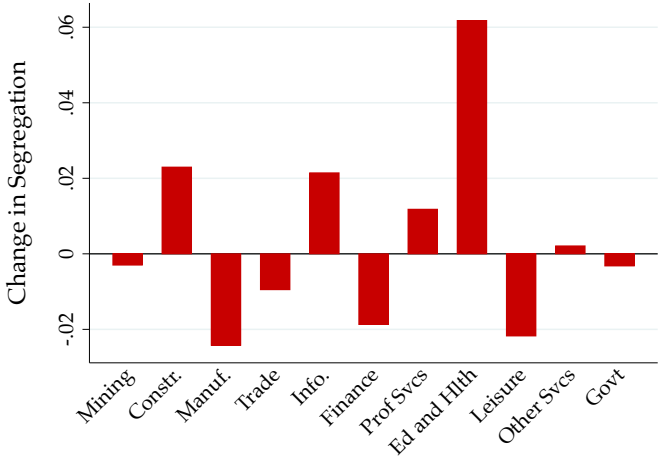
Increasing Gender Segregation by Sector in the U.S.



...Is Driven by Married Women



Which Sectors?



Marital status

Empirical Decompositions

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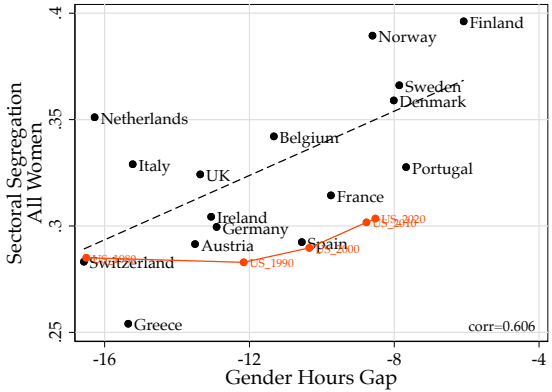
   - Fix sector employment shares at 1980s
   - Structural change explains 40%
2. Domestic outsourcing?
   - Fix occupation shares within sectors at 1980s
   - Does not affect measured segregation

Europe: More Gender Equal Countries Are More Segregated



EU Labour Force Survey and CPS. Average of 2008-2019.

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Model Overview: Hsieh et al. (2019) applied to sectors

One-time sector choice to maximize lifetime utility

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How we use the model:

1. Estimate prefs and discrim for each **cohort**-group
2. Perform counterfactuals for sector shares and the gender earnings gap

Choice Over Sectors $i \in I$ (Including Home): Utility

$$\max_{i \in I} \beta \sum_{t=c}^{c+2} \log C_{ig}(c,t) + \log z_{ig}(c) + \log[1 - s_i(c)]$$

- $C_{ig}(c,t)$: consumption at time t of an individual in sector i, group g, cohort c
- $z_{ig}(c)$: cohort-group preference for sector i
- $s_i(c)$: time spent in education if choosing sector i

Unpacking Sector i Consumption

$$C_{ig}(c,t) = [1 - \tau_{ig}^{w}(t)]w_i(t)\epsilon h_{ig}(c,t) - e_{ig}(c,t)[1 + \tau_{ig}^{h}(c)]$$

- $\tau_{ig}^{w}(t)$, $\tau_{ig}^{h}(c)$: labor market and human capital barriers (discrimination)

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- $h_{ig}(c,t) = \bar{h}_{ig}\gamma(t-c)s_i(c)^{\phi_i(c)}e_{ig}(c,t)^{\eta}$: human capital
  - $\bar{h}_{ig}$: group-specific innate human capital in sector i
  - $\gamma(t-c)$ returns to experience
  - $\phi_i(c)$: return to schooling time in sector i for cohort c (technology)
  - $e_{ig}(c,t)$: educational expenditure
  - η: elasticity of human capital wrt to educational expenditure

