

# Preschool Availability and Female Labor Force Participation: Evidence from Indonesia

Daniel Halim  
World Bank

Hillary C. Johnson  
World Bank

Elizaveta Perova  
World Bank

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# Motivation

- Provision of early-childhood education is a central policy debate in many countries
  
- Potential benefits of preschools:
  1. Long-term benefits on children attending preschools, especially from lower SES (e.g. [Havnes & Mogstad 2015](#), [Garcia et. al. 2016](#), [Chang et. al. 2016](#))
  2. Mothers can participate in the workforce?
    - Low female labor force participation in Indonesia, in 2003 = 48.8 percent
      - » vs. East Asia & Pacific = 68.5 percent
      - » vs. Upper Middle Income = 63.0 percent

# Preschools on maternal employment

- Preschools may free up mothers' time to enter the labor market (e.g. [Berlinski and Galiani 2007](#), [Baker et. al. 2008](#), [Schlosser 2011](#))

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## BUT ...

- Preschools can be costly
- Substitutability of preschools and informal childcare arrangements ([Havnes and Mogstad 2011](#))
- Norms may favor keeping children at home ([Myers 1995](#))
- Female labor supply elasticity may vary across time and contexts ([Fitzpatrick 2010](#))
- Depends on preschool utilization and female labor force participation rates ([Lundin et. al. 2008](#), [Bauernschuster and Schlotter 2015](#))

# This Paper

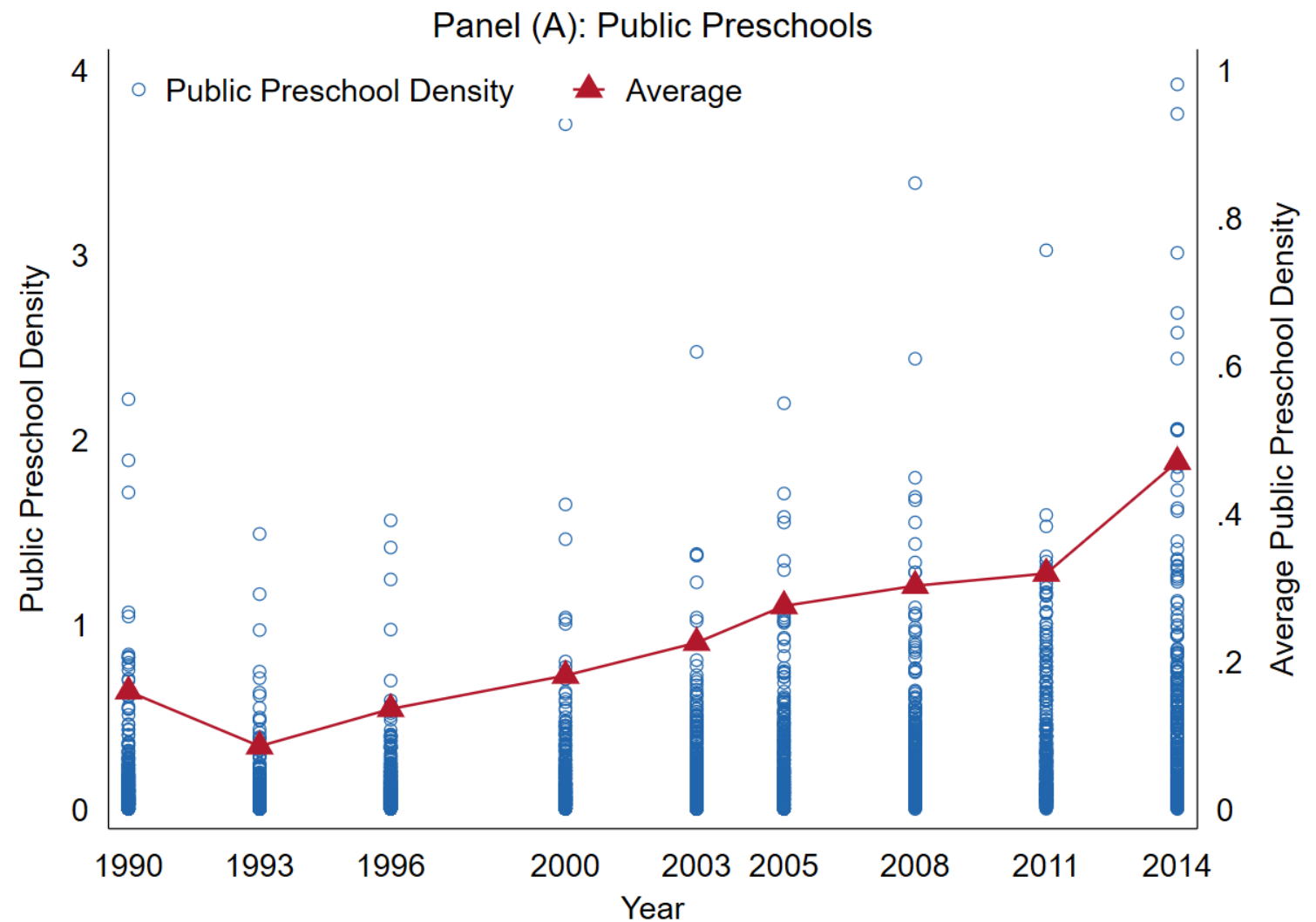
## Research Questions

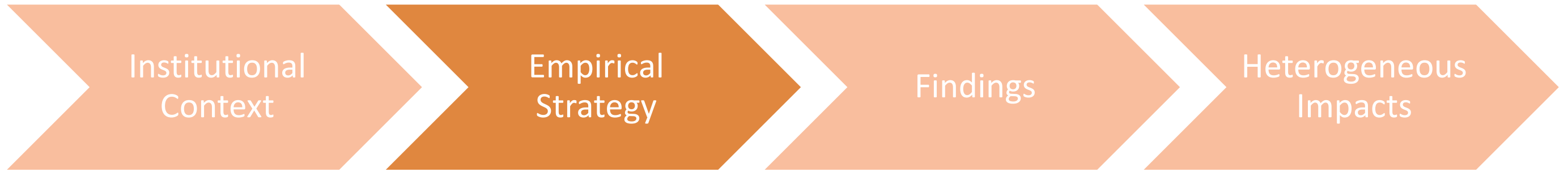
- Does preschool access improve maternal employment in Indonesia?
- Does it shift women to “better” jobs?
- Use IFLS panel data from Indonesia (1993-2014)



# Public preschool expansion in Indonesia

- Indonesia passed the National Education System Act in 2003 to increase preschool enrollment
- Preschools (TK) operate daily (5-6 days/week) for 3-hours/day
- Enrollment rates increased from 25% in 2003 to 60% in 2016



