The Geography of Jobs and Couple Migration

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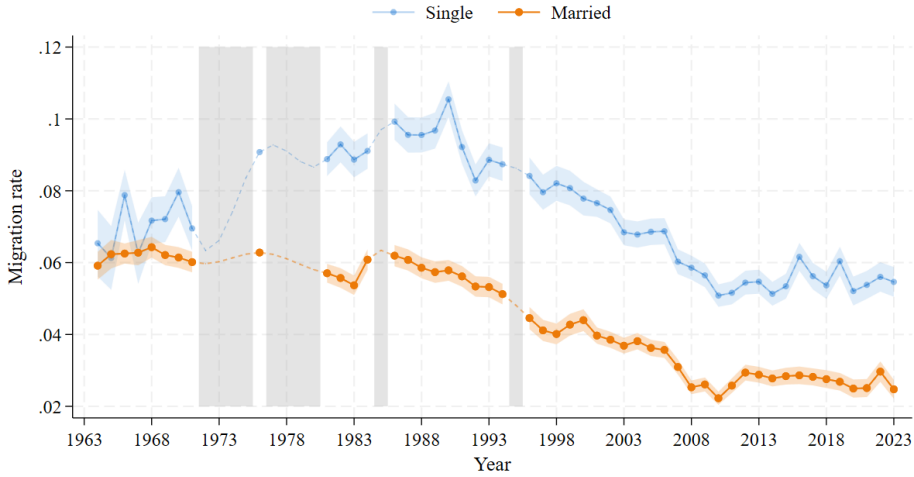
Cross-county migration rates decreasing over time



Notes: 18-65 and active. Gray bars indicate missing years. Values are interpolated using a cubic spline (dashed lines). Excludes households where migration status was imputed [Kaplan-Schulhofer-Wohl-2017]. 95% confidence intervals. *Source:* CPS.

Adjusted

At the same time...

- **Increase in the share of women in the labor force** [Goldin-2021]
  - More dual-earner households [Braun-et-al-2021]
  - Co-location problem: **Finding a job for both** in the new location [Mincer-1978; Costa-Kahn-2000; Rueda-Wilemme-2021; Venator-2022; Foerster-Ulbricht-2023]
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    - → Depends on *where* partner can work
- **Occupational gender segregation decreasing overtime** [e.g., Blau-et-al-2012]
  - Women increasingly in “male” occupations [Sloane-et-el-2021]

Mobility of occupations and the co-location problem

Single earner household

1960

Engineer

Housewife

Mobility of occupations and the co-location problem

Dual earners with mobile wife

1980

Engineer

Teacher

Mobility of occupations and the co-location problem

Dual earners with immobile wife

2000

Engineer

Biologist

Today

How does the geography of occupations affect couple migration?

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- Measure joint geographic constraints of couples
  - Geographic concentration (*where can a job be done*)
  - Geographic overlap (*can two jobs be done in the same set of locations*)

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- Study relation between occupation geography and couple migration decisions
  - *Push* factors: Potential gains from migration
  - *Brake* factors: Constrain set of locations

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- Study relation between occupation geography and couple migration decisions
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→ Couples in high concentrated occupations migrate less wrt other couples

→ Negative association mitigated by geographic overlap of partners' occupations

Measures of Geographic Concentration and Overlap of Occupations

Data Sources

Occupational Employment Data: Decennial Census 1970 - 2010

- Coverage: 1-5% population
- Geographic level: Counties $\geq$ 100,000 inhabitants
- Occupation: Census 1990 system [Autor-Dorn-2013; Autor-2015]
- Geographic Unit: 1990 Commuting Zones [Autor-Dorn-2013; Autor-et-al-2019]
  - $\Rightarrow$ 330 occupations & 741 CZs

Migration Data: Current Population Survey, March Supplement (ASEC) 1972 - 2023

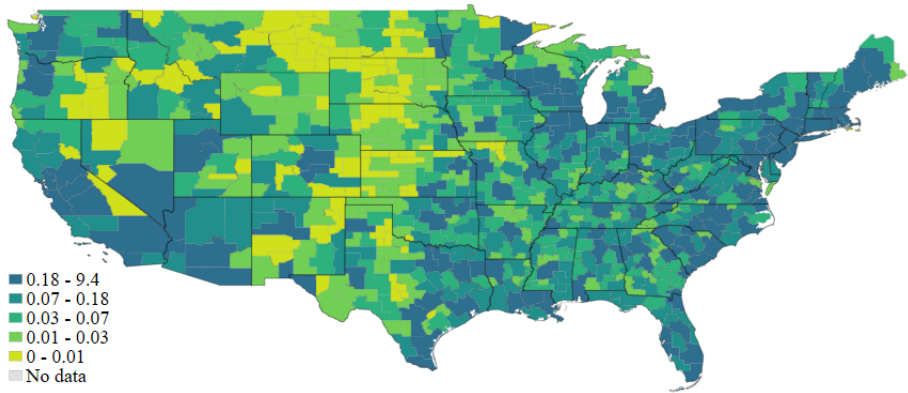
- Monthly household survey, 200,000 individuals per wave
- Relevant information:
  - $\rightarrow$ Occupation this and last year
  - $\rightarrow$ Migration status in last 12 months: across counties, across states, abroad

Distribution of Employment across Locations

CZ employment

Share of workers in commuting zone out of US total by occupation

Example: Primary school teachers



Distribution of Employment across Locations

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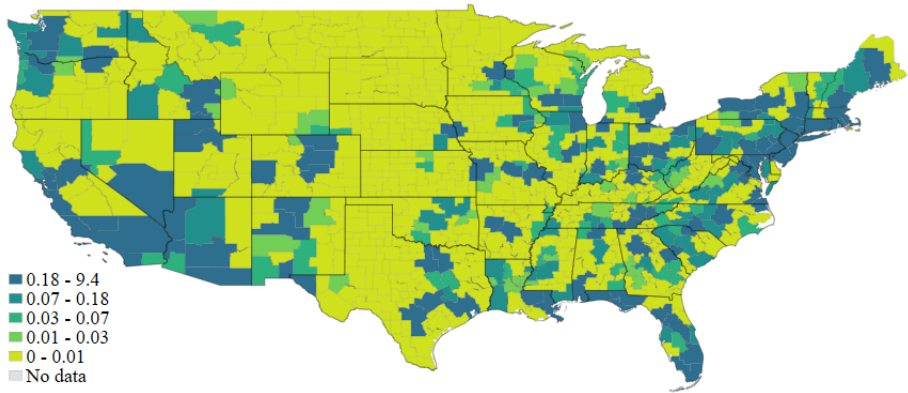
Share of workers in commuting zone out of US total by occupation

Example: Astronomers and physicists



Measure of Geographic Concentration

From Benson [2014] - Construction

Generalized Duncan's dissimilarity index for each occupation j:

$$DDI_j^* = \frac{1}{2} \sum_{L}^{l=1} \left| \frac{n_{jl}}{n_j} - \frac{n_l - n}{n - n_j} \right|$$

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- $n_{j,l}$ employment in location l and occupation j
- n_j total employment in occupation j

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- n_j total employment in occupation j
- n_l total employment in location l
- n total employment

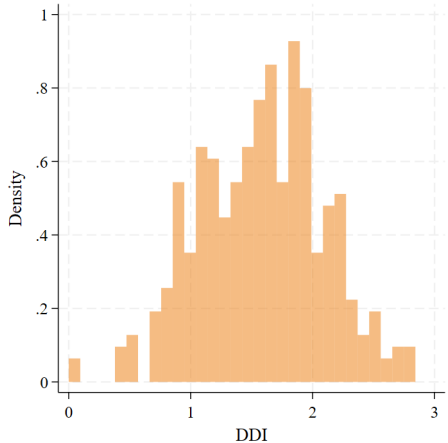
Measure of Geographic Concentration

From Benson [2014] - Interpretation and Normalization

- *Interpretation:* Share of workers that should relocate to balance employment in occupation *j* across all locations

  Example

- Higher DDI:
  - more concentration
  - job available in fewer locations
- Normalize: log and lowest value = 0



Switches Over time

Measure of Geographic Overlap

Can two occupations be done in the same set of locations?

