The Geography of Women's Opportunity: Evidence from Indonesia

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Boston University

There are large differences in women's labor force participation within countries

Note: The figure shows the distribution of district-level female labor force participation rates (FLFP) by country. Data from IPUMS International.

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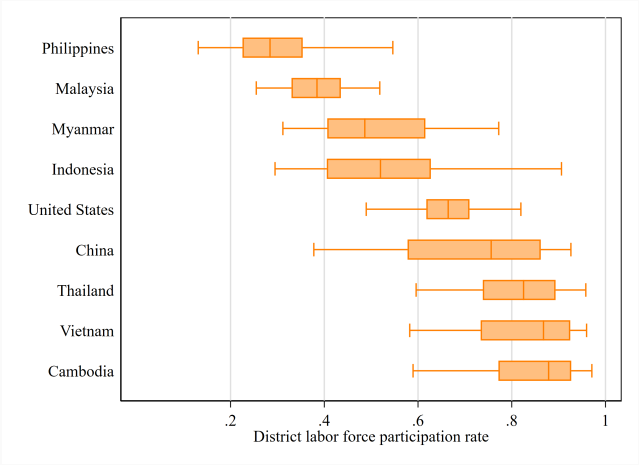

Note: The figure shows the distribution of district-level female labor force participation rates (FLFP) by country. Data from IPUMS International.

This dispersion in FLFP could shape women's economic outcomes

This paper: provides causal evidence that women's birthplace shapes their labor force participation in adulthood.

I use rich data from Indonesia and exploit data from women who migrate, as children, across local labor markets within Indonesia.

I compare the labor supply of women **living in the same labor market** as adults, but whom:

(i) come from locations with different FLFP,

(ii) left their origin at different ages.

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I find large effects from women's birthplace

(i) **Large and persistent influence of birthplace on women's labor force participation**

- Conditional on being in the same place in adulthood, gap in FLFP of 22 p.p. at birthplace $\Rightarrow$ 10 p.p. in likelihood of working as adult.

(ii) **Place is key during late childhood and early teens**

- Effects are concentrated between the ages of 6 to 16 years old.

(iii) **Approximately 45% of the differences in FLFP are driven by birthplace**

- Place-effects contribute to persistence of FLFP dispersion.

(iv) **Effects could be driven by variation in social norms or the quality of schooling**

- Can rule-out differences un human capital accumulation and rates of maternal labor supply.

Policy implications $\Rightarrow$ (i) large within country heterogeneity (ii) focus on early interventions.

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- **Neighborhood quality and place effects:** Chetty et al. (2016); Chetty and Hendren (2018a,b); Finkelstein et al. (2016, 2022, 2021)
  - Adds new evidence linking place to gender inequality.
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Roadmap

Data

- Data sources
- Motivating facts

Empirical strategy and results

Conclusions

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- **Indonesian Family Life Survey (IFLS)** panel data tracking ≈40k Indonesians across five waves in the years 1993, 1997, 2000, 2007 and 2014.
  - I build respondent's *location* history since birth, and yearly work history for the years 1980-2014 using IFLS's retrospective questions.

Supplementary sources:

- **Intercensal Survey:** IPUMS International samples for 1985, 1995, and 2005.
- **Indonesian decennial census:** IPUMS International samples for 1980-2010.
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Sample:

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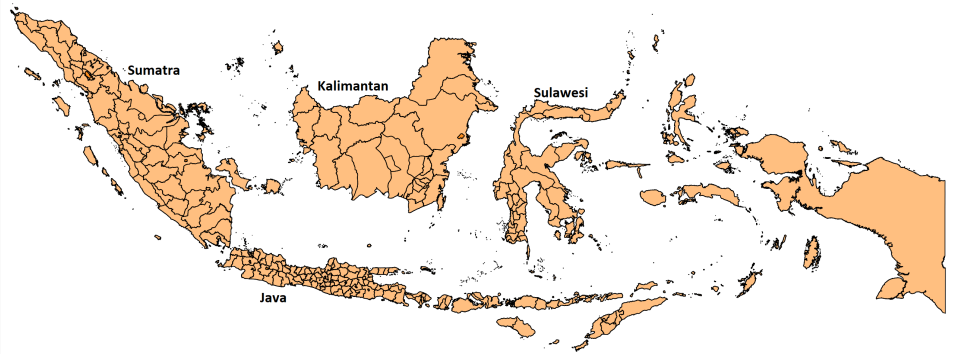
Key variable definitions

- **Labor supply measure:** dummy indicating whether a person worked in a year.
- **Geographic unit:** "regencies". Administrative units akin to US counties.



stats

About one third of people are emigres

	All (1)	Women (2)	Men (3)
Age	35.54	35.27	35.85
Attended at least high school	0.37	0.32	0.42
Muslim	0.89	0.90	0.89
Share left birthplace by age 25	0.31	0.29	0.34
Employed	0.71	0.55	0.89
Type of worker			
Self-employed	0.46	0.40	0.50
Salaried	0.42	0.37	0.46
Unpaid / family worker	0.12	0.23	0.04
Industry of employment			
Agriculture	0.31	0.31	0.32
Services	0.40	0.44	0.38
Manufacturing	0.14	0.16	0.13
Construction	0.05	0.01	0.09
Observations	516,670	276,986	239,684
Number of individuals	37,440	19,074	18,366

Notes: data from Indonesian Family Life Survey (IFLS).