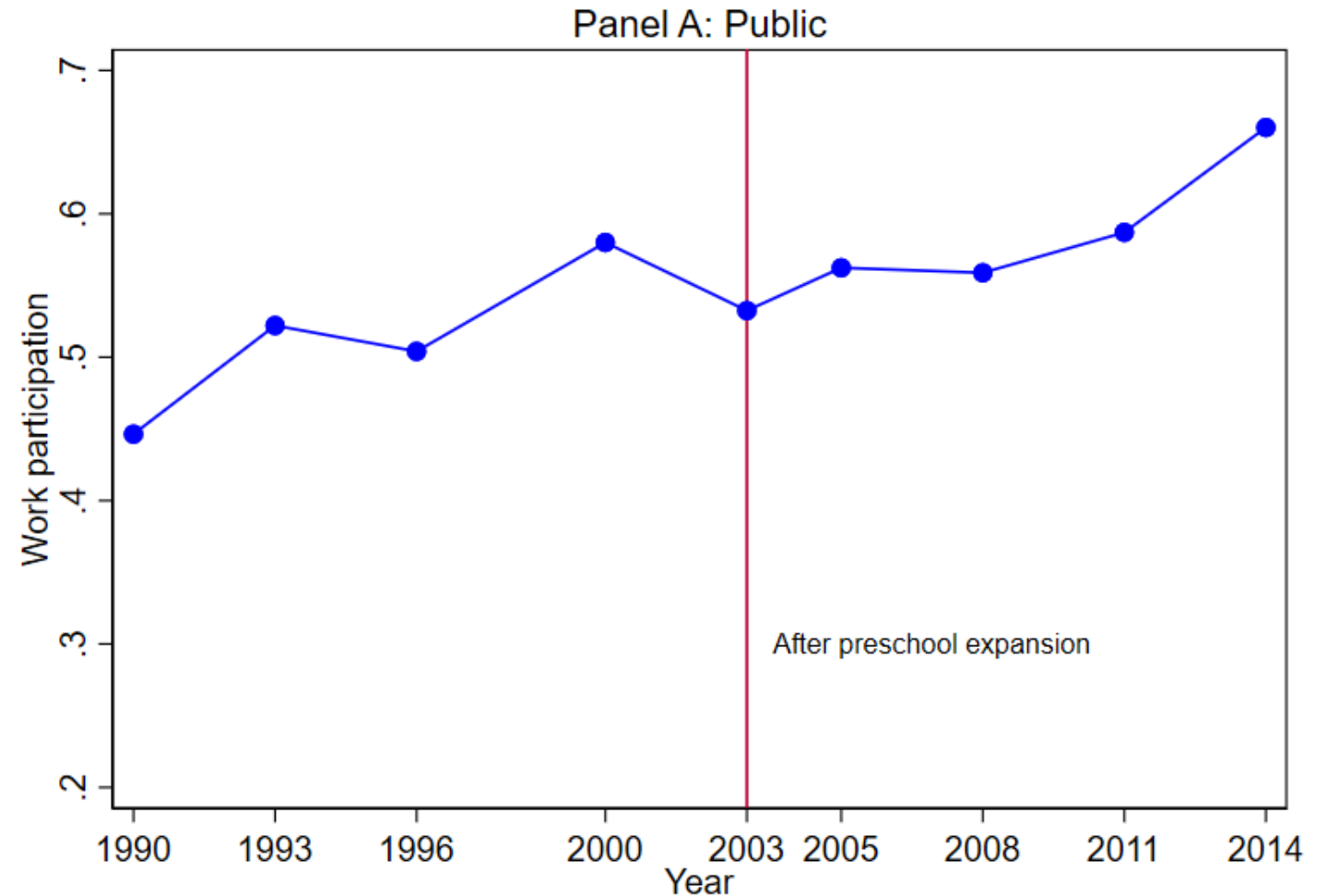


**How to causally identify the effect of public preschool expansion on mother's work participation?**



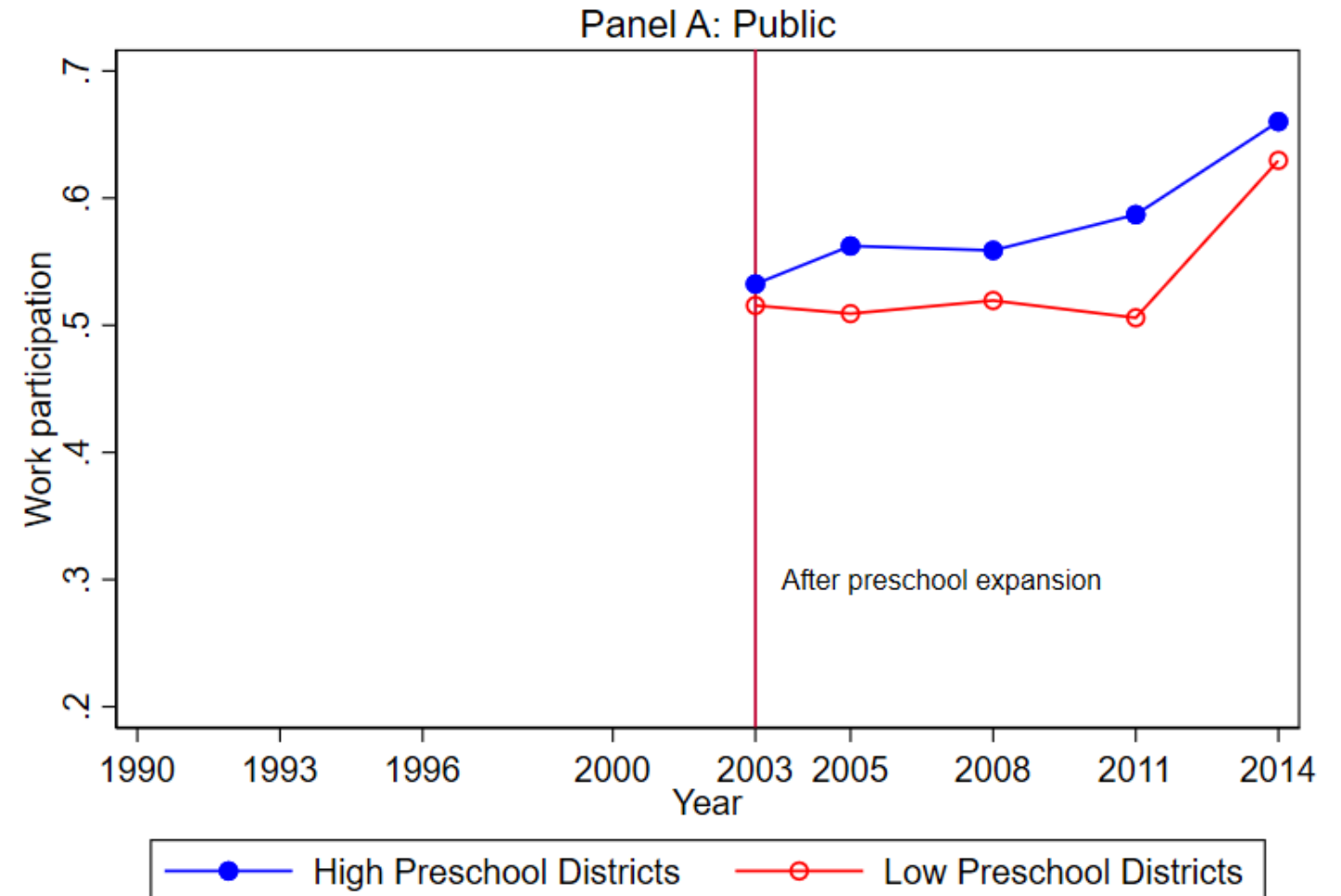
# 1: Compare **before** and **after** preschool expansion

