Women's Labour Market Opportunity and Son Preference

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Motivation

- "More Than 100 Million Women Are Missing" (Sen, 1990)
  - More than 125 million in 2010 and 145 million in 2020 (Bongaarts and Guilmoto, 2015; UNFPA, 2020)
- One key reason for missing women is son preference (Ebenstein, 2010)
- Son preference involves high social and economic costs (Bhalotra and Cochrane, 2010; Bharadwaj and Lakdawala, 2013; Ebert and Vollmer, 2022)
- As reasons of son preference existing literature focus on
  (i) patrilocal and patrilineal culture, (ii) decline in fertility/family size etc.
  (Ebenstein, 2021; Jayachandran, 2017; Murphy et al., 2011)

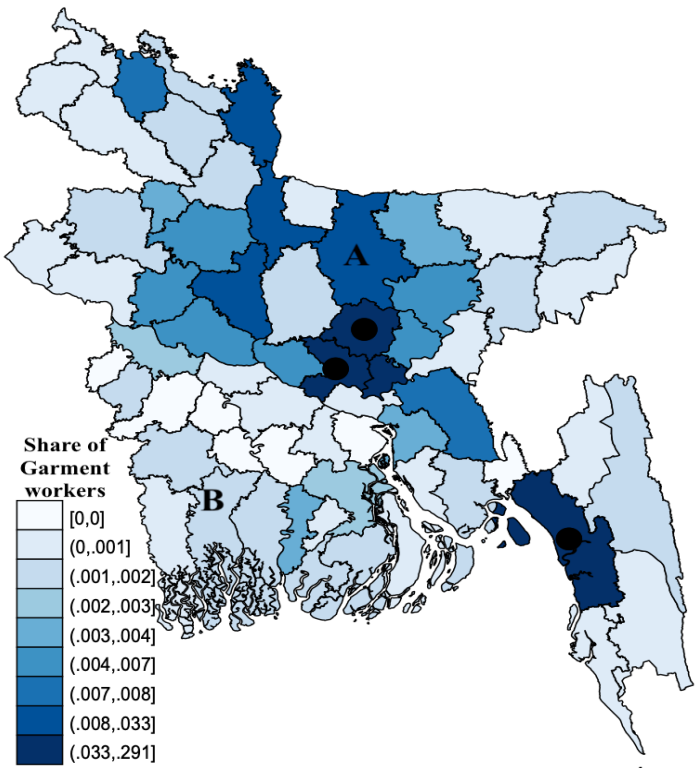
Research Question

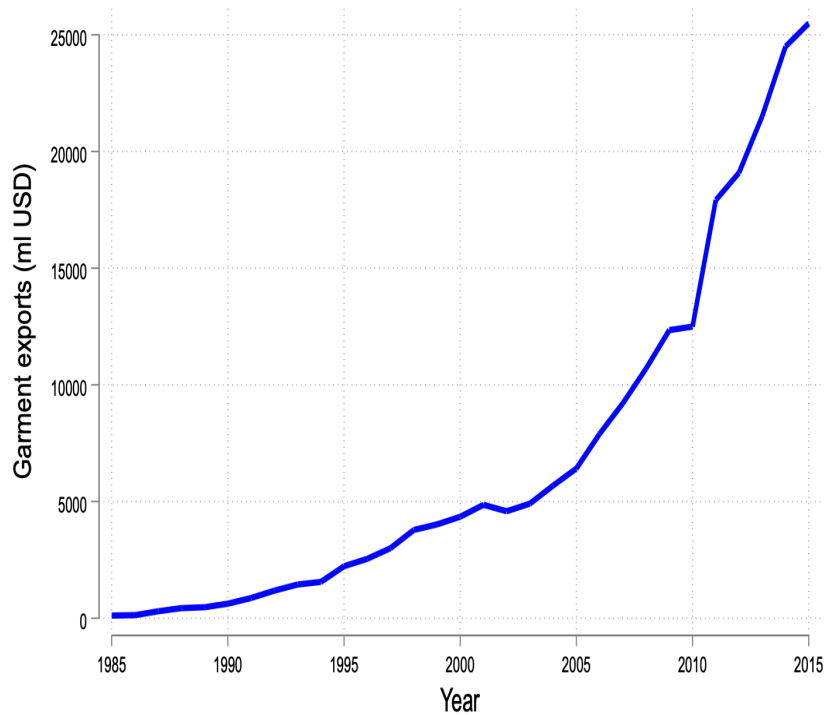
- Less is known about the causal evidence on the impact of women's labour market opportunity on son preference
- The net impact of job opportunity for women is not obvious:
  - This reduces fertility and decline in fertility results in higher son preference (Jayachandran, 2017)
  - This raises the value of girls and lowers the preference for sons (Gupta et al., 2003)

This paper . . .

- Define son preference as an indicator for preferring more sons than daughters (Behrman and Duvisac, 2017; Bhat and Zavier, 2003)
- Compare son preference for women with more access to jobs to that for similar women with lower access
  - Job access measured in terms of both

    (i) Spatial access to export jobs (ii)Time varying access to export jobs





This paper . . .