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1. For each occupation j, construct a vector $(1 \times L)$ of the share of its total employment in each commuting zone l:

$$V_j = \begin{bmatrix} n_{j,1}/n_j \\ n_{j,2}/n_j \\ \dots \\ n_{j,L}/n_j \end{bmatrix}$$

$\rightarrow$ Plotted in maps before

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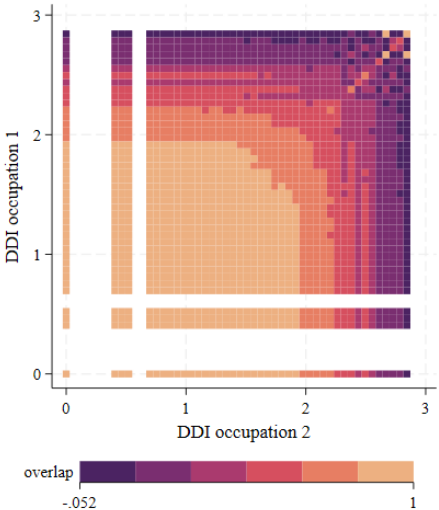
2. Compute correlation of these vectors for any two occupations (j, k): $O_{j,k}$
   - Distributed [-1,1], close to zero uncorrelated locations
   - Examples:
     - → Lawyers and paralegals $O_{j,k} = 0.977$
     - → Financial managers and conservation scientists $O_{j,k} = 0.391$

Measure of Geographic Overlap

Distribution & Evolution



- Overlap close to one when low concentrated
- Relevant metric for high concentrated
- Few negative values: Number
  → Extraction occupations

Joint Geographic Constraints and Migration

Do concentration and overlap encourage or deter migration?

***Push* factors:** Migration more appealing in high concentrated occupations

$$y_{i,t} = \beta_0 + \beta_1 \text{DDI}_{i,t} + \beta_2 \text{Migrate}_{i,t} + \beta_3 \text{DDI}_{i,t-1} \times \text{Migrate}_{i,t} + \epsilon_{i,t}$$

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Single individuals in high concentrated occupations are:

- ✓ 1.5 pp more likely to migrate for a job

See table

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- ✓ 10.6 pp less likely to change occupation after move if college occ. See table

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- ∼ Weak evidence on labor earnings: positive, not significant

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***Brake* factors:** Joint geographic restrictions intensify co-location problem

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- ✓ 10 pp **less** likely when partners in same occupation (perfect overlap)

Do concentration and overlap encourage or deter migration?

***Brake* factors:** Joint geographic restrictions intensify co-location problem

- ~ Partner DDI makes migrating for a job less likely See table
- ✓ Occupation changes post-migration 10 pp likelier when partners in concentrated occupations See table
- ✓ 10 pp less likely when partners in same occupation (perfect overlap)
- ✓ Unemployment 7 pp likelier when partners in concentrated occ., fully mitigated by overlap

Do concentration and overlap encourage or deter migration?

- Migrating yields positive labor market outcomes for individuals in highly concentrated occupations
- In couples where both partners are in highly concentrated occupations, at least one faces labor market drawbacks
- These drawbacks are mitigated when there is substantial overlap in the feasible set of occupational locations

Classify couples based on concentration of occupations

Based on 1990 DDI divide occupations in 2 groups by concentration: Occupations

→ High: top 1/3 of occupations

→ Low: remaining 2/3

Classify couples based on partners' occupations:

- Single earner couples → No co-location problem
- Dual earner couples, based on concentration
  1. Both low
  2. Mixed
  3. Both high, different occupations → Most constrained
  4. Both high, same occupation → Perfect overlap

Migration depending on couple type

For each couple *i* at time *t* and using *single earners* as baseline:

$$y_{i,t} = \alpha_{i,t-1}^{\text{Low}} + \alpha_{i,t-1}^{\text{Mix}} + \alpha_{i,t-1}^{\text{High}} + \alpha_{i,t-1}^{\text{Same}} + \mu_t + X_{i,t}\beta + u_{i,t}$$

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	(1)	(2)
Low	-0.0118***	-0.0105***
	(0.000)	(0.000)
Mixed	-0.0115***	-0.0110***
	(0.001)	(0.001)
High	-0.0170***	-0.0167***
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Same	-0.0112***	-0.00972***
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Year dummies	✓	✓
Controls	×	✓
Observations	1007484	932740

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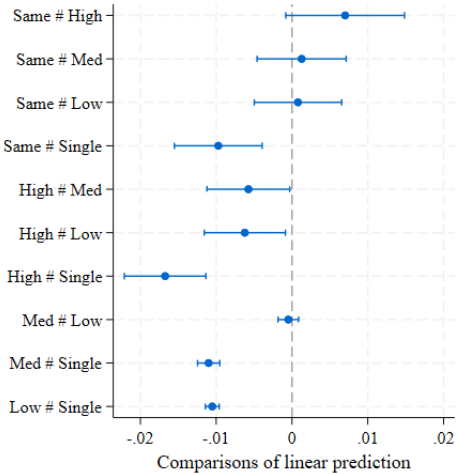
Observations	1007484	932740

Migration depending on couple type

Pairwise comparisons across all types



- Single earners migrate significantly more than any dual earner
- **High** concentration couples migrate the **least**
- The rest are **not statistically different** from each other

Migration, couple type and overlap

$$y_{i,t} = \alpha^{\text{Low}}_{i,t-1} + \alpha^{\text{Mix}}_{i,t-1} + \alpha^{\text{High}}_{i,t-1} + \alpha^{\text{Same}}_{i,t-1} + O_{i,t-1} \times \left[\alpha^{\text{Low}}_{i,t-1} + \alpha^{\text{Mix}}_{i,t-1} + \alpha^{\text{High}}_{i,t-1} + \alpha^{\text{Same}}_{i,t-1}\right] \mu_t + X_{i,t}\beta + u_{i,t}$$

	(1)	(2)	(3)
Low	-0.0118***	-0.0105***	-0.0710
	(0.000)	(0.000)	(0.060)
Mixed	-0.0115***	-0.0110***	-0.0567
	(0.001)	(0.001)	(0.059)
High	-0.0170***	-0.0167***	-0.0741
	(0.003)	(0.003)	(0.059)
Same	-0.0112***	-0.00972***	-0.0525
	(0.003)	(0.003)	(0.058)
Overlap ×			
Low			0.0247***
			(0.005)
Mixed			0.0106**
			(0.003)
High			**0.0418****
			(0.013)
Observations	1007484	932740	553401

Concluding Remarks

Joint geographic constraints explain couple migration patterns

- Couples in high concentrated occupations migrate less than other couples
- This negative effect dissipates with higher overlap

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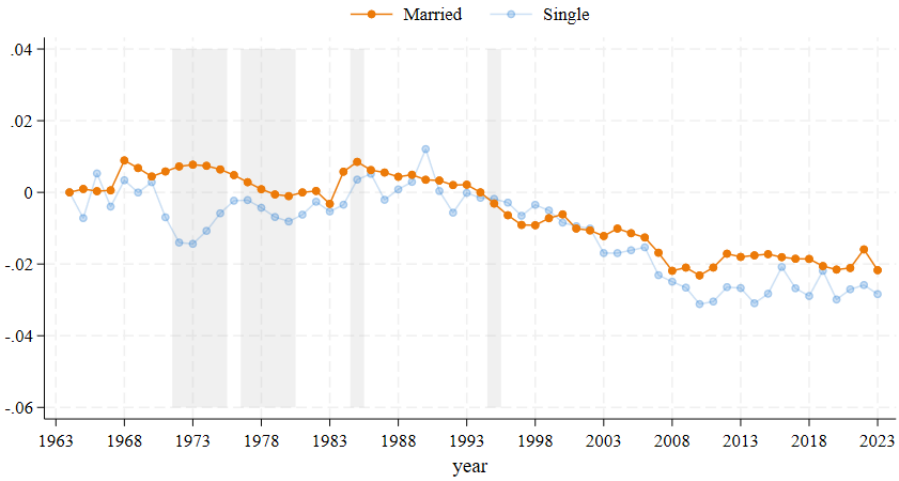
Work in progress:

- Empirically: Shocks to concentration through staggered introduction of state-level occupational licensing requirements
- Theoretically: Can changes in occupational choices explain the aggregate decrease in couple migration rates?