- Many other things happened between 1990 and 2014
  - Financial Crisis in 1998
  - Other government programs
- Can't attribute increase in maternal employment **solely** due to preschool expansion



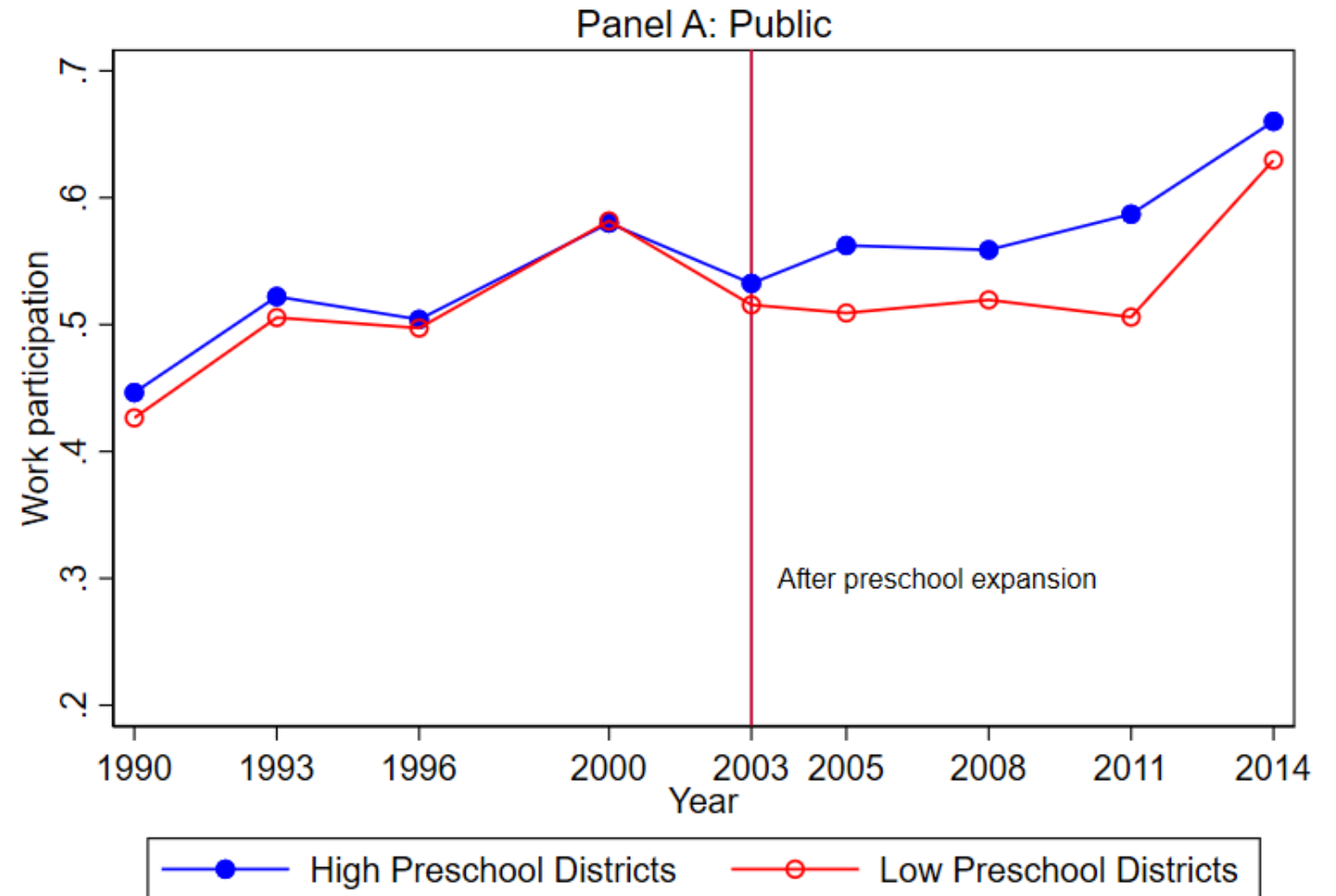
## 2: Compare areas that build **many** vs **less** preschools

- Inherent differences between regions
  - Cultural norms
  - Local labor market shocks
- Can't attribute increase in maternal employment **solely** due to preschool expansion