Estimating Preferences and Discrimination

Normalizations and parameter values

1. Composite discrimination $\tau_{igc} = \frac{(1+\tau^h_{igc})^\eta}{1-\tau^w_{igc}}$ is identified using:

$$\frac{\overline{earnings}_{igc}}{\overline{earnings}_{imc}} = \left(\frac{\tau_{igc}}{\tau_{imc}}\right)^{-\frac{1}{1-\eta}} \times \left(\frac{p_{igc}}{p_{imc}}\right)^{-\frac{1}{\theta(1-\eta)}} \quad (1)$$

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2. Women's relative preferences $\tilde{z}_{igc} = z_{igc}^{\frac{1-\eta}{3\beta}}$ are identified using:

$$\frac{p_{igt}}{p_{imt}} = \left(\frac{1-\text{LFP}_{gc}}{1-\text{LFP}_{mc}}\right) \times \left(\frac{\tau_{igc}}{\tau_{imc}}\right)^{-\theta} \times \left(\frac{z_{igc}}{z_{imc}}\right)^{-\frac{\theta(1-\eta)}{3\beta}} \quad (2)$$

Intuition for the Estimation

- We assume men face no discrimination, innate human capital is the same across groups, and the home sector is undistorted for all as in Hsieh et al. (2019)
- Earnings gaps (eq. 1) are increasing in relative sectoral shares $\frac{p_{igc}}{p_{imc}}$ because of a selection effect: marginal worker is of lower quality than average
- Given discrimination, relative sectoral shares (eq. 2) pin down relative preferences: group's preference for a sector is reflected in sectoral shares

Estimated Sectoral Discrimination and Preferences

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- Discrimination declines across all sectors, dispersion across sectors declines
- Married women face higher discrimination than single women on average
- Married women's relative preferences $\frac{z_{igc}}{z_{imc}}$:
  - Autocorrelation over time: 84%
  - Correlation with same cohort single women's prefs $\frac{z_{isc}}{z_{imc}}$: 68%

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Fix each of these to 1980s and let the others vary as in the data:

1. Preferences $\tilde{z}$
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$\Rightarrow$ yield counterfactual paths for sector shares $\tilde{p}_{igc}$ and $\widetilde{earnings}_{igc}$

Decomposition of Aggregate Changes in Segregation

				Decomposition of Channels		
		Actual	Model	Prefs. (z)	Disc. (τ)	Tech. (w, ϕ)
Segregation	Married	0.049	0.049	0.029	0.006	0.008
	Single	-0.006	-0.006	-0.015	-0.032	0.016

Difference between observed and counterfactual S_t is role of each channel. 1976 to 2019.

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- Changes in prefs account for $\frac{0.029}{0.049} = 59\%$ of rise in married women's segregation

Decomposition of Aggregate Changes in Gender Earnings Gap

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Gender Earnings Gap	Married	-0.347	-0.347	-0.080	-0.214	-0.077
	Single	-0.097	-0.097	-0.023	-0.004	-0.060

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Sources of Changing Preferences for Sectors

Must be:

1. Changes in way married women value fixed sector characteristics
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- Hours flexibility/greedy jobs/childcare compatibility
- Homophily: female share
- Risk: correlation with partner's income/GDP
- These are pretty persistent over time at sector level

Regressing Estimated Preferences on Amenities

	Married	Single	Men
Part time share	0.111	0.080	0.080
	[0.000]	[0.000]	[0.000]
Hours	0.032	-0.044	-0.028
	[0.055]	[0.014]	[0.004]
Num. children	0.019	0.001	-0.005
	[0.002]	[0.875]	[0.390]
Female share	-0.015	-0.023	-0.005
	[0.236]	[0.135]	[0.511]
Business cycle risk	0.002	-0.014	-0.008
	[0.748]	[0.108]	[0.159]
R^2	0.834	0.802	0.848
Observations	55	55	55