Appendix

Adjusted migration

Back

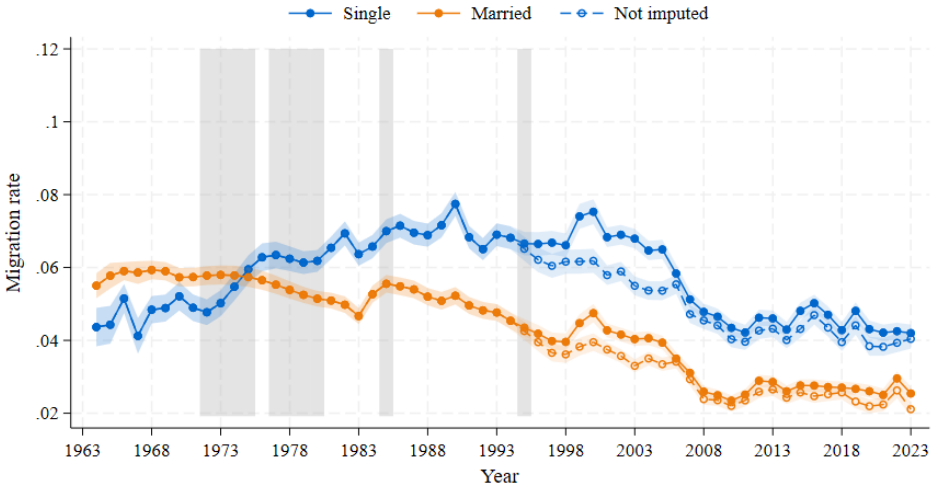


Notes: Adjusted migration rate. Controls include age, sex, education, family income, race and family size. 18-65 and active. Points in gray interpolated using a cubic spline. Excludes households where migration status was imputed [Kaplan-Schulhofer-Wohl-2017].

More

Cross-country migration of total population

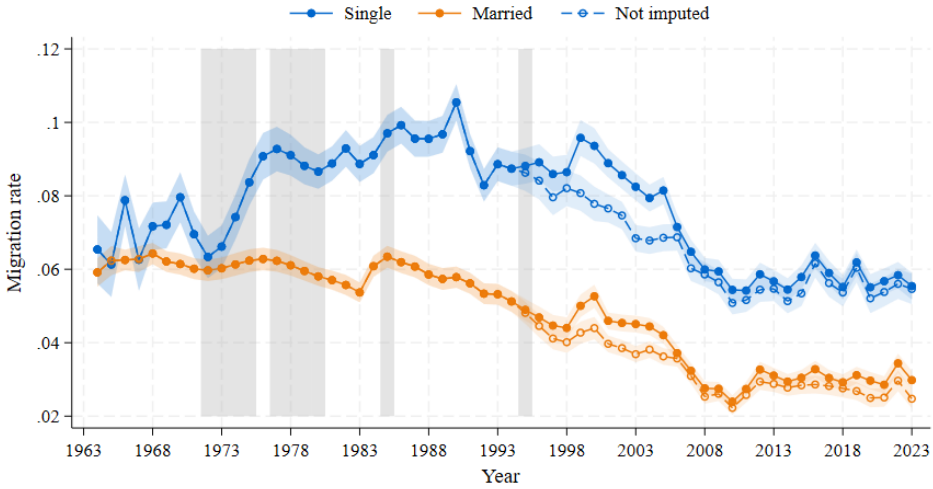
Back



Notes: Points in gray bars are interpolated using a cubic spline. Excludes households where migration rate was imputed [Kaplan-Schulhofer-Wohl-2017]. 95% confidence intervals. *Source:* Current Population Survey.

Cross-country migration using imputed

Back



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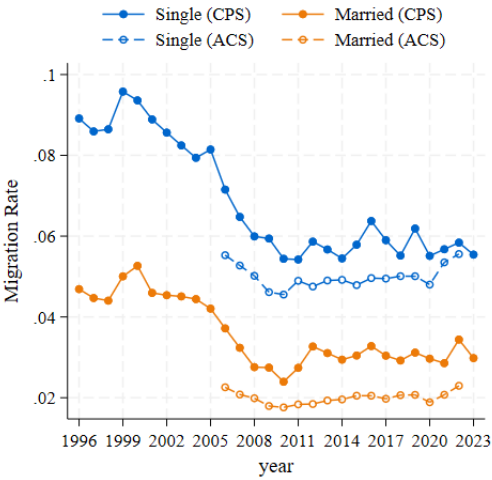
Migration rate, other sources

Back

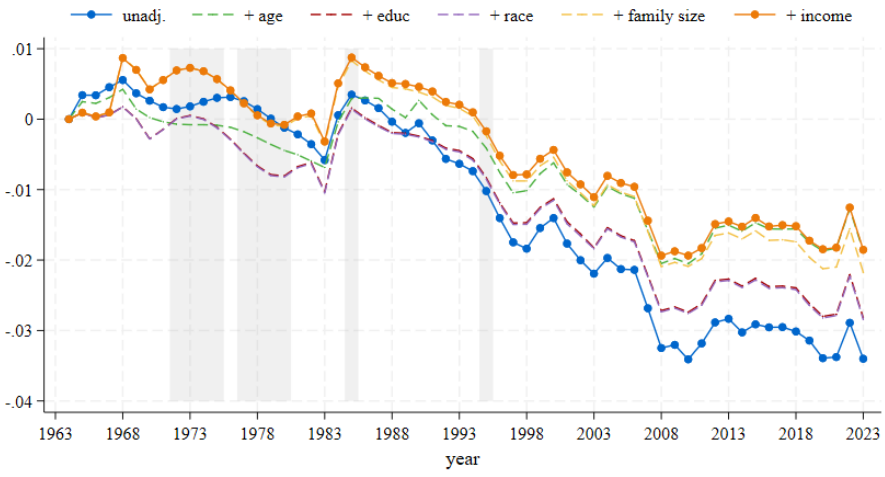


American Community Survey (ACS):

- Monthly survey: migration, occupation, and socio-economic characteristics
- Migration “over the last year”, less precise than the CPS