- **31%** had emigrated from their birthplace by age 25.
- 34 p.p. gender gap in employment.
- Highly agrarian and self-employed labor market.
- Large gender differences in **type** and some **industries of work**.

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Average female emigre left at 20 years old

	Stayers (1)	Emigres (2)	Left young (3)
Age	36.07	35.34	33.27
Attended at least high school	0.24	0.44	0.40
Muslim	0.91	0.87	0.88
Age left birthplace		19.82	13.87
Employed	0.57	0.53	0.51
Type of worker			
Self-employed	0.43	0.36	0.36
Salaried	0.31	0.45	0.45
Unpaid / family worker	0.25	0.19	0.19
Industry of employment			
Agriculture	0.37	0.20	0.20
Services	0.37	0.55	0.55
Manufacturing	0.16	0.15	0.15
Construction	0.00	0.01	0.01
Observations	169,669	68,619	29,871
Number of individuals	11,555	6,769	2,933

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Migrant women are:

- more educated, yet they are not more likely to work,
- more likely to be salaried employees,
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Motivating facts

Fact 1: women employment is very dispersed within countries

Statistics	China	Indonesia	Myanmar	Vietnam	Cambodia	Thailand	Philippines	Malaysia	USA
Women									
IQR	0.28	0.22	0.21	0.19	0.16	0.16	0.13	0.11	0.09
SD	0.17	0.14	0.13	0.12	0.11	0.11	0.10	0.07	0.07
Mean	0.71	0.53	0.51	0.82	0.84	0.81	0.30	0.38	0.67
Men									
IQR	0.14	0.05	0.07	0.06	0.08	0.08	0.08	0.06	0.10
SD	0.10	0.04	0.05	0.06	0.05	0.06	0.06	0.04	0.07
Mean	0.85	0.87	0.86	0.90	0.90	0.88	0.82	0.84	0.77
Mean Pop. (000)	267	534	84	79	50	58	40	92	203
No. districts	2,845	268	362	674	174	670	1,274	133	722

Notes: Columns ordered from highest to lowest dispersion in women's labor supply. I use the latest available sample from IPUMS International for each country. SD and IQR are Standard deviation and Interquantile range, respectively.

- Within-variation in women's employment rates is **pervasive** across countries and mostly limited to **women**.
- Dispersion in Indonesia is **comparable** with that of other countries.

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SD	0.17	0.14	0.13	0.12	0.11	0.11	0.10	0.07	0.07
Mean	0.71	0.53	0.51	0.82	0.84	0.81	0.30	0.38	0.67
Men									
IQR	0.14	0.05	0.07	0.06	0.08	0.08	0.08	0.06	0.10
SD	0.10	0.04	0.05	0.06	0.05	0.06	0.06	0.04	0.07
Mean	0.85	0.87	0.86	0.90	0.90	0.88	0.82	0.84	0.77
Mean Pop. (000)	267	534	84	79	50	58	40	92	203
No. districts	2,845	268	362	674	174	670	1,274	133	722

Notes: Columns ordered from highest to lowest dispersion in women's labor supply. I use the latest available sample from IPUMS International for each country. SD and IQR are Standard deviation and Interquantile range, respectively.

- Within-variation in women's employment rates is **pervasive** across countries and mostly limited to **women**.
- Dispersion in Indonesia is **comparable** with that of other countries.

Fact 1: women employment is very dispersed within countries

Statistics	China	Indonesia	Myanmar	Vietnam	Cambodia	Thailand	Philippines	Malaysia	USA
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Fact 2: women work at very different rates across Indonesia's regencies

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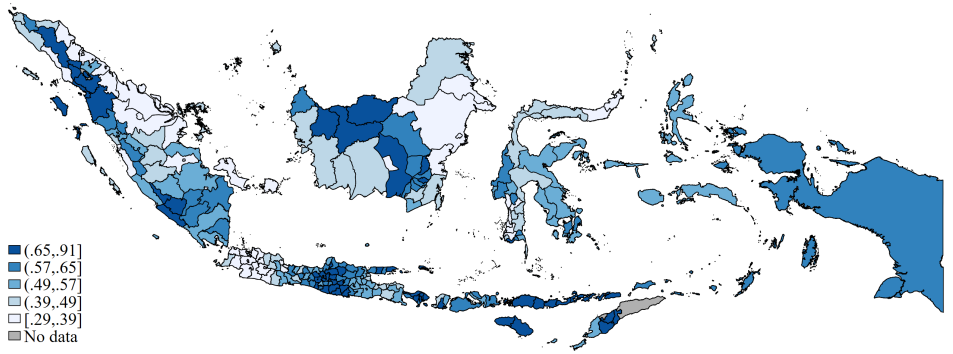

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+info

Fact 3: regency differences in women's employment are very persistent

	Female employment rate			
	(1)	(2)	(3)	(4)
Female employment rate 10 years ago	0.80			
	(0.02)			
Female employment rate 20 years ago		0.72		
		(0.03)		
Female employment rate 30 years ago			0.70	
			(0.04)	
Male employment rate (same-year)				0.51
				(0.04)
Observations	800	534	268	1,071

Notes: Sample restricted to women aged 18-64. Data IPUMS international. Robust standard errors in parenthesis.