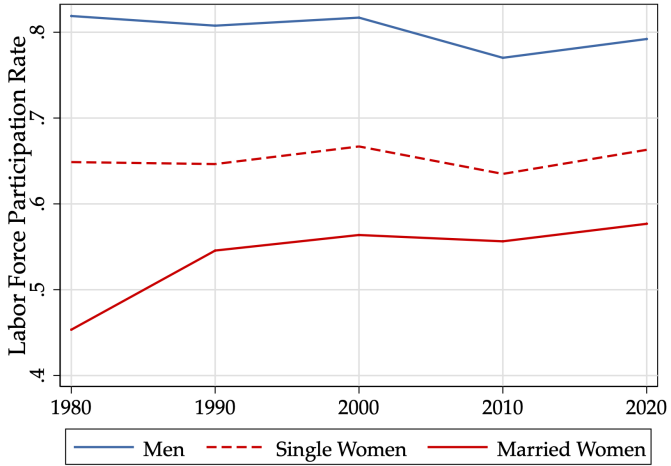
Group Preferences For Sectoral Amenities

Conclusion

- 17% rise in gender segregation of married women
- Divergence despite convergence on many other dimensions
- Married women's preferences drive rising segregation (59%)
- Increasingly prefer high paying sectors $\Rightarrow$ 23% of decline in gender earnings gap

Extra Slides

Labor Force Participation Rates by Group



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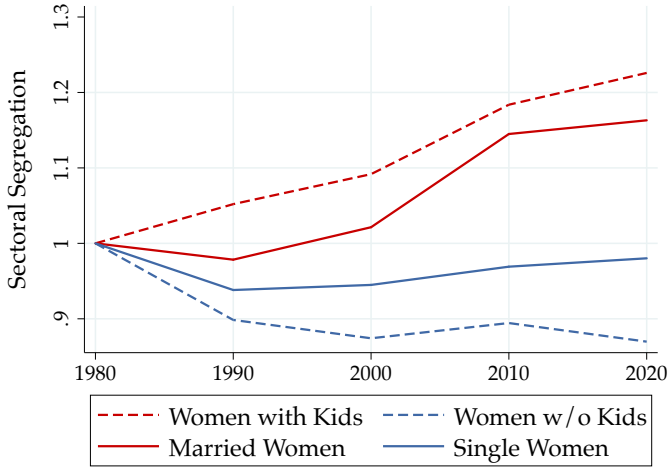
Segregation by the Existence of Kids



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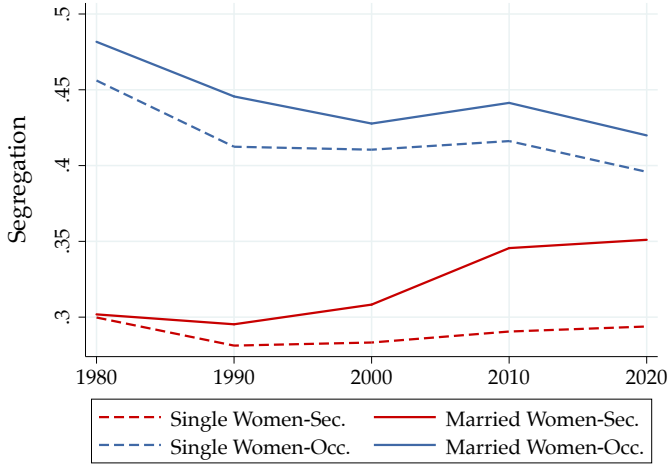
Segregation Levels