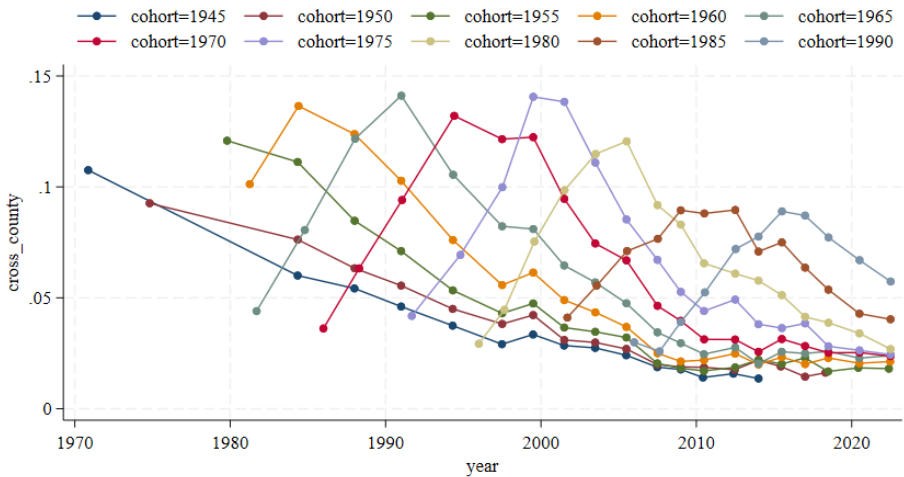
Adjusted migration - Different controls

Back



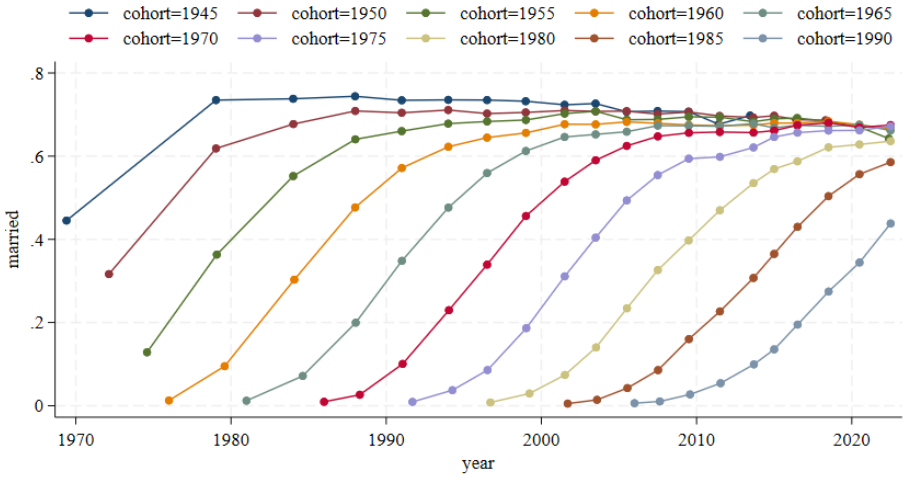
Adjusted migration - By cohort

Back



Adjusted migration - Marriage by cohort

Back



Increase in the share of women in labor force

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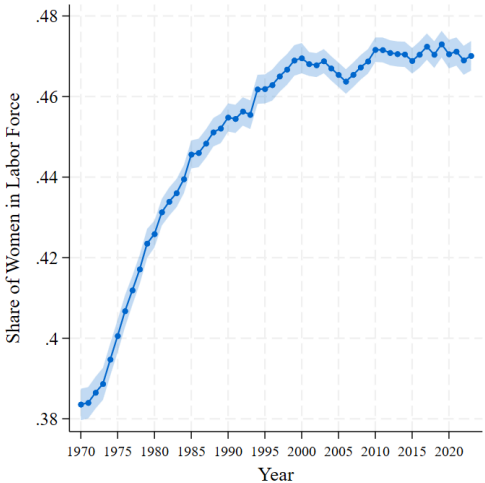

- 20th century: Substantial increase in female labor force participation
- 21st century: Stabilize around 47%
- Structural change in the composition of the labor force

Increase in the share of dual earner couples

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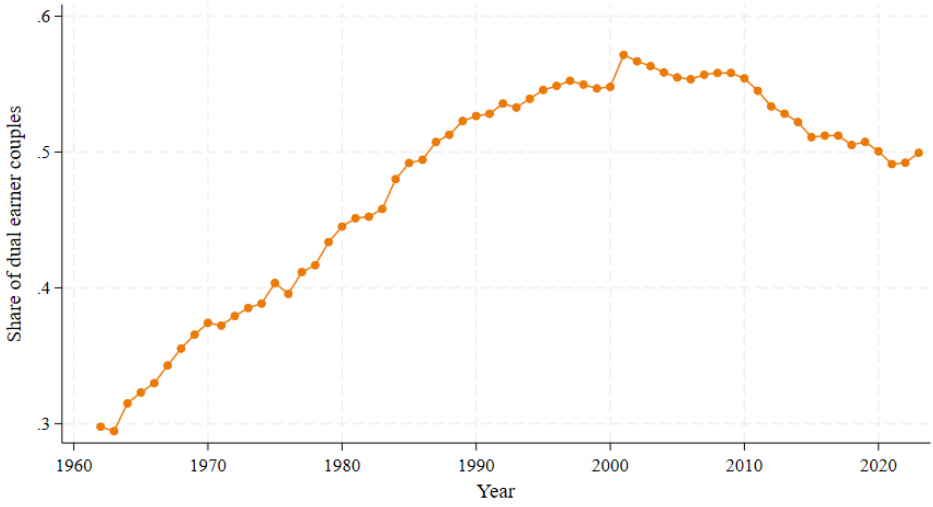

Decreasing migration of dual earner couples

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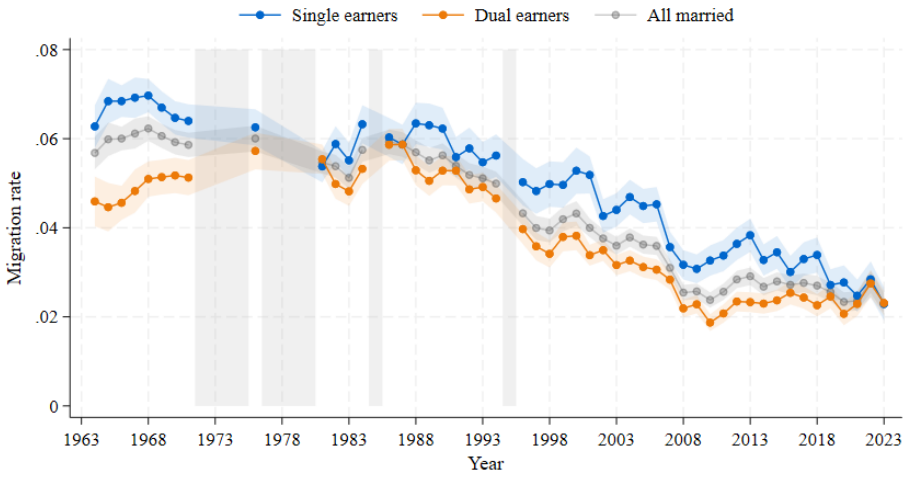

Literature and contribution

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Migration decisions of couples [Braun-et-al-2021; Foerster-Ulbricht-2023; Guler-Taskin-2018; Mincer-1978]

- Tied migraion contributing to the gender wage gap [Blackburn-2010; Cooke-et-al-2009; Foged-2016; Lundberg-Pollak-2003; Jayachandran-et-al-2023; Rabe-2011; Venator-2022]
- Education and occupation determining migration [Alonzo-2022; Benson-2014; Costa-Kahn-2000; Compton-Pollak-2007; Rueda-Wilemme-2021; Venator-2024]

▷ Differences in potential gains from migration of women and men's occupations

▷ Consider the role of joint geographic constraints imposed by occupations

Occupational segregation by sex [Blau-et-el-2012; Cortes-Pan-2018; Sloane-et-al-2021]

- Women favor flexible arrangements [Goldin-2014; Le-Barbanchon-et-al-2021; Liu-Su-2022; Mas-Pallais-2017; Wiswall-Zafar-2018; Zhang-Zou-2023]

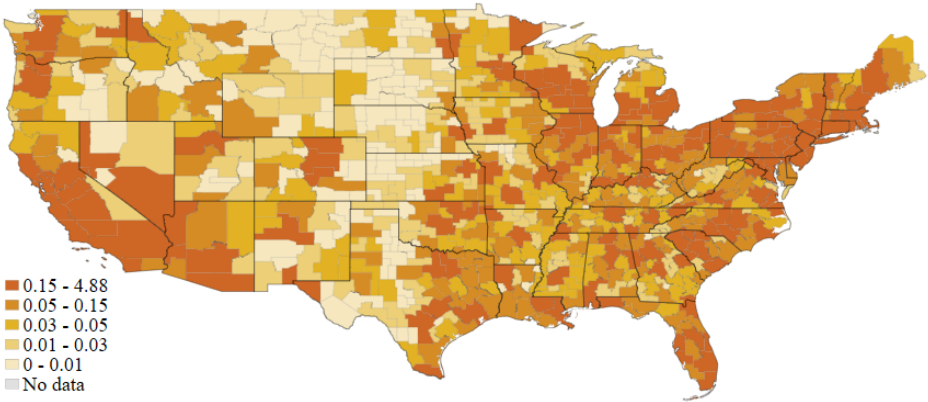
▷ Document sorting based on geographic availability of jobs