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Fact 4: women's demographics leave a lot of dispersion unaccounted for

- **Previous literature:** industry/occupation, having children, and education are important determinants of women's labor supply (Blau and Kahn, 2015; Black et al., 2014).

	Women's					Men's				
Dep. var.: regency's employment rate	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
R^2	0.13	0.26	0.30	0.31	0.47	0.01	0.41	0.60	0.69	0.79
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Age structure		✓	✓	✓	✓		✓	✓	✓	✓
Women's education level			✓	✓	✓					
Men's education level								✓	✓	✓
Share married				✓	✓				✓	✓
With child under 5				✓	✓				✓	✓
Industry shares					✓					✓
N	804	804	804	804	804	804	804	804	804	804

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Taking stock

There are large differences in women's labor force participation across Indonesia that are:

(i) large and highly persistent.

(ii) a large share of this variation is unaccounted for by women's demographics.

Being exposed to a high-FLFP location could make women more likely to work.

I link birthplace to adult female employment proceeds in two steps:

(i) Show birthplace is highly predictive of women's employment in adulthood.

(ii) Exploit age of emigration data to show that persistence is larger the longer women stay at their birthplace.

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Empirical strategy and results

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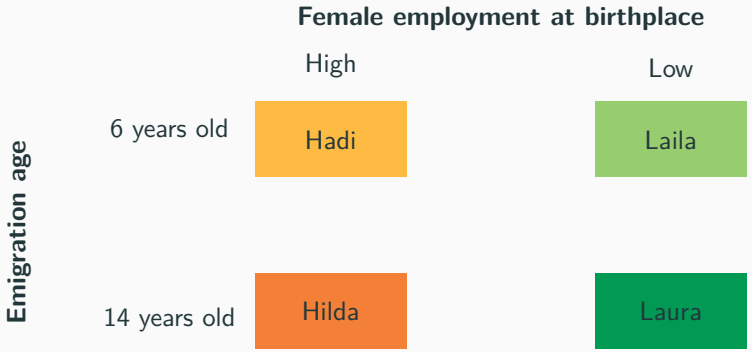

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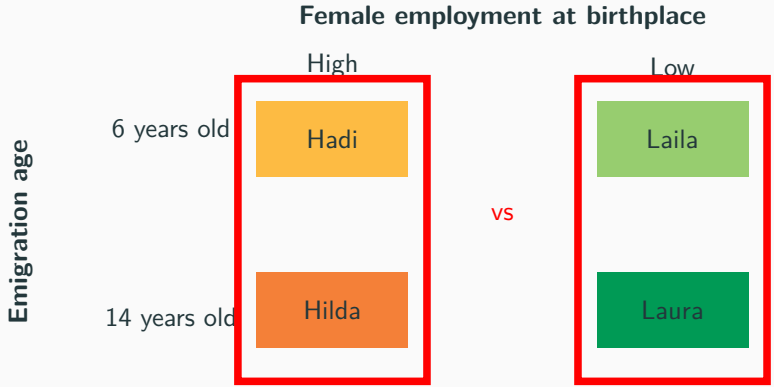

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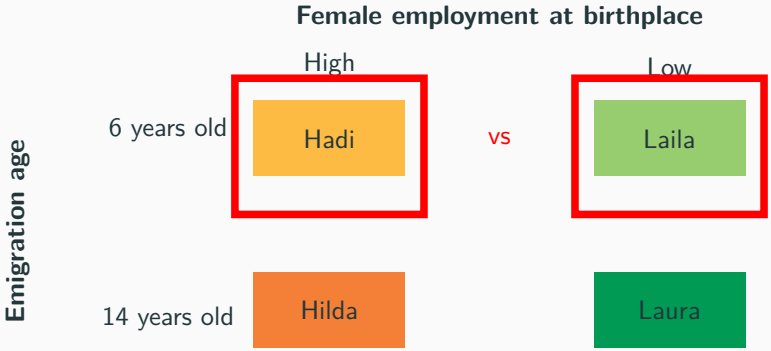

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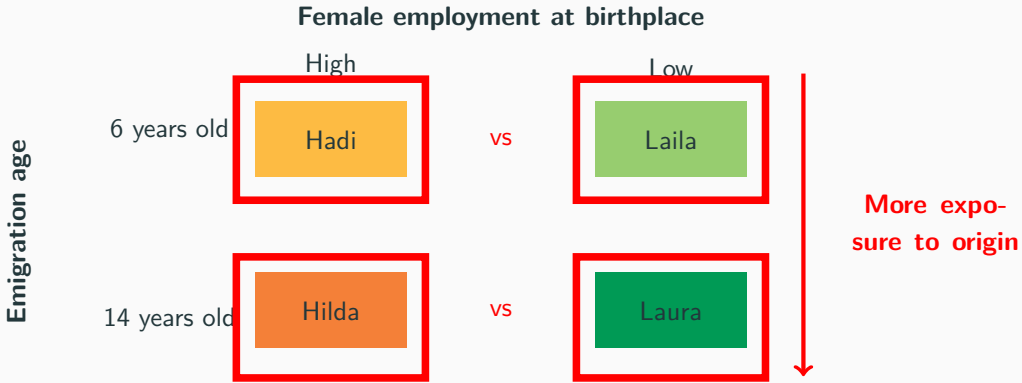