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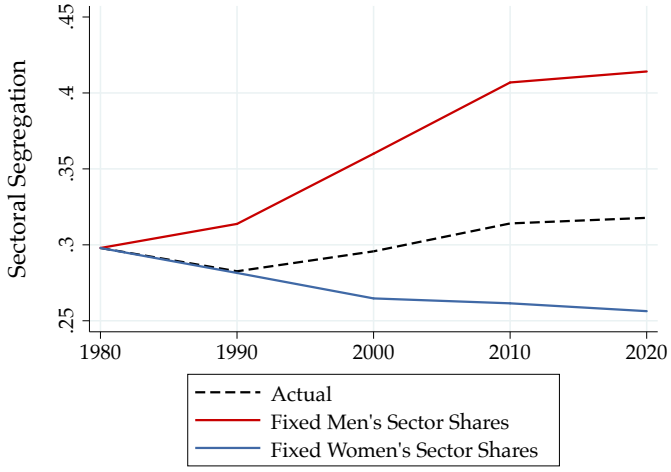
Segregation by Gender Shares



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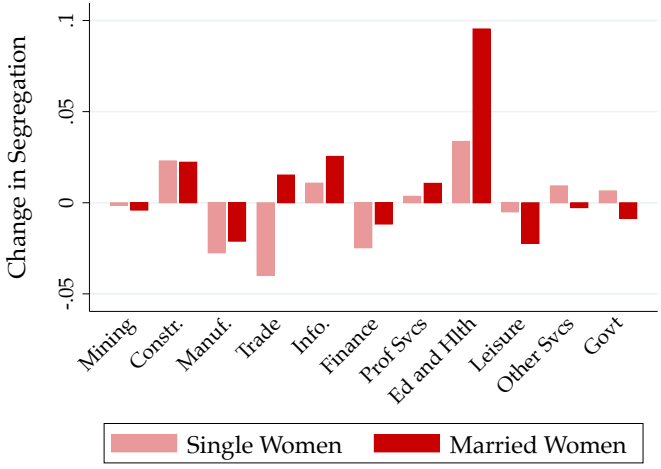

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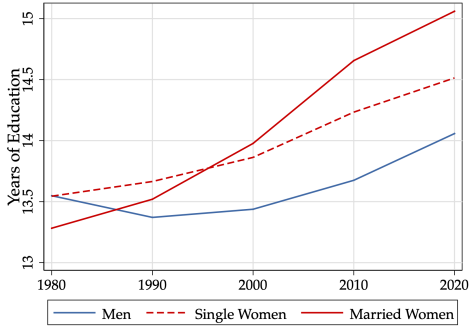
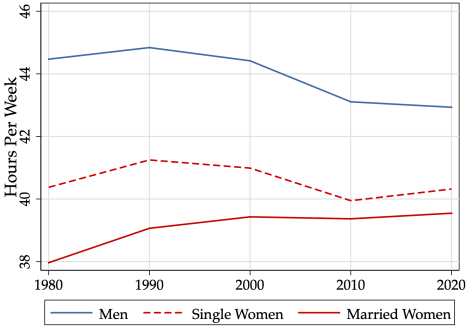
Changes in Education and Hours by Group





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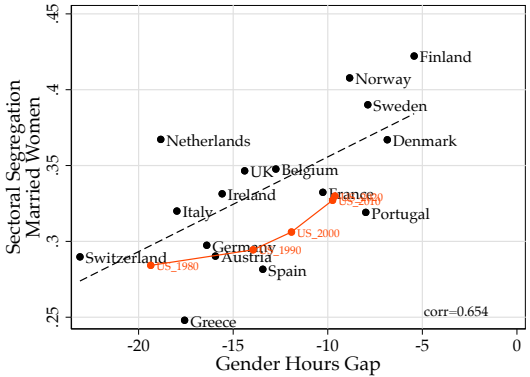
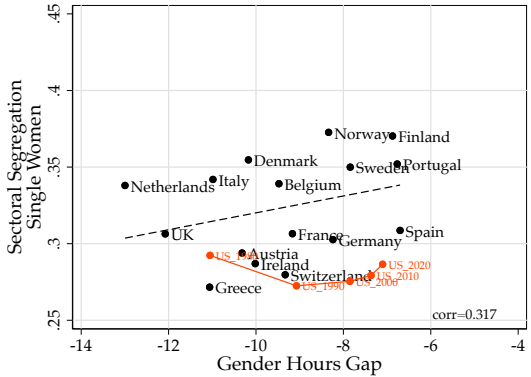
Segregation in Europe