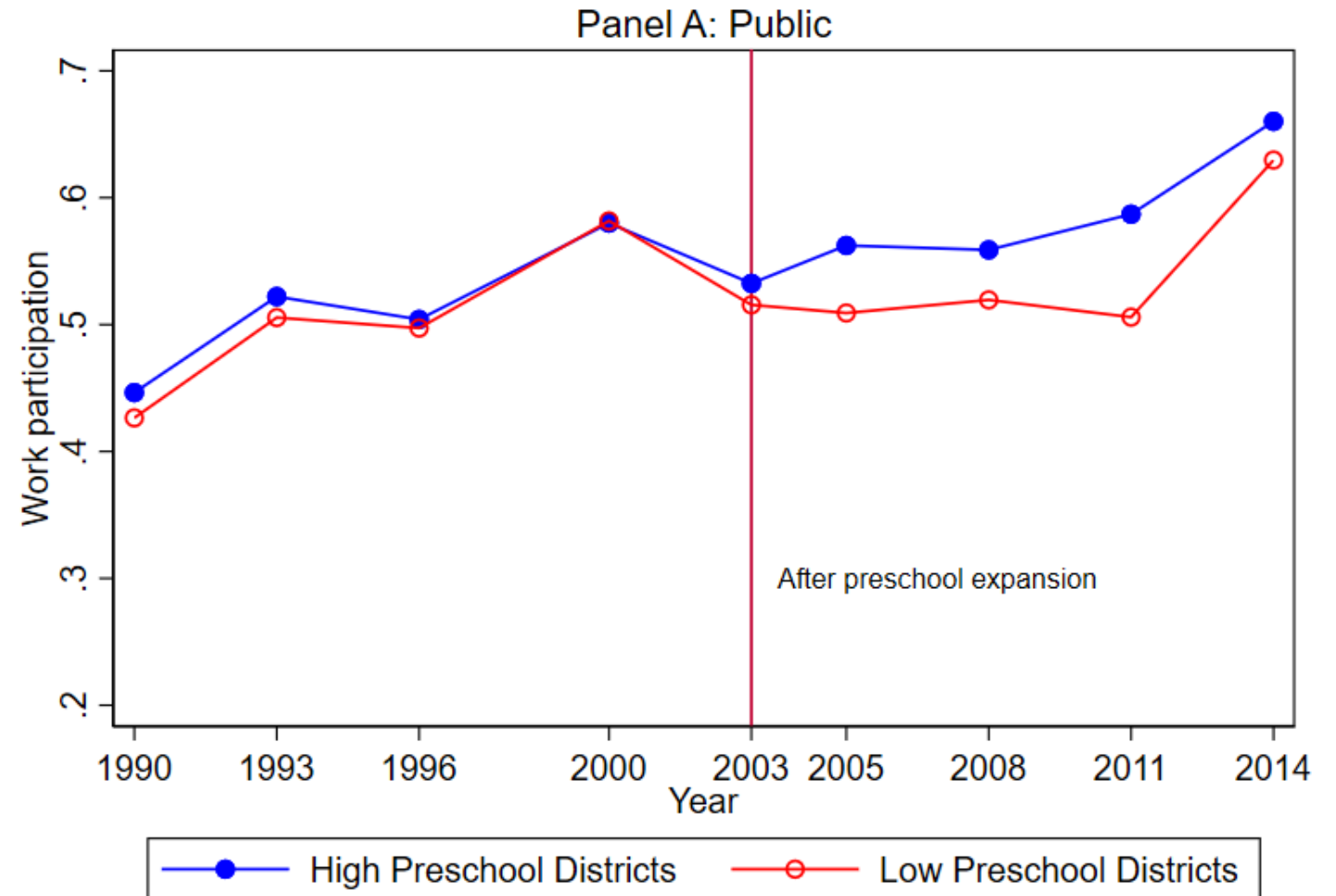
# Difference-in-differences

- Two wrongs make a right
- Compare **before** and **after** preschool expansion
- Compare areas that build **many** vs. **less** preschools
- Remove concerns:
  - Financial Crisis in 1998
  - Other government programs
  - Cultural norms
  - Local labor market shocks



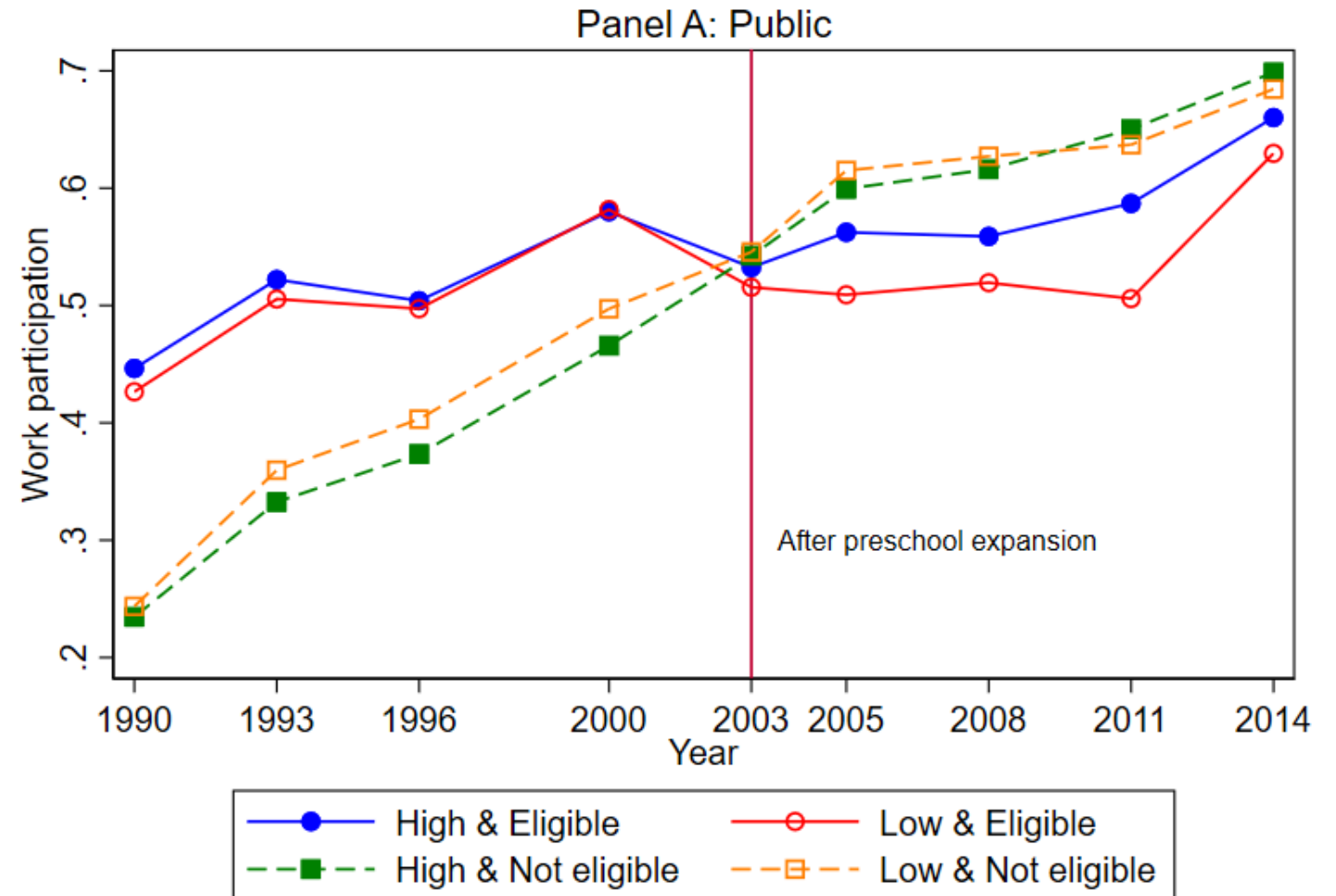
# Difference-in-differences

- Two wrongs make a right
- Compare **before** and **after** preschool expansion
- Compare areas that build **many** vs. **less** preschools
- Still worry that government build more preschools in areas that have higher or lower female LFP