Birthplace is highly predictive of women's employment as adults

Let e_{it} be a dummy whether the woman is employed at year t:

$$e_{it} = \delta_c + \theta_t + \boldsymbol{b} p_b + X_{it}\beta + \varepsilon_{it}$$

where,

- i, c, b, and t index individual, regency of current residency, regency of birth, and time.
- δ_c: regency current residency fixed-effects.
- θ_t: year fixed-effects.
- p_b: women's employment rate in regency of birth.
- X_{it}: individual and regency-level controls.

Parameter of interest: $\boldsymbol{b} \Rightarrow$ *association* between women's birthplace and labor supply.

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Dep. var.: employed dummy	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Women's employment rate at birthplace (p_b)	0.38***	0.39***	0.35***	0.37***	0.34***	0.34***	0.29***	0.24***
	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.08)	(0.08)
Mean employment rate	0.54	0.54	0.54	0.54	0.54	0.54	0.51	0.51
Implied IQR gap	0.08	0.09	0.08	0.08	0.08	0.08	0.06	0.05
Sample	Full	Full	Full	Full	Full	Full	Known mother	Known mother
Age		✓	✓	✓	✓	✓	✓	✓
Religion			✓	✓	✓	✓	✓	✓
Education				✓	✓	✓	✓	✓
Childhood SES					✓	✓		
Siblings						✓		
Mother worked								✓
Observations	64,501	64,501	64,501	64,501	64,501	64,501	18,135	18,135
N individuals	6,115	6,115	6,115	6,115	6,115	6,115	2,640	2,640
R^2	0.10	0.12	0.13	0.14	0.14	0.14	0.14	0.14

Notes: Uses data from IFLS. When indicated, the regressions control for a quadratic polynomial in age, and fixed-effects for seven religion and for education categories. All regressions include year and regency of residence fixed-effects. Standard errors clustered by regency of origin.

- Large b: Δp_b of 22 p.p. $\Rightarrow \uparrow$ 8 p.p. in women's employment.
- There is no such persistence for men

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Birthplace and length of stay

Let e_{it} be any outcome measured in adulthood for people who left their birthplace at age a

$$e_{it} = \delta_c + \theta_t + \lambda_a + \boldsymbol{b_a} p_b + X_{it}\beta + \varepsilon_{it}$$

where,

- λ_a: age of emigration fixed effects.
- $\boldsymbol{b_a}$ captures persistence accumulated up to age a.

DiD-like identification: compares LFP differences of women (i) living in the same place, (ii) from different origin locations, but (iii) who emigrated at different ages.

Identication assumption: correlation between omitted variable bias and female employment rate is the same no matter the age of emigration.

Emigration age data: binned for the youngest ages:

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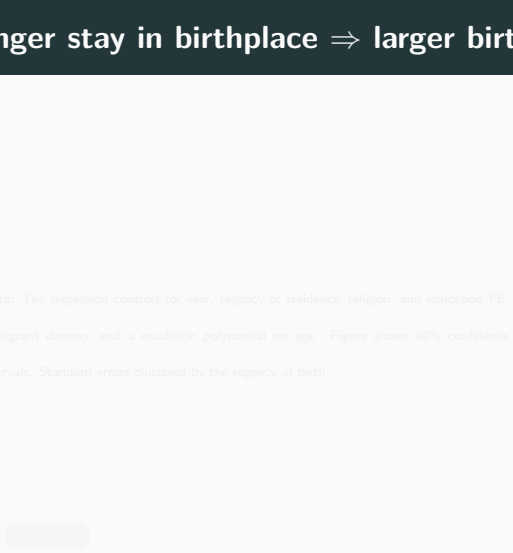
Emigration age data: binned for the youngest ages:

(i) 11 or younger (ii) 12-15 (iii) 15-16

Longer stay in birthplace ⇒ larger birthplace persistence



Note: The regression controls for year, regency of residency, religion, and education FE; a migrant dummy, and a quadratic polynomial on age. Figure shows 90% confidence intervals. Standard errors clustered by the regency of birth.

- Birthplace coefficients are **increasing** in age of migration.
- Coefficient for 11- reflects –mostly– differences in women's characteristics.
- Increase in estimates there after reflects causal effect of birthplace.
- They **fade-out** after 16 years of age.
- Similar patterns arise for other outcomes [Table].