(a) Married Women



(b) Single Women

Segregation in Europe

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Parameterization and Normalizations (Hsieh et al. (2019))

Param.	Meaning	Value/Norm.
θ	Dispersion of idiosyncratic ability	2
η	Elasticity of human capital w.r.t education spending	0.106
β	Utility weight on pre-working life	0.231
$\tau_{i,men}$	Composite discrim. in all sectors for men	0
$\tau_{home,g}$	Composite discrim. in home sector, all groups	0
$\tilde{z}_{home,g}$	Pref. for home sector, all groups	1
$\bar{h}_{ig}$	Innate human capital, all groups, all sectors	1

Hsieh et al. (2019) estimate θ using dispersion of residuals from wage regressions on age, group, and education. η is estimated using education expenditure as a share of GDP. β estimated using Mincerian returns to schooling.

Back.

Decomposition of Changes in Segregation

Log point change decomposition not promising:

$$\log\left(\left(\frac{\sum_i |p_{if,2020} - p_{im,2020}|}{2}\right)\right) - \log\left(\left(\frac{\sum_i |p_{if,1980} - p_{im,1980}|}{2}\right)\right)$$

(Note: can separate sectors into two groups, male and female dominated)

Decomposing Segregation

$$
\begin{aligned}
|p_{ig} - p_{i,men}| &= \left| \frac{\tilde{w}_{ig}^{\theta}}{m_g} - \frac{\tilde{w}_{i,men}^{\theta}}{m_{men}} \right| \\
&= (w_i(s_i^{\phi_i}(1-s_i)^{\frac{1-\eta}{3\beta}}))^{\theta} \left| \left(\frac{\tilde{\tilde{z}}_{ig}}{m_g \tau_{ig}} \right)^{\theta} - \left(\frac{\tilde{\tilde{z}}_{i,men}}{m_{men}} \right)^{\theta} \right|
\end{aligned}
$$

Note these are relative employment shares

Segregation and Wages: Female Dom. Sector: $p_{ig} - p_{im} \geq 0$

$$\frac{\tilde{w}_{ig}^{\theta}}{\sum_{i=1}^{M} \tilde{w}_{ig}^{\theta}} - \frac{\tilde{w}_{i,men}^{\theta}}{\sum_{i=1}^{M} \tilde{w}_{im}^{\theta}} \geq 0$$

$$\frac{1}{1 + \tilde{w}_{ig}^{-\theta} \sum_{j \neq i}^{M} \tilde{w}_{jg}^{\theta}} - \frac{1}{1 + \tilde{w}_{im}^{-\theta} \sum_{j \neq i}^{M} \tilde{w}_{jm}^{\theta}} \geq 0$$

$$\tilde{w}_{im}^{-\theta} \sum_{j \neq i}^{M} \tilde{w}_{jm}^{\theta} \geq \tilde{w}_{ig}^{-\theta} \sum_{j \neq i}^{M} \tilde{w}_{jg}^{\theta} \quad \text{if } 1+ \text{ these are positive}$$

Then the change in segregation when w_i increases is ambiguous:

$$\frac{\partial(p_{ig} - p_{im})}{\partial w_i} = \theta w_i^{-1} \left(\frac{\tilde{w}_{ig}^{-\theta} \sum_{j \neq i}^{M} \tilde{w}_{jg}^{\theta}}{(1 + \tilde{w}_{ig}^{-\theta} \sum_{j \neq i}^{M} \tilde{w}_{jg}^{\theta})^2} - \frac{\tilde{w}_{im}^{-\theta} \sum_{j \neq i}^{M} \tilde{w}_{jm}^{\theta}}{(1 + \tilde{w}_{im}^{-\theta} \sum_{j \neq i}^{M} \tilde{w}_{jm}^{\theta})^2} \right)$$