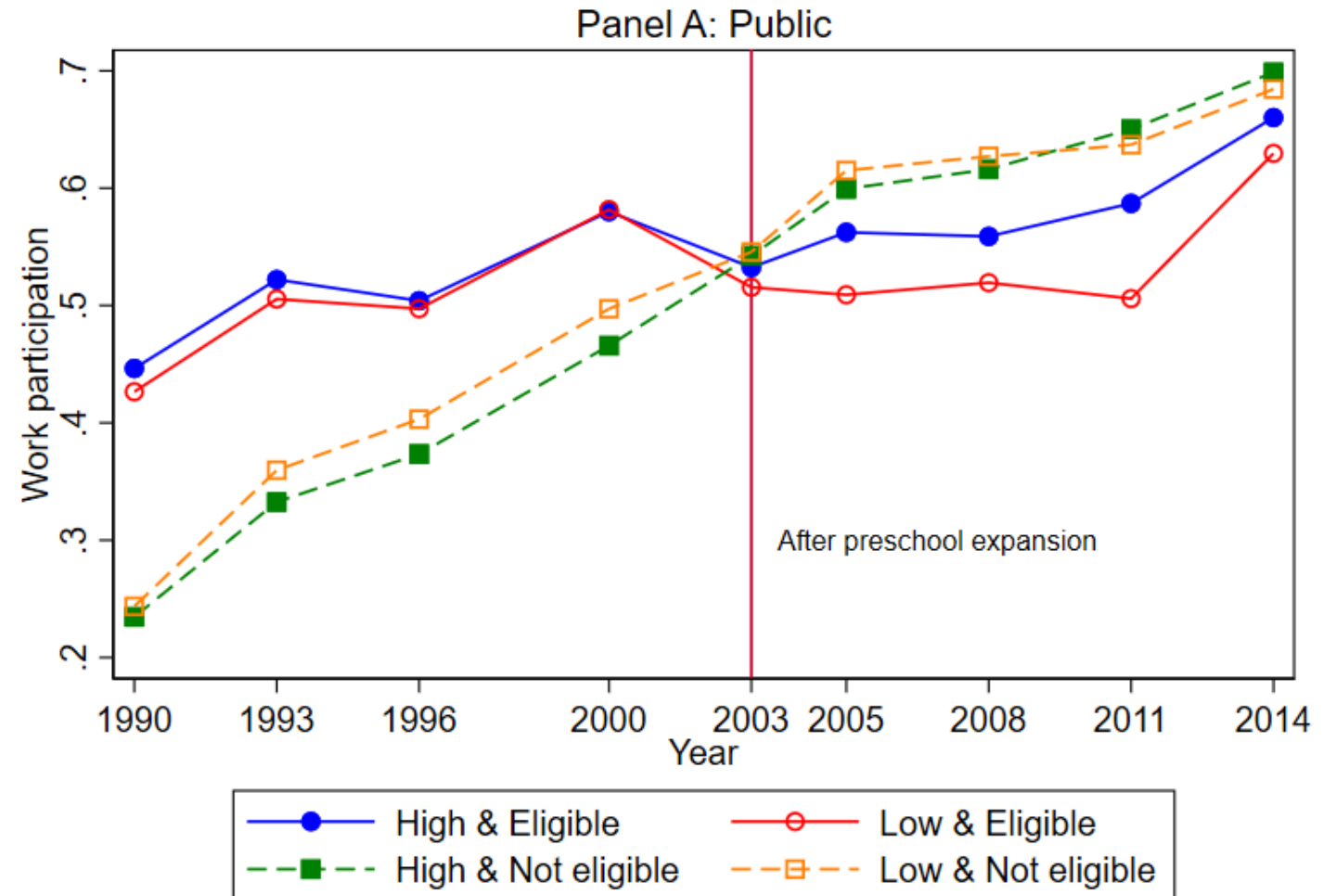
# Difference-in-difference-in-differences (DDD)

- Compare across mothers **with** and **without** preschool-aged kids
- Remove concerns that **all** mothers in areas that build many preschools are more likely to work



# Difference-in-difference-in-differences (DDD)

- Compare across mothers **with** and **without** preschool-aged kids
- Remove concerns that **all** mothers in areas that build many preschools are more likely to work
- Can **isolate** increase in maternal employment **solely** due to preschool expansion





# Public preschools increase mothers' work participation

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(1)  
Work  
participation

---

Public preschool  
density \* Eligible  
child      0.048\*\*\*  
                  (0.017)  
                  [0.026]

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Observations      226,400

Dep. Var. Mean      0.520

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## ... but as unpaid family workers

	(1)	(2)	(3)	(4)	(5)	(6)
	Work	Has a side	Self-	Government	Private	Family
	participation	job	employed	employee	employee	worker
Public preschool density * Eligible child	0.048*** (0.017) [0.026]	-0.002 (0.009) [0.899]	0.010 (0.011) [0.899]	-0.001 (0.008) [0.899]	-0.003 (0.010) [0.899]	0.042*** (0.012) [0.004]
Observations	226,400	225,985	226,400	226,400	226,400	226,400
Dep. Var. Mean	0.520	0.077	0.172	0.037	0.185	0.125

# Working mothers do not 'upgrade' their sector of work

	(1)	(2)	(3)
Sector	Primary	Secondary	Tertiary
Public preschool density *	0.004	-0.003	-0.010
Eligible child	(0.021)	(0.010)	(0.019)
	[0.845]	[0.845]	[0.845]
Observations	121,367	121,367	121,367
Dep. Var. Mean	0.194	0.095	0.323

# Working mothers do not earn more, nor work longer

	(1)	(2)	(3)	(4)
	Salary	Net Profit	Earned Income	Work Hours
Public preschool density *	-0.039	0.033	-0.012	-0.025
Eligible child	(0.139)	(0.143)	(0.101)	(0.037)
	[0.907]	[0.907]	[0.907]	[0.907]
Observations	20,193	17,804	37,523	48,537
Dep. Var. Mean	4.42	4.67	4.58	37.89

Note: Dependent variables in column (1)-(3) are logged in the regression, while means are reported in Rp 1 million increments. Data limited to IFLS years.



# The effect of preschools is bigger in areas with low preschool enrollment

	Dep. Var.: Work Participation		
	(1)	(2)	(3)
Preschool utilization	< 20%	20-40%	> 40%
Public preschool density *	0.111***	0.061**	-0.066
Eligible child	(0.030)	(0.030)	(0.196)
Observations	23,076	11,982	2,489
Dep. Var. Mean	0.583	0.639	0.583

Note: Data limited to PODES years with preschool enrollment data.