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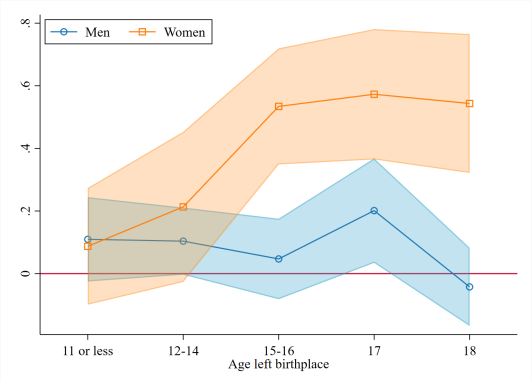

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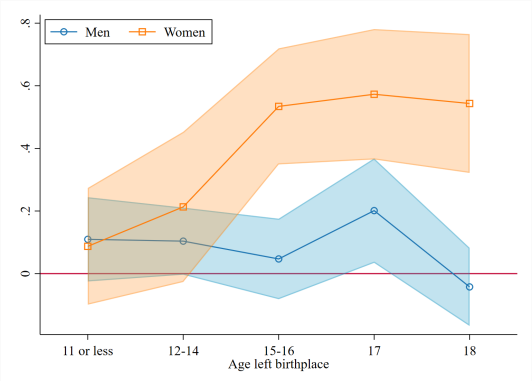

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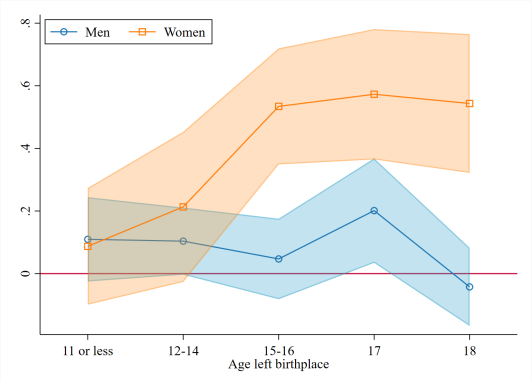

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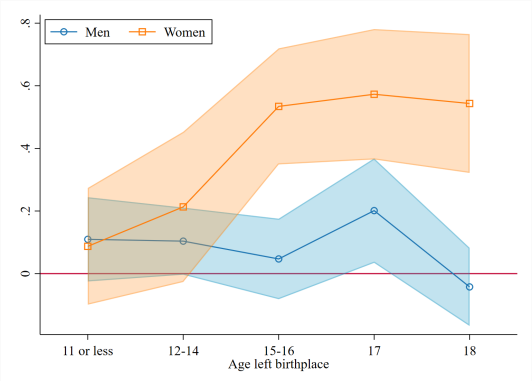

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intercensal

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Estimates imply large effects from birthplace

Figure 1: Implied gap IQR in employment rate by age of emigration ($b_a \times$ IQR)

Note: Point estimates are placed at the mean point of the respective age interval. Shaded areas show 90% confidence intervals. The figure uses data from IFLS.

- Gap of 22 p.p. in birthplace FLFP $\Rightarrow$ gap in employment of:
  - 2 p.p. at 6 years old.
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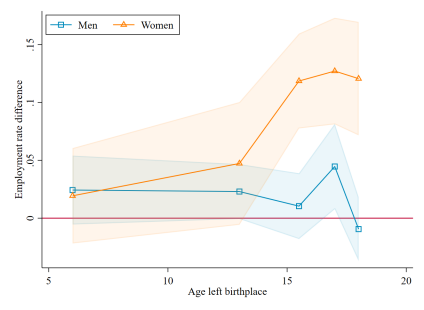

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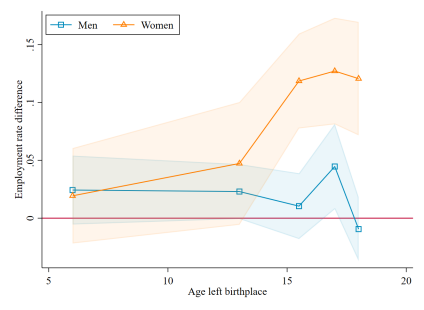

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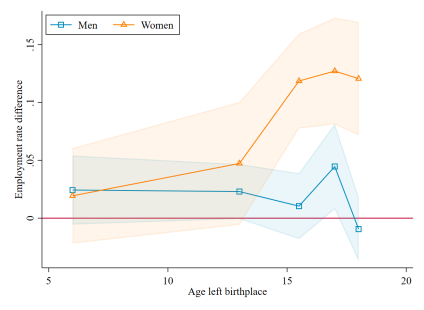

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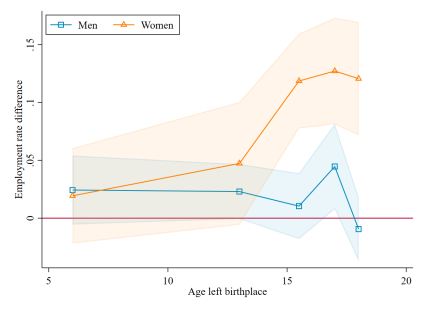

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Possible mechanisms:

- Differences in human capital accumulation. ✗
- Maternal labor supply. ✗
- Culture and social norms and differences in quality of education

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Conclusions

Conclusions

- Large and persistent influence of birthplace on women's LFP.
- Place is key during late childhood and early teens
- Approx 45% of the differences in FLFP is driven by birthplace effects.
- There is a large geographic heterogeneity in factors determining women's labor market choices.