Decline in US internal migration [Kaplan-Schulhofer-Wohl-2017; Molloy-et-el-2011; Olney-Thompson-2024]

▷ Connect with the most relevant contemporaneous change in the labor force

Commuting Zone employment 1990

Back



Share of workers relocating to balance employment across locations

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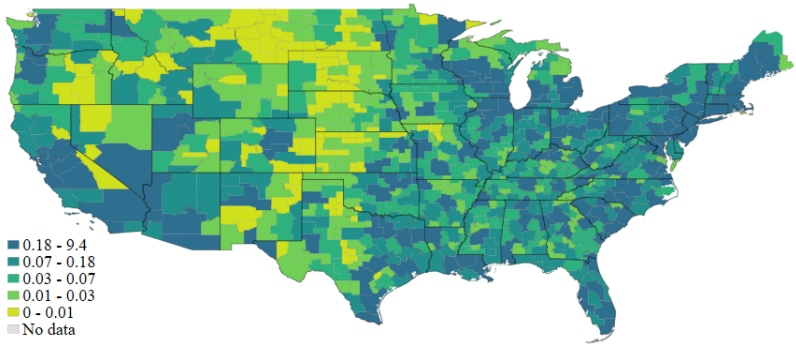
Primary school teachers $DDI_j^* = 0.067$

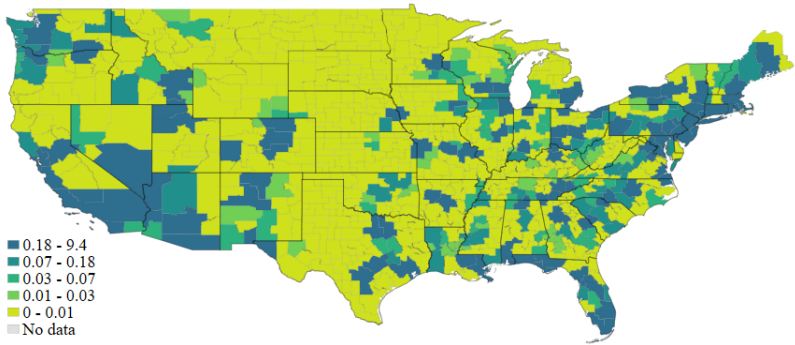


- In 1990 2.4% of the US labor force were primary school teachers
- 6.7% of teachers should relocate to constitute 2.4% of the labor force in each location

Share of workers relocating to balance employment across locations

Back

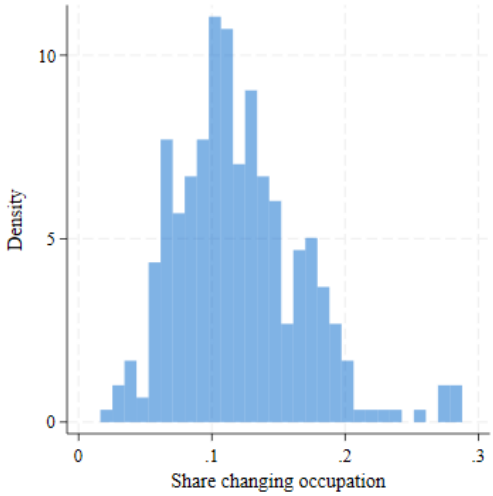
Astronomers and physicists $DDI_j^* = 0.307$



- In 1990 0.02% of the US labor force were astronomers and physicists
- 30.7% of physicists should relocate to constitute 0.02% of the labor force in each location

Occupation switching by occupation in CPS data

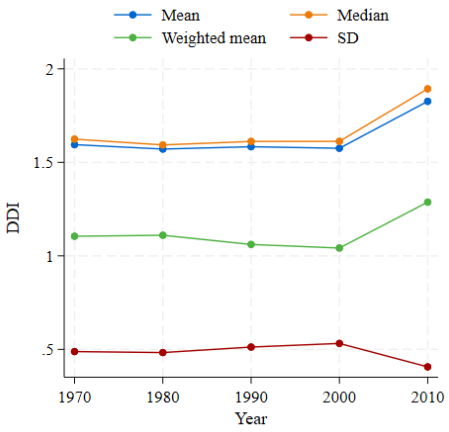
Back



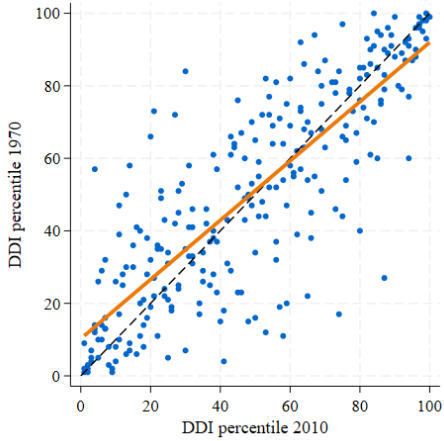
Concentration Measure - Evolution

Back

(a) Evolution



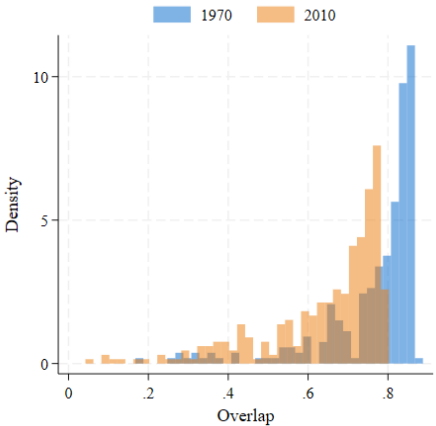
(b) Rank ($\rho = 0.8342$)



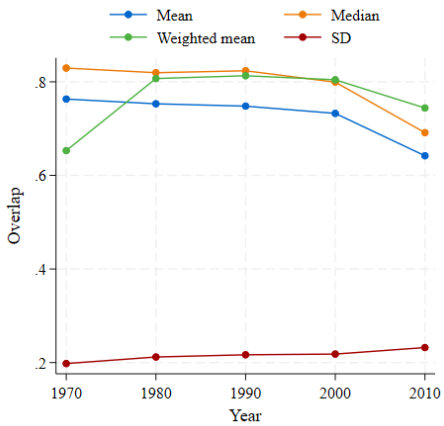
Overlap Measure - Distribution and evolution

Back

(a) Distribution

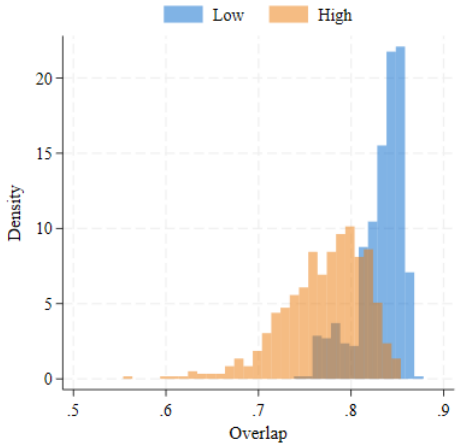


(b) Evolution



Overlap Measure - Distribution by concentration

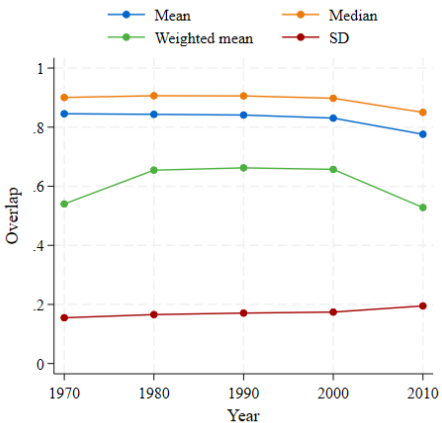
Back



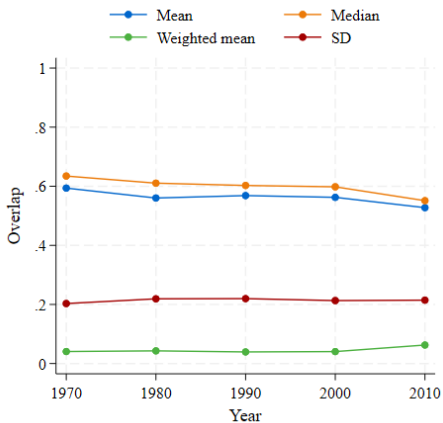
Evolution of overlap measure by concentration