# The effect of preschools seems to be U-shaped w.r.t. mother's education

	Dep. Var.: Work Participation			
Mother's education	(1) < Primary	(2) Primary	(3) Lower Secondary	(4) > Upper Secondary
Public preschool density *	0.049*	0.054**	0.011	0.052*
Eligible child	(0.029)	(0.026)	(0.032)	(0.028)
Observations	58,976	61,541	35,362	67,034
Dep. Var. Mean	0.613	0.514	0.441	0.494

# Conclusion

- Additional public preschool per 1,000 children increases mothers' work participation by **9.2 percent**
- Mothers are more likely to be **unpaid family workers**
- But the pathway to “better” jobs for women needs more than building preschools
  - No change in occupations/sectors
  - No change in work hours
  - Not more likely to claim ‘work’ as main activity
  - No change in income
- The design of preschools, such as duration, will likely influence the type of jobs that women can access

# Thank you!

Daniel Halim

[dhalim@worldbank.org](mailto:dhalim@worldbank.org)

Hillary C. Johnson

[hjohnson1@worldbank.org](mailto:hjohnson1@worldbank.org)

Elizaveta Perova

[eperova@worldbank.org](mailto:eperova@worldbank.org)

<https://www.worldbank.org/en/programs/east-asia-and-pacific-gender-innovation-lab>



# Appendix slides

# Related Literature

- ECED on female labor supply

- **High/Upper middle income**

Argentina (Berlinski et. al. 2011), Canada (Baker et. al. 2008, Lefebvre & Merrigan 2008), Chile (Martínez & Perticará 2017), France (Goux & Maurin 2010), Germany (Bauernschuster & Schlotter 2015), Italy (Carta & Rizzica 2018), Netherlands (Bettendorf et. al. 2015), Norway (Havnes & Mogstad 2011), Spain (Nollenberger & Rodriguez-Planas 2015), Sweden (Lundin et. al. 2008), Switzerland (Felfe et. al. 2016), US (Cascio 2009, Gelbach 2002, Fitzpatrick 2010)

- **Lower middle/Low income** (\* at the time of rollout/expansion)

China (Du & Dong 2013), Colombia (Attanasio & Vera-Hernandez 2004), Ecuador (Rosero & Oosterbeek 2011), Ghana (Quisumbing et. al. 2007), Guatemala (Hallman et. al. 2005), India (Jain 2016), Kenya (Lokshin et. al. 2004), Romania (Lokshin & Fong 2006), Vietnam (Dang et. al. 2019)

- Women as unpaid family workers

Goldin 1995, Costa 2000, Thomas et. al. 2000, Kabeer 2012, Koolwal & van de Walle 2013, Schaner & Das 2016

# Empirical Strategy

**Challenge:** preschool availability likely endogenous to FLFP

**Strategy:** triple differences (DDD)

- Exploit variation in preschool availability across **regions** and over **time**
- Exposure to preschool access is jointly determined by preschool availability at the time **child is of preschool age** (age 3-6) – “eligible” mothers
- Identification assumptions
  - The difference in employment trends of eligible mothers and non-eligible mothers are not systematically different across high and low-growth areas.
  - Preschool availability does affect the likelihood of having an eligible child

# Econometric specification

$$y_{ijt} = \alpha + \beta TK_{jt} \cdot Eligible_{it} + \gamma TK_{jt} + \delta Eligible_{it} + age_{it} + \psi \mathbf{X}_{ijt} + \mu_j + \phi_t + \varepsilon_{ijt}$$

- $y_{ijt}$  - employment outcome of female  $i$  in district  $j$  in year  $t$
- $TK_{jt}$  - number of preschools per 1,000 children in district  $j$  in year  $t$
- $Eligible_{it}$  - woman has at least 1 child aged 3-6
- $age_{it}$  - age fixed effect
- $\mathbf{X}_{ijt}$  is a vector of time-variant individual characteristics: urban residence, number of non-eligible children: ages 0-2 and 7-18
- $\mu_j$  and  $\phi_t$  - district and year fixed effects
- Standard errors clustered at district-level

# Data

## Indonesian Family Life Survey

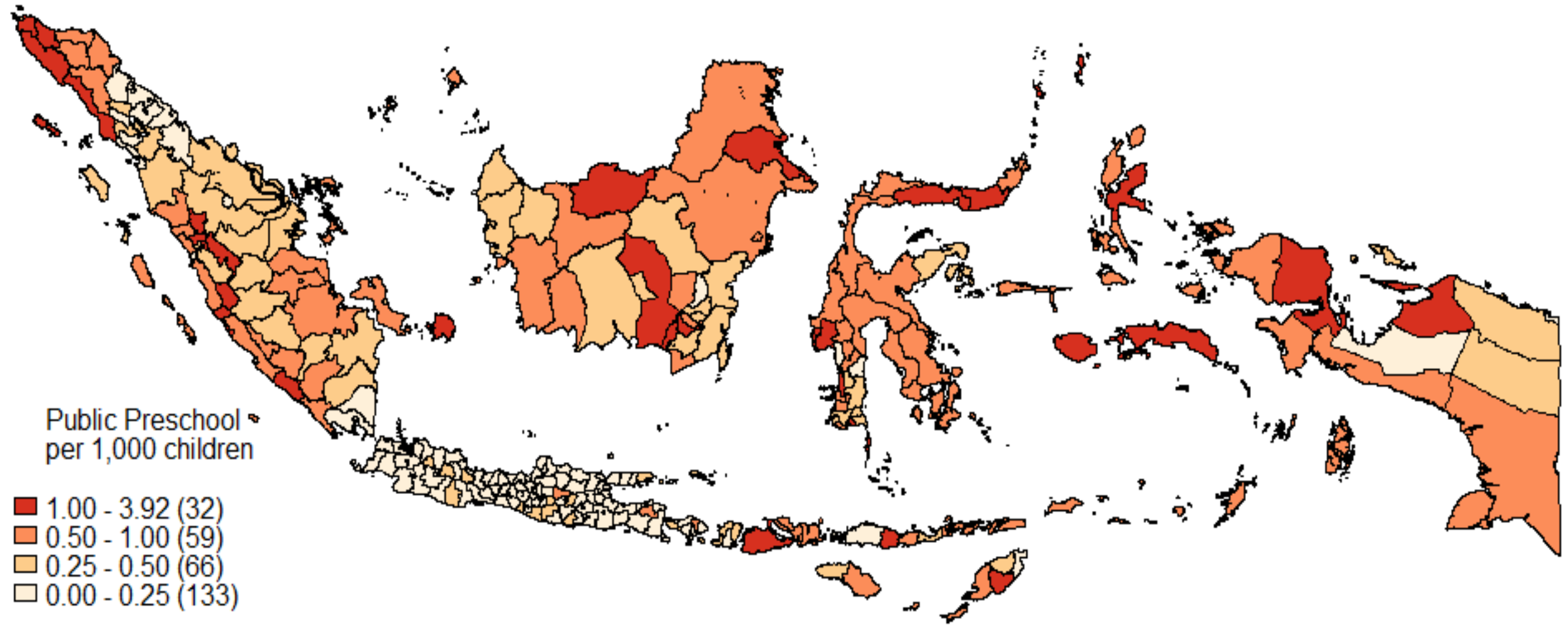
- Representative of 83% of Indonesian population
- 5 rounds between 1993 – 2014 (87.8% re-contacted)
- Restricted to ever married women age 19-45 in at least 2 rounds, with  $\geq 1$  pregnancy in 1993-2014 (N = 10,340)
- Recall history of employment and pregnancies
- Children do NOT need to live in the same household