Appendix

I get retrospective migration and work histories from the IFLS

I can build **yearly work and migration** history for 1988-2014

Migration

Respondents list all migration episodes that:

1. Are after 12 years old.
2. Crossed a village border line
3. Lasted for 6 months or longer.

⇒ I observe whether migration occurred in the first 12 years + all post-12 migration history.

Work

For each survey wave, respondents list information on:

1. Whether they worked in the each of the previous 4 years.
2. If they work, they list information on their primary and secondary job.

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back

Regency-level summary statistics

Table 1: Regency-level summary statistics

	Mean (1)	Std. Dev. (2)	Min (3)	Max (4)	Obs. (5)
Population	533,867	525,307	18,430	3,909,730	268
Share urban	0.45	0.30	0.07	1.00	268
Share migrating	0.21	0.17	0.02	0.74	268
Share with at least high school					
Women	0.32	0.15	0.06	0.80	268
Men	0.36	0.15	0.10	0.82	268
Employment rate					
Women	0.53	0.14	0.29	0.91	268
Men	0.87	0.04	0.70	0.94	268
Industry composition					
Agriculture	0.43	0.23	0.00	0.81	268
Services	0.35	0.13	0.12	0.68	268
Manufacturing	0.08	0.08	0.01	0.42	268
Construction	0.05	0.03	0.01	0.14	268

Notes: table uses information from Indonesian Census and SUSENAS 2012.

back

- There are large cross-regency differences in women's employment and industrial structure.
- Differences in men's employment rate are limited.

Migration is not just rural to urban

	Birth regency		
	Rural	Urban	Total
	(1)	(2)	(3)
Number of regencies	135	94	229
Share of IFLS women born in these regencies	0.49	0.51	100
Migration rate	0.30	0.27	0.28
A. Share of emigres living in:			
Rural regencies	0.37	0.28	0.67
Urban regencies	0.63	0.72	0.67
B. Characteristics of origin regency			
Women's employment rate			
Average	0.57	0.46	0.52
SD	0.14	0.11	0.14

Notes: Data from IFLS and IPUMS International.

- Literature in developing countries places emphasis on rural-urban migration (Hamory et al., 2021).
- But people from rural and urban areas migrate at similar rates.
- And migration flows across urban areas, and urban to rural are also important.
- Dispersion of women's employment is large *within* urban and rural areas.

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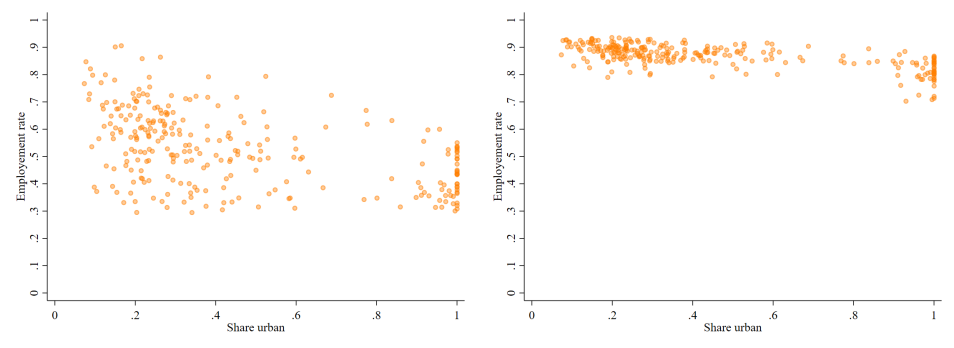
Urbanicity and women's employment rate

Figure 2: Indonesia: employment share and urbanicity, 2010

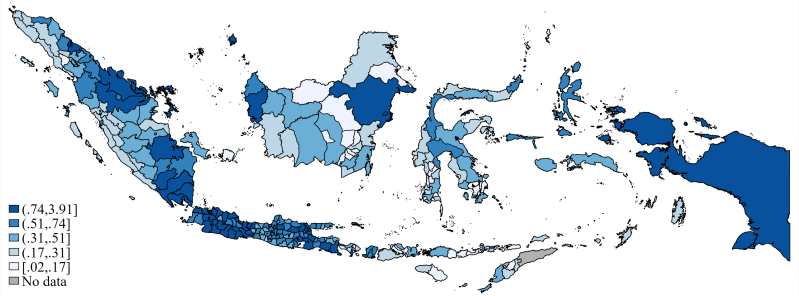


(a) Women **(b)** Men

Note: Data from 2010 Indonesian Census, IPUMS international.

back

Geographic distribution of Indonesia's population



Note: Figure uses data from the 2010 Indonesian census from IPUMS international. Population numbers in millions.

- Most populous islands are **Java, Sumatra and Sulawesi**.
- However, Java is the most densely populated.

back

Women of all marital statuses work at very different rates across Indonesia

Table 2: Regency-level dispersion in women's employment rates within demographic groups

		Marital status		Has children		Age	
	All	Single	Married	No	Yes	≤ 40	> 40
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Women	0.14	0.10	0.16	0.11	0.16	0.16	0.13
Men	0.04	0.09	0.03	0.07	0.02	0.03	0.05

Notes: This table shows the standard deviation in employment rates by gender for selected demographic groups. Data from 2010 Indonesian Census.