Back

(a) Bottom 80%

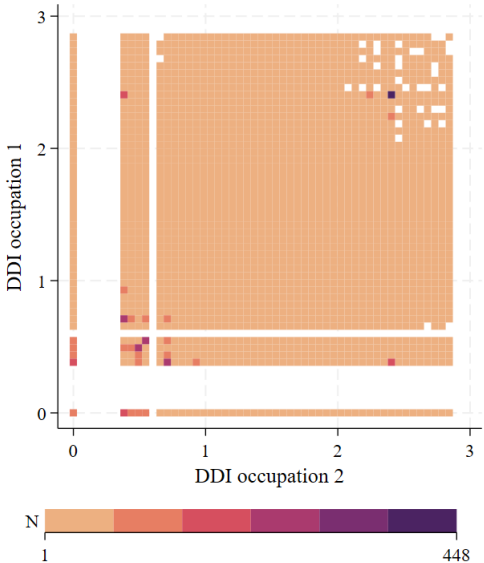


(b) Top 20%



Overlap Measure - Number of couples per bin

Back



Push factors

Back

$$y_{i,t} = DDI_{i,t-1}\beta_1 + M_{i,t}\beta_2 + \left(DDI_{i,t-1} \times M_{i,t}\right)\beta_3 + \boldsymbol{X}_{i,t}\gamma + \epsilon_{i,t}$$

	(1) Migrate for job	(2) Occ. change	(3) Unemployment	(4) Labor earnings
DDI		0.0009	0.0046***	0.0322***
		(0.001)	(0.002)	(0.005)
Migrate		0.1634***	0.0423***	-0.1268**
		(0.006)	(0.003)	(0.049)
Migrate × DDI	0.0154***	-0.0073	-0.0153***	-0.0063
	(0.003)	(0.005)	(0.003)	(0.043)
Sample	Migrants	Full	Full	Panel
Controls	✓	✓	✓	✓
R-squared	0.216	0.018	0.004	0.483
Observations	43772	627996	628198	149053

Notes: Controls include year, age, education, race and family size. Standard errors clustered at the state level in parentheses.

Push factors in migrant sample

Back

	Migrate for job		Occ. change		Unemployment		Labor earnings	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DDI	0.0154***	0.0063*	0.0041	0.0436***	-0.0022	0.0014	0.0680*	0.0484
	(0.003)	(0.003)	(0.005)	(0.005)	(0.002)	(0.003)	(0.035)	(0.041)
College × DDI		0.0135*		-0.1064***		0.0026		0.0344
		(0.008)		(0.010)		(0.005)		(0.072)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
R-squared	0.246	0.248	0.018	0.026	0.027	0.028	0.277	0.279
Observations	43772	43527	43731	43527	43772	43527	2867	2854

Notes: Controls include year, age, education, race and family size. Standard errors clustered at the state level in parentheses.

Brake factors in migrant sample

Back

	(1)	(2)	(3)
DDI	0.0042		0.0020
	(0.003)		(0.017)
Partner DDI	-0.0004		
	(0.002)		
Overlap		-0.0212*	-0.0173
		(0.012)	(0.026)
DDI × Overlap			0.0009
			(0.018)
Controls	✓	✓	✓
R-squared	0.012	0.012	0.012
Observations	17697	17697	17697

Notes: Controls include year, age sex, education, race and family size of both partners. Standard errors clustered at the state level in parentheses.

Brake factors in migrant sample

Back

	(1) Occ. change	(2) Unemployment
Both low	0.0842***	0.0504***
	(0.007)	(0.004)
Mixed	0.0990***	0.0808***
	(0.009)	(0.007)
Both high	0.1908***	0.0694***
	(0.034)	(0.018)
High, same occ.	-0.2307***	0.0123
	(0.022)	(0.030)
Controls	✓	✓
R-squared	0.038	0.033
Observations	42174	46249

Notes: Controls include year, age sex, education, race and family size of both partners. Standard errors clustered at the state level in parentheses.

Brake factors in migrant sample

Back

	Change occupation		Unemployment		Overlap	
	(1)	(2)	(3)	(4)	(5)	(6)
Overlap	-0.160***		-0.118***		0.781***	
	(0.029)		(0.025)		(0.017)	
Both low × Overlap		-0.137***		-0.103***		0.702***
		(0.030)		(0.027)		(0.019)
Mixed × Overlap		-0.106***		-0.0887***		0.602***
		(0.038)		(0.032)		(0.023)
Both high × Overlap		0.00237		-0.105**		0.618***
		(0.067)		(0.045)		(0.032)
Controls	✓	✓	✓	✓	✓	✓
R-squared	0.022	0.027	0.023	0.026	0.616	0.672
Observations	17905	17905	17048	17048	15146	15146

Classification of occupations

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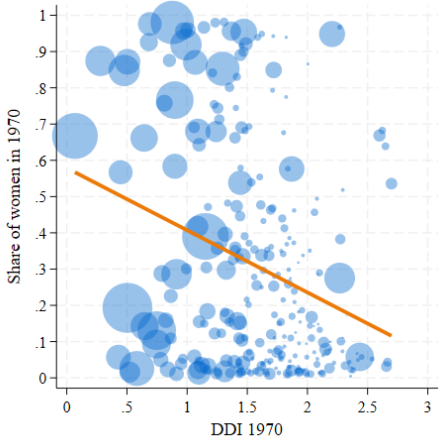
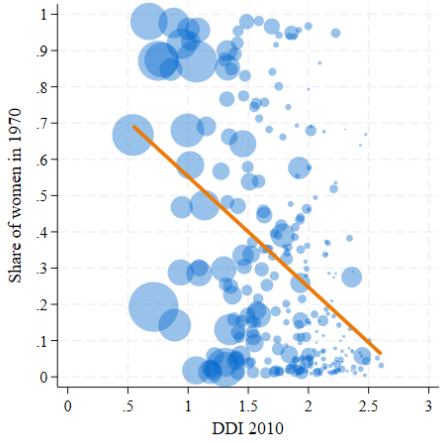
Least concentrated	Most concentrated
275 Retail salespersons and sales clerks	738 Winding and twisting textile and apparel operatives
243 Sales supervisors and proprietors	616 Miners
337 Bookkeepers and accounting and auditing clerks	614 Drillers of oil wells
313 Secretaries and stenographers	617 Other mining occupations
458 Hairdressers and cosmetologists	498 Fishers, marine life cultivators, hunters, and kindred
276 Cashiers	739 Knitters, loopers, and toppers textile operatives
453 Janitors	745 Shoemaking machine operators
156 Primary school teachers	47 Petroleum, mining, and geological engineers
383 Bank tellers	496 Timber, logging, and forestry workers
355 Mail carriers for postal service	488 Graders and sorters of agricultural products