- Village Census (PODES) number of public and private preschools
- National Socioeconomic Survey (SUSENAS) population of children aged 3-6
- Aggregated to districts as they existed in 1993
  - Districts responsible in allocating public goods

# Summary statistics

	Obs	Mean	SD
<b>Panel A: Individual-year means</b>			
Age	227,579	31.57	11.20
Have preschool-aged child	227,579	0.30	0.46
Work participation	227,559	0.52	0.50
Urban	227,579	0.51	0.50
<b>Panel B: Individual means</b>			
Number of surveys	10,340	3.54	1.13
Number of years	10,340	22.01	5.00
Age of first marriage	10,329	20.23	4.59
Age of first birth	10,337	22.13	4.52
Number of children	10,340	2.74	1.59
Years of education	10,140	7.75	4.39
<b>Panel C: District-year means (PODES years only)</b>			
Public preschool density	2,559	0.24	0.35
Private preschool density	2,559	4.18	3.24

# Spatial distribution of public preschools



# Preschools do not lead to a change in occupation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Professional	Manager	Clerk	Sales	Service	Agricultural	Production
Public preschool density *	-0.008	-0.003*	-0.011	-0.028*	0.017	0.020	0.001
Eligible child	(0.013)	(0.001)	(0.007)	(0.016)	(0.014)	(0.019)	(0.014)
	[0.926]	[0.534]	[0.534]	[0.534]	[0.902]	[0.916]	[0.926]
Observations	124,696	124,696	124,696	124,696	124,696	124,696	124,696
Dep. Var. Mean	0.075	0.003	0.044	0.223	0.150	0.319	0.114



# Preschools do not change mothers' main activity

	(1)	(2)	(3)	(4)
	Working	Job searching	Attending school	Housekeeping
Public preschool density *	-0.004	-0.001	-0.008	0.015
Eligible child	(0.021)	(0.002)	(0.005)	(0.022)
	[0.860]	[0.860]	[0.508]	[0.860]
Observations	36,287	37,223	37,223	37,223
Dep. Var. Mean	0.446	0.008	0.038	0.491

# Preschools have bigger effects for mothers with fewer children

	Dep. Var.: Work Participation					
Birth order:	(1) First	(2) Second	(3) Third	(4) Fourth	(5) Fifth	(6) Sixth
Public preschool density * Eligible child	0.075*** (0.020) [0.001]	0.084*** (0.024) [0.002]	0.050* (0.026) [0.198]	0.022 (0.037) [0.558]	-0.025 (0.043) [0.558]	-0.056 (0.071) [0.558]
Observations	226,400	187,376	110,371	57,258	28,857	15,460
Dep. Var. Mean	0.520	0.526	0.538	0.550	0.555	0.558

# Annual cost of attendance

	Private		Public		Private - Public
	Mean	SD	Mean	SD	
Registration fee	15.47	(38.58)	6.19	(13.53)	9.27***
Other scheduled fees	12.92	(33.79)	4.80	(8.86)	8.12***
Exam fees	0.23	(1.66)	0.01	(0.05)	0.22**
Books/writing supplies	5.57	(11.16)	2.61	(5.24)	2.95***
Uniform and sports supplies	5.54	(10.35)	5.16	(8.35)	0.38
Transportation costs	3.87	(18.50)	0.25	(1.57)	3.63***
Food/housing costs	13.96	(29.43)	9.40	(15.98)	4.57
Special courses	0.93	(13.70)	0.00	(0.00)	0.93
Other school expenses	1.22	(7.14)	0.00	(0.00)	1.22***
Observations	430		76		506