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back

Men's employment rates are also persistent

	(1)	(2)	(3)
Male employment rate 10 years ago	0.81		
	(0.06)		
Male employment rate 20 years ago		0.73	
		(0.07)	
Male employment rate 30 years ago			0.78
			(0.05)
Observations	800	534	268

Notes: Sample restricted to men aged 18-64. Data from IPUMS international. Robust standard errors in parenthesis.

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No such persistence for men

Dep. var.: employed dummy	(1)	(2)	(3)	(4)
Women's employment rate at birthplace (p_b)	0.01	0.04	0.05*	0.04
	(0.03)	(0.03)	(0.03)	(0.03)
Mean employment rate	0.90	0.90	0.90	0.90
Implied IQR gap	0.00	0.01	0.01	0.01
Year FE	✓	✓	✓	✓
Regency FE	✓	✓	✓	✓
Age		✓	✓	✓
Religion			✓	✓
Education				✓
Observations	60,126	60,126	60,126	60,126
N individuals	6,293	6,293	6,293	6,293
R^2	0.05	0.17	0.17	0.18

Notes: Uses data from IFLS. Sample restricted to people residing outside their birthplace. When indicated, the regressions control for a quadratic polynomial in age, and fixed-effects for seven religion and for education categories. Standard errors clustered by regency of origin.

- For men: Δp_b of 22 p.p. $\Rightarrow$ less than $\uparrow$ 1 p.p. in men's employment.

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	(0.03)	(0.03)	(0.03)	(0.03)
Mean employment rate	0.90	0.90	0.90	0.90
Implied IQR gap	0.00	0.01	0.01	0.01
Year FE	✓	✓	✓	✓
Regency FE	✓	✓	✓	✓
Age		✓	✓	✓
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Education				✓
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No systematic difference in women's characteristics by age of emigration

Note: Data on reasons for emigrating is available only for people emigrating at 12 years old or older. Error clustered by regency of birth. The figure shows 90% confidence intervals. Data from the IFLS.

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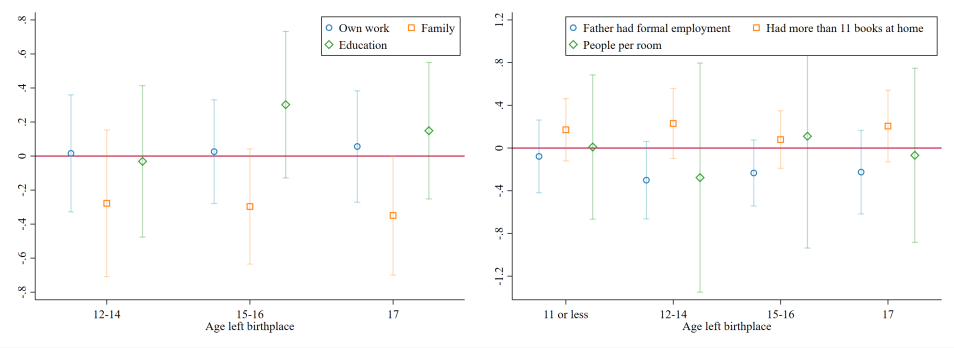

(e) Reason of migration **(f)** Wealth and human capital proxies

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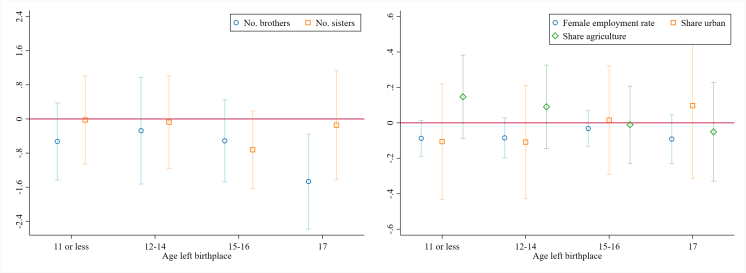
more variables back

Support for identification strategy

Figure 3: Indonesia: women and selection by age of emigration in the IFLS



(a) Number of siblings **(b)** Characteristics of destination

Note: Data on reasons for emigrating is available only for people emigrating at 12 years old or older. Error clustered by regency of birth. The figure shows 90% confidence intervals.

Data from the IFLS.

Similar results under alternative labor supply measures

	Employed	Paid worker	Weekly hours	Full-time
	(1)	(2)	(3)	(4)
Birthplace female employment rate (p_b)	0.36***	0.27***	15.52***	0.22***
	(0.04)	(0.04)	(3.14)	(0.06)
Mean outcome	0.54	0.44	18.61	0.31
Observations	64,727	64,727	19,900	19,900
N individuals	6,133	6,133	2,791	2,791
R^2	0.14	0.11	0.14	0.11

Notes: All regressions control for year, regency of residency, religion, and education FE, and a quadratic polynomial on age. Standard errors clustered by the regency of birth. Uses data from IFLS..