Traditionally *male* occupations more concentrated

(a) Contemporaneously, in 1970



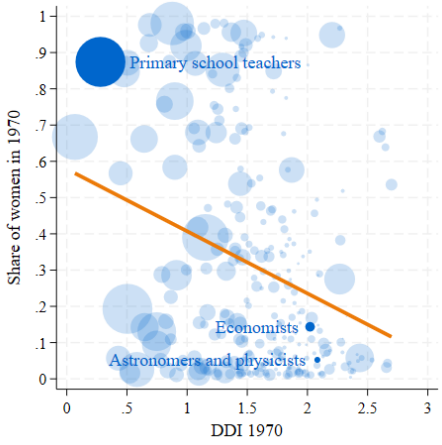
(b) Current concentration



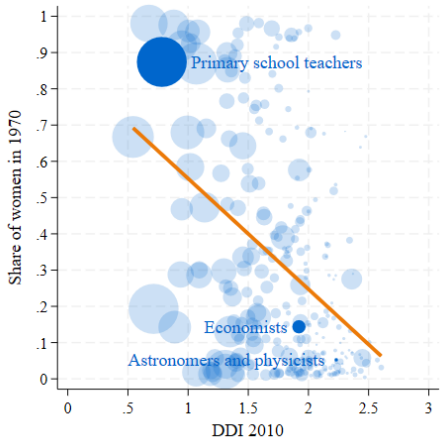
Regression analysis | Changes by 1970 share | 2010 share of women

Traditionally *male* occupations more concentrated

(a) Contemporaneously, in 1970



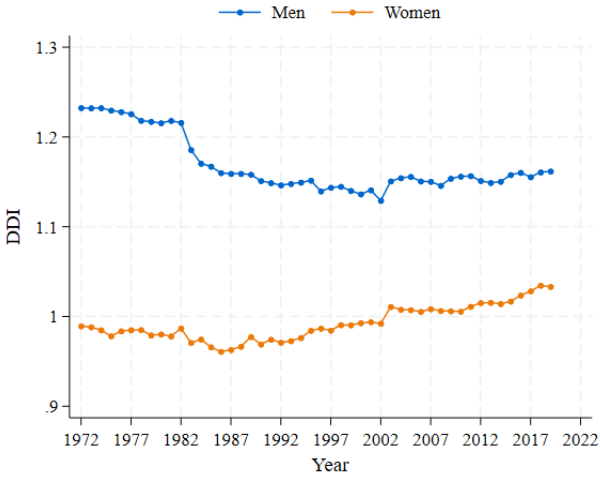
(b) Current concentration



Regression analysis | Changes by 1970 share | 2010 share of women

Women in increasingly concentrated occupations

1. Plug DDI computed for 1990 into CPS data
2. Average concentration by sex at each CPS year



Relative to trend | By education | Census data | Occupational segregation | Overlap

Can this explain the trend in couple migration?

Shift-share decomposition

Migration rate at time t, where c denotes couple type:

$$M_t = \sum_t W_{c,t} M_{c,t}$$

- $W_{c,t}$ share of c type couples
- $M_{c,t}$ migration rate of c type

Change in the aggregate migration rate:

$$\Delta M = M_{2010} - M_{1970} = \underbrace{\sum_c \Delta W_{c,2010} M_c}_{\text{within}} + \underbrace{\sum_c M_{c,2010} \Delta W_c}_{\text{between}} + \underbrace{\sum_c \Delta M_c \Delta W_c}_{\text{residual}}$$

Can this explain the trend in couple migration?

Shift-share decomposition

Change in the aggregate migration rate:

$$\Delta M = M_{2010} - M_{1970} = \underbrace{\sum_c \Delta W_{c,2010} M_c}_{\text{within}} + \underbrace{\sum_c M_{c,2010} \Delta W_c}_{\text{between}} + \underbrace{\sum_c \Delta M_c \Delta W_c}_{\text{residual}}$$

Migration Rate			Decomposition		
1970	2010	Change	**Within**	Between	Residual
0.0569	0.0265	-0.0304	**-0.03**	0.0003	-0.0008

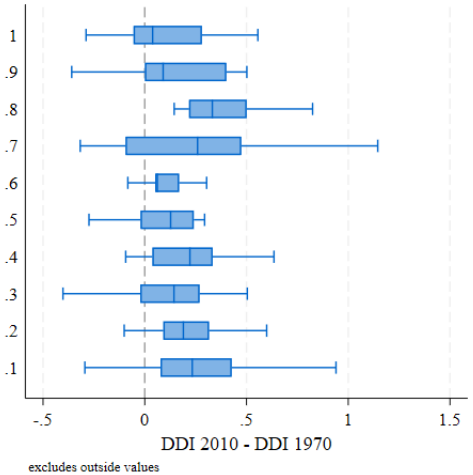
Regression analysis

Back

	(1) Women 1970	(2) Women 1970	(3) Women 2010
DDI 1970	-0.172***		
	(0.037)		
DDI 2010		-0.305***	-0.303***
		(0.042)	(0.035)
Observations	266	263	329