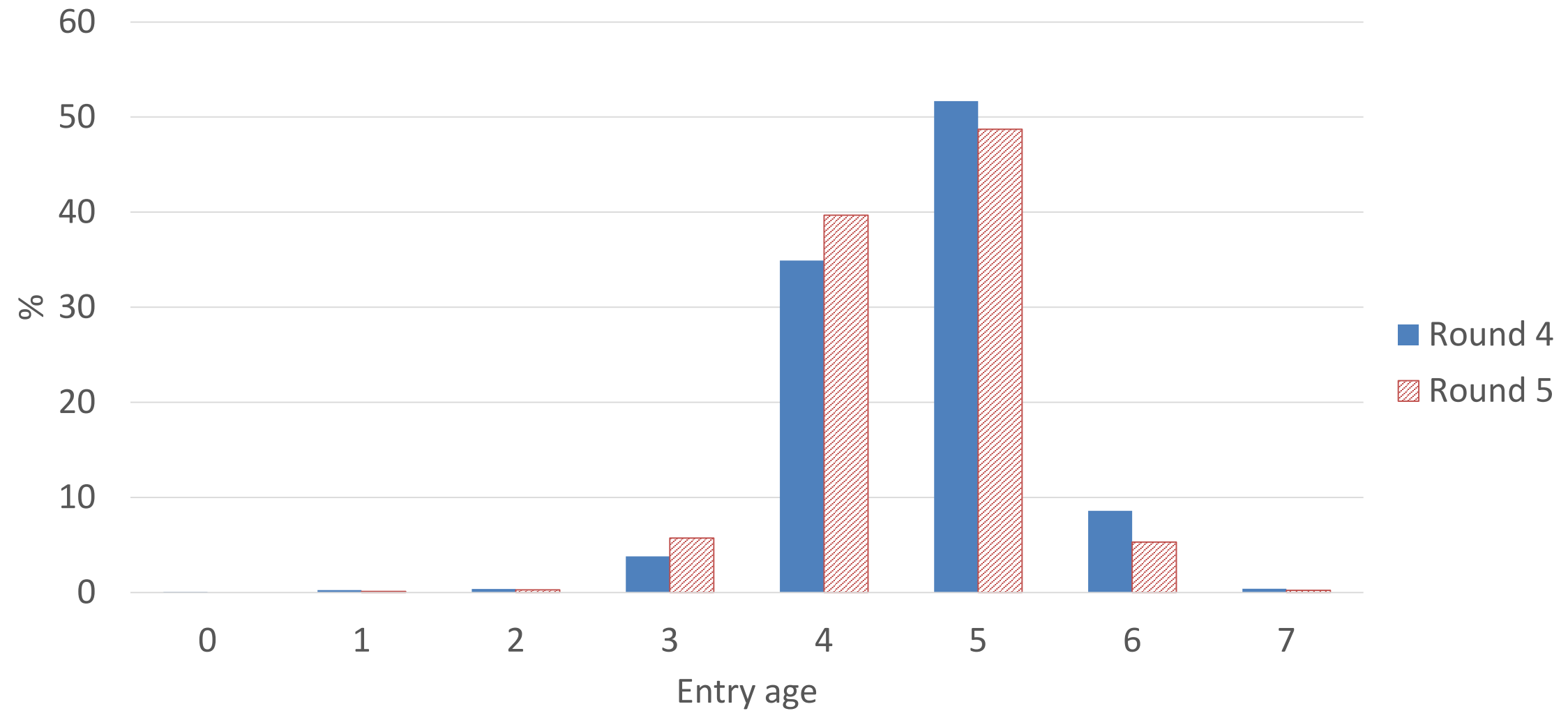
# Sorting for better preschool access

	(1)	(2)	(3)	(4)
	<u>Net migration of mothers with preschool-aged kids</u>			
Net density change in private preschool	0.087 (0.055)			
Net density change in public preschool		-0.688 (0.476)		
Lag Net density change in private preschool			-0.067 (0.055)	
Lag Net density change in public preschool				0.102 (0.474)
Observations	1,733	1,733	1,732	1,732

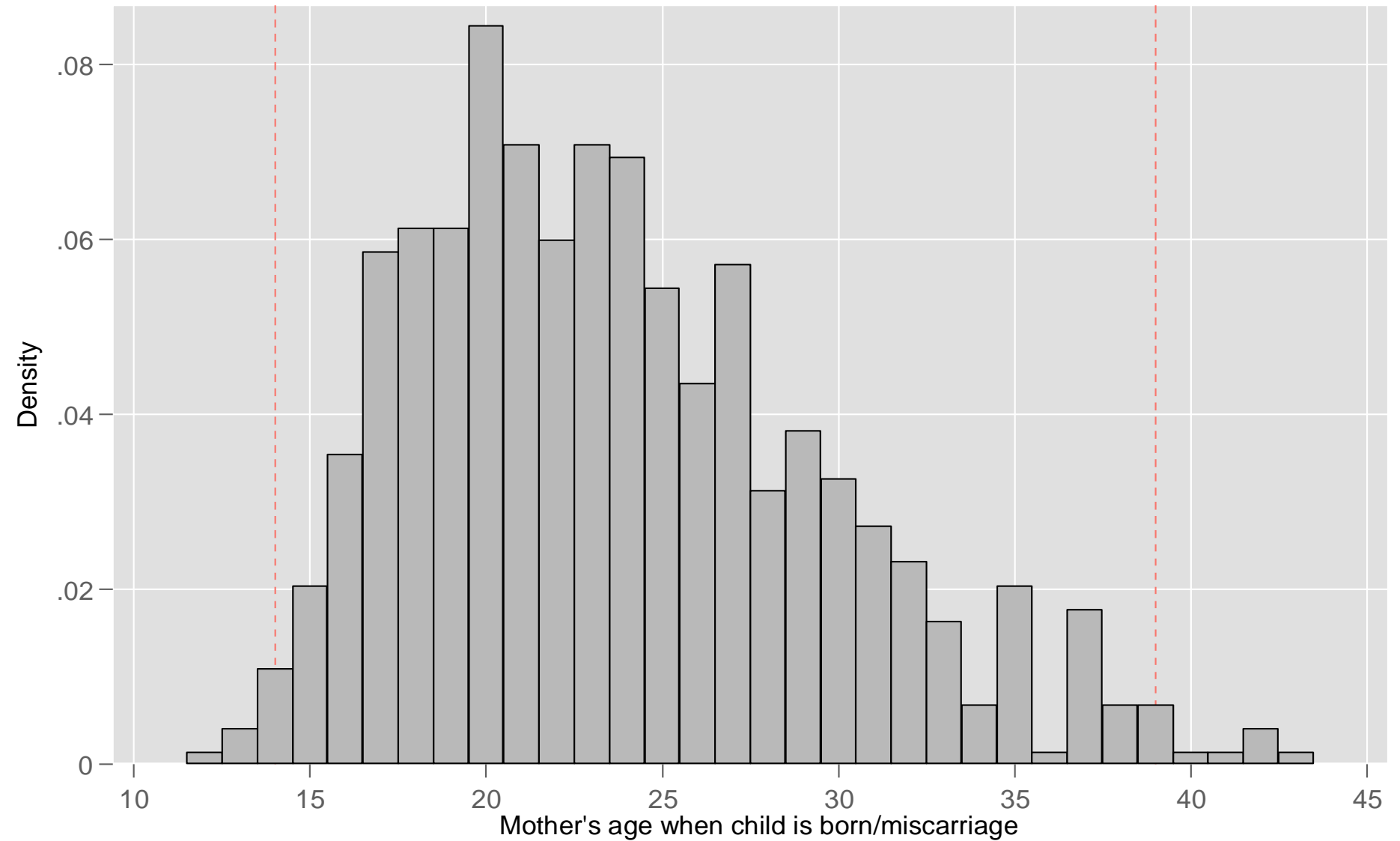
# Correlation with other village characteristics

	Public Preschool
City	0.017*** (0.003)
Post office	0.009*** (0.002)
Public library	-0.003* (0.002)
Population density	-0.000 (0.000)
Enrollment (age 7-15)	-0.001 (0.001)
Permanent housing	-0.022*** (0.003)
Certificate of poverty	0.046*** (0.010)
Asphalt/solid road	0.004*** (0.001)
Frac. HH in agriculture	-0.010*** (0.003)
Observations	65,308

# Age to enter kindergarten



# Mother's age when child is born



Source: IFLS 1 (1993). Note: dashed lines indicate 1st and 99th percentiles.

# Top-2 occupations

	N	%
<b><u>Professionals</u></b>		
Teachers	7,073	67.43
Nurses, midwives, x-ray technicians, traditional medicine	1,500	14.30
<b><u>Managers</u></b>		
Managers	236	69.62
Administrator unknown	44	12.98
<b><u>Clerical workers</u></b>		
Bookkeepers, cashiers, and related workers	2,965	43.53
Clerical and related workers not elsewhere classified	1,983	29.11
<b><u>Sales workers</u></b>		
Salesmen, shop assistants and related workers	26,727	82.50
Working proprietors (wholesale and retail trade)	4,298	13.27
<b><u>Service workers</u></b>		
Maids and related housekeeping service workers NEC	10,027	42.48
Working proprietors (catering and lodging services)	7,068	29.94
<b><u>Agricultural workers</u></b>		
Agricultural and animal husbandry workers	37,450	92.52
Planters and farmers	1,110	2.74
<b><u>Production workers</u></b>		
Tailors, dressmakers, sewer, upholsterers and related workers	6,466	39.21
Food and beverage processors	5,299	32.14