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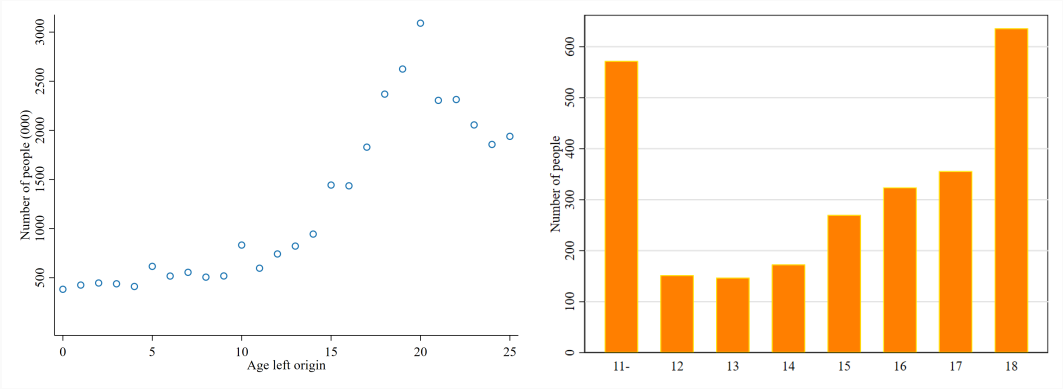
Large migration flows start around 18



(c) Intercensal Survey

(d) IFLS

Note: Data from the IFLS and the Intercensal Survey.

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Persistence also arises for women who emigrated when young

- Emigrants who left **before** they turned 19 are less likely to be working at the time of migration.

	Women		Men	
	Baseline	Young	Baseline	Young
	(1)	(2)	(3)	(4)
Women's employment rate at birthplace (p_o)	0.36***	0.39***	0.04	0.08*
	(0.04)	(0.06)	(0.03)	(0.04)
Mean	0.54	0.52	0.90	0.86
Implied IQR gap	0.08	0.09	0.01	0.02
Age at emigration	All	< 19	All	< 19
Observations	64,727	27,977	60,119	23,016
N individuals	6,133	2,629	6,291	2,389
R^2	0.14	0.16	0.18	0.25

Notes. All regressions controls for year, regency of residency, religion, and education FE, and a quadratic polynomial on age. Standard errors clustered by the regency of birth. Uses data from IFLS.

Back

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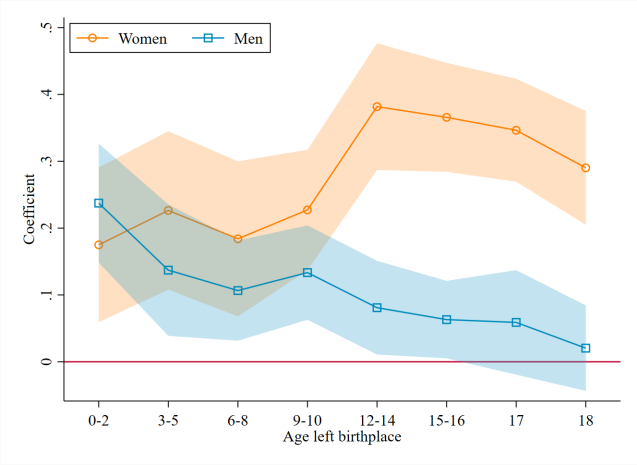
Intercensal survey places effects in a similar age window



Note: The table restricts the sample to people residing outside their birthplace. All regressions control for education FE; and a quadratic polynomial on age. Data from the 1985, 1995, and 2005 intercensal surveys.

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Similar results with other labor supply measures

	Employed (1)	Paid worker (2)	Weekly hours (3)	Full time (4)
Age of emigration interactions				
11- $\times$ p_b	0.09	-0.00	13.96	0.19
	(0.11)	(0.11)	(11.04)	(0.20)
12-14 $\times$ p_b	0.21	-0.01	15.03	0.28
	(0.15)	(0.15)	(10.94)	(0.21)
15-16 $\times$ p_b	0.53***	0.41***	10.84	0.14
	(0.11)	(0.11)	(8.93)	(0.17)
17 $\times$ p_b	0.57***	0.42***	20.84**	0.35*
	(0.13)	(0.14)	(8.44)	(0.19)
18 $\times$ p_b	0.54***	0.59***	31.97***	0.41**
	(0.13)	(0.12)	(9.34)	(0.18)
Observations	27,977	27,977	8,599	8,599
No. individuals	2,629	2,629	1,156	1,156
No. migrants	2,629	2,629	1,156	1,156
r2	0.16	0.13	0.17	0.15

Notes: I define full-time work as working more than 35 hours per week. Weekly hours data is not available for waves 4 and 5 of the IFLS. This substantially reduces the sample in columns (4) and (5). Table restricts the sample to people residing outside their birthplace with known age of outmigration. All regressions control for religion, and education FE; and a quadratic polynomial on age. Data from the ILFS.

Identification assumption: constant omitted variable bias

Estimate of will reflect causal effect accumulated up age a (σ_a) and omitted variable bias γ_a.

$$\hat{b}_a = \sigma_a + \gamma_a \quad (1)$$

γ_a: driven by correlation between omitted variable and birthplace employment rate.

Identication assumption: omitted variable bias is independent from emigration age: $\gamma_a = \gamma$.

$\Rightarrow$ Differences in characteristics that I do not control across women of different origins is the **same** no matter the age they left their birthplace.

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