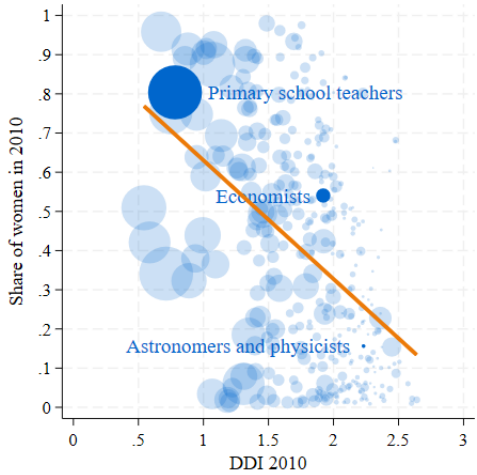
Changes in DDI by share of women 1970

Back



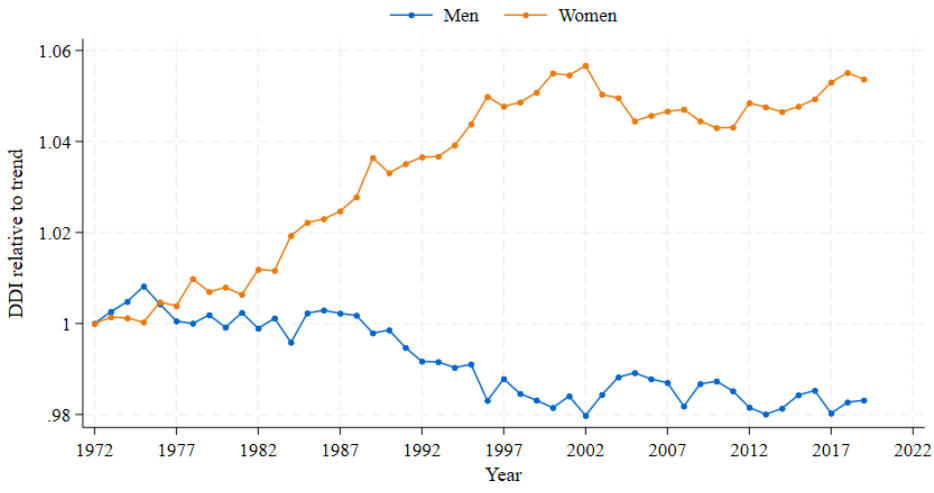
DDI 2010 by share of women 2010

Back



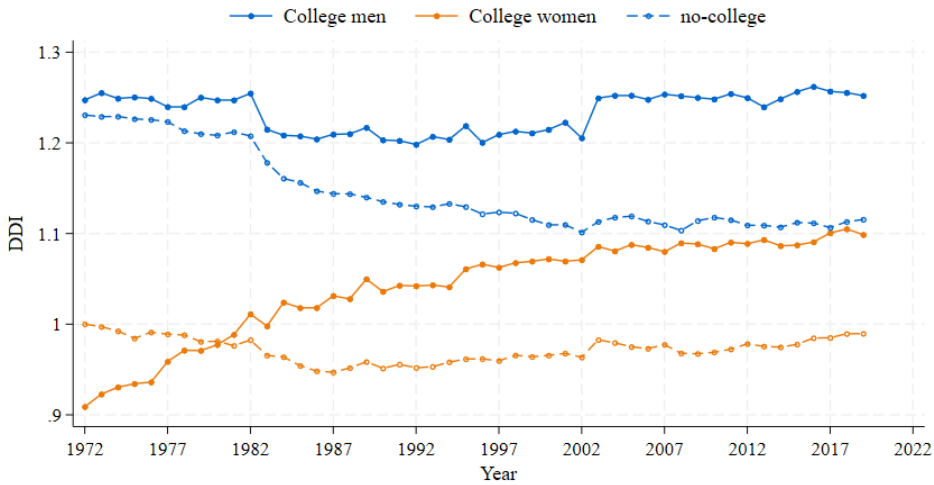
Concentration by sex relative to trend

Back



Concentration by sex and college education

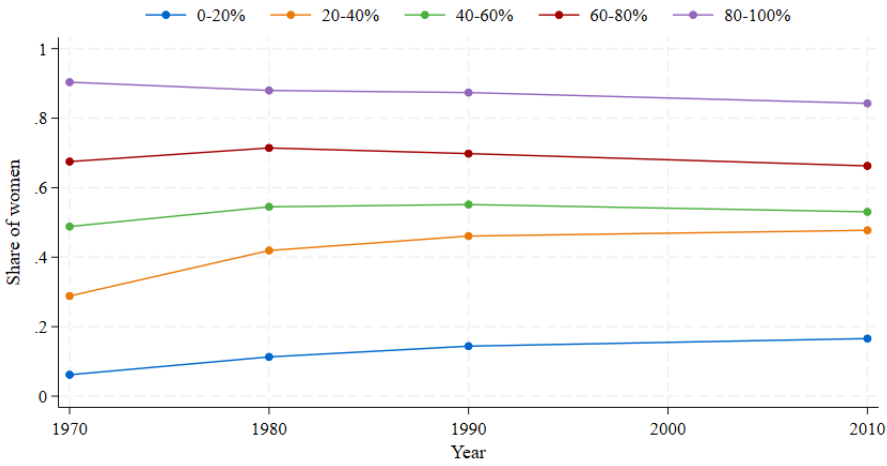
Back



Women in increasingly concentrated occupations

Back

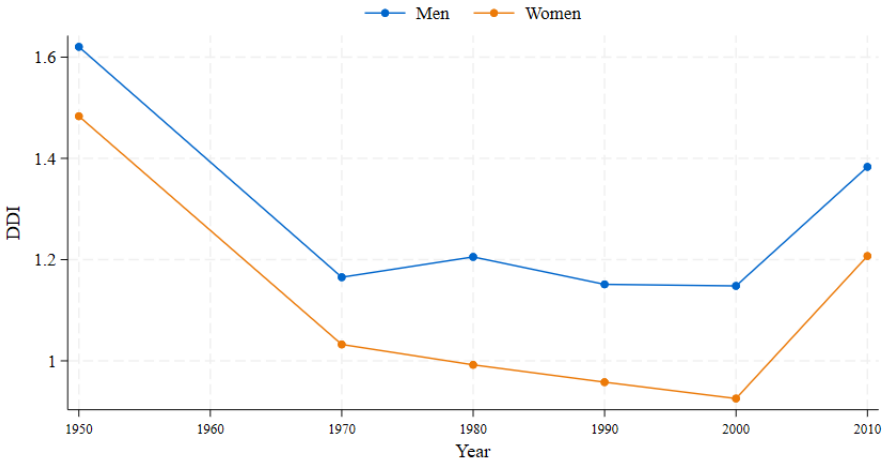
Occupational segregation



Women in increasingly concentrated occupations

Census data

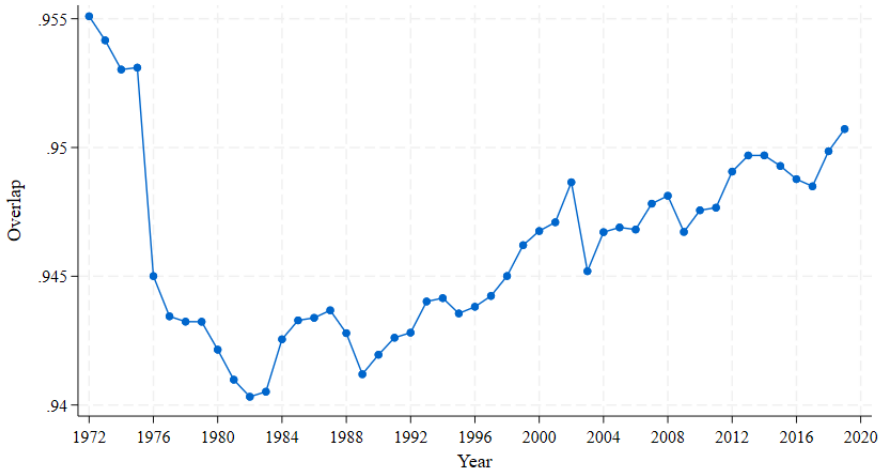
Back



Women in increasingly concentrated occupations

Back

Overlap



Based on Braun et al. [2021]

Back

- Risk neutral households search for jobs and pool income
  - Local and foreign offers at different arrival rates: $\{\alpha_{\text{local}}, \alpha_{\text{foreign}}\}$
  - No moving costs
- 2 types of households: single and dual searchers
- 2 types of occupations:
  - General: Can be done anywhere and do not require moving $\rightarrow$ Small α_{foreign}
  - Specialized: Few available locations and require mobility $\rightarrow$ Large α_{foreign}
- *Occupation* specific wage offer distributions: $F^i(w)$ for $i \in \{S, G\}$
- Changing occupations comes at a cost f

Occupational Licenses

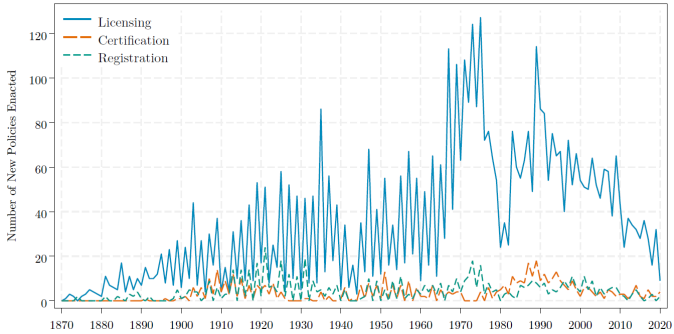
- Government-issued **credentials** required by workers **to legally perform the tasks** within an occupation's scope of practice
- Required by 1/5 of the US labor force (+30 million workers)
  - Share doubled since 1970

Over time

- Most strict form of occupational regulation:
  - Certification: to use occupation title
  - Registration: no competency requirement
- State-level variation of requirements: training, examinations, renewal...

Historical Licensing Data [Carollo-2020]

- Occupational regulation in 50 states + District of Columbia
- Coverage period: 1870-2020
- 8,852 regulatory events in 50 states for 343 detailed occupations



Empirical Strategy

- Exploit time variation in license introduction at the state level [Carollo-2020]
- *Link to concentration:* Licensing requirements increase relocation costs and reduce the amount of available locations for an occupation

  $\Rightarrow$ Licensure increases concentration

Empirical Strategy

- For individual i, at time t, living in state s, and with occupation o in the previous period:

$$y_{i,t,o,s} = \alpha_{o,s} + \mu_{o,t} + \gamma D_{o,s,t} + \beta X_{i,t} + u_{i,t}$$

  - y indicates whether i migrated to s over the last year
  - $D_{o,s,t} = 1$ if occupation o is subject to licensure in state s in period t
  - $\alpha_{o,s}$ occupation $\times$ state dummies
  - $\mu_{o,t}$ occupation $\times$ period dummies