- Exploit exogenous variation in access to export jobs due to
  - road distance based spatial exposure
  - birth-cohort specific time-varying exposure
- River based instrument to deal with 'endogenous' road placements

Literature and Contribution

- Existing evidence on labor market opportunity and sex ratio: Anukriti (2018); Qian (2008) etc.
- Existing literature on labor market access and son preference
  - Employment: Asadullah et al. (2021); Behrman and Duvisac (2017); Pande and Astone (2007); Visaria (2012) etc.
  - Wages/income incentives: Craigie and Dasgupta (2017); Koolwal (2007); Murphy et al. (2011) etc.
- Contribution: Causal evidence due to exogenous variation in women's labour market opportunity

Key Results

- Women with higher job opportunity prefer fewer sons
  - 1 SD increase in job access measure reduces probability of prefering sons by 0.27 pp
- Results not driven by
  - Migration
  - Ultrasound

Data

- Bangladesh Demographic and Health Survey 2014
  - 17863 aged 15-49 years ever-married women
  - Apply two criteria to select a sample of 12038 women: SumStats
    - ★ Prefer at least one child DHS Q
    - ★ Aged 15-35 (childbearing age) in 2014 Childbearing age
- Geofabrik: 2014 geo-shape files for rivers, roads, bridges, POIs etc.
- BGMEA: Yearly garment export
- LFS 2013: District-wise distribution of export/garment jobs
- LFS 2016: In-migration

Cohort-specific spatial proximity to export jobs (CSP)

- Households located at (centroid) sub-districts s and export/garment jobs at (major town) districts d
- Construct CSP:

$$CSP_{cs} = \underbrace{ln\left(\sum_{d=1}^{64} \tau_{sd}^{-\psi} \times GW_d\right)}_{SP_s} \times \underbrace{ln\left(\sum_{t=15}^{35} GarExp_{ct}\right)}_{GX_c} \quad (1)$$

  - τ_{sd} = measure of costs of road travels from sub-district s to district d
  - ψ is a responsiveness parameter ($\psi = 1.5$)
  - GW_d = share of district d in total export/garment jobs
  - $GarExp_{ct}$ = annual garment export exposed by a woman of birth-cohort c at age t.

CSP Density

Identification

- Econometric Specification:

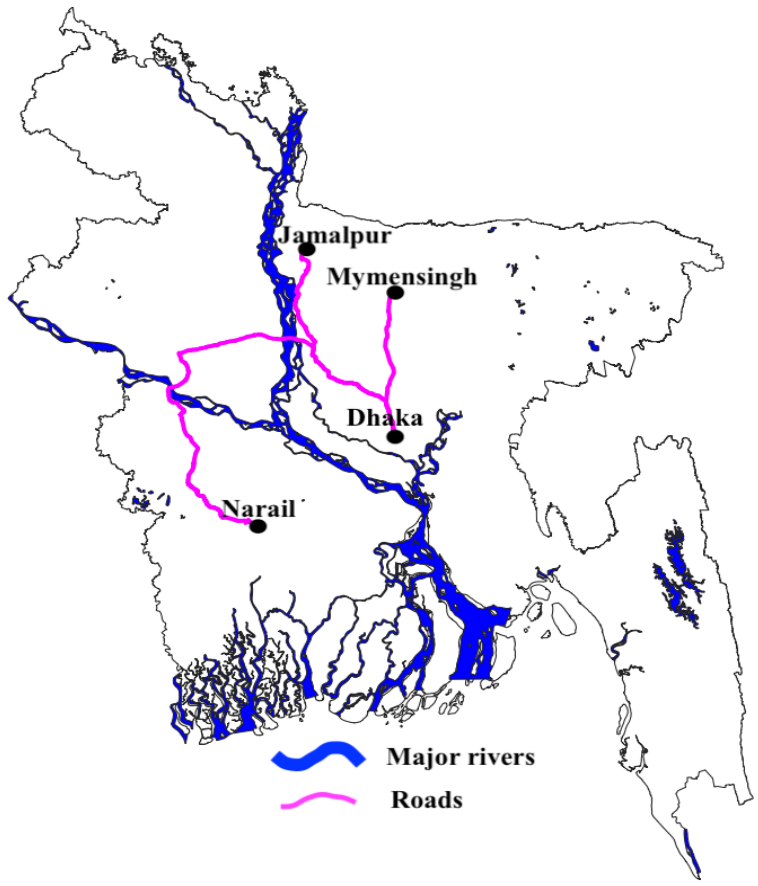
$$SonPref_{ics} = \alpha + \gamma CSP_{cs} + W'_{ics}\beta + \theta_c + \theta_s + \varepsilon_{ics} \quad (2)$$

  - $SonPref_{ics}$: indicator for preferring more sons than daughters for woman i in birth cohort c in sub-district s Sub-district SonPref-Hist. SonPref-Dist.
  - CSP_{cs}: Measure for cohort-specific spatial proximity to export jobs
  - W: Set of controls, i.e., indicators for muslim and gender of hh head
  - Fixed effects: birth cohort FE θ_c, sub-district FE θ_s
  - Coefficient of interest: γ

Addressing Endogeneity in CSP

- Three sources of endogeneity in CSP
  - Location of the export jobs - use sub-district FE
  - Migration/spatial sorting - investigate later
  - Road placements - use IV based on (i) straight-line distance, and (ii) length of river-widths

	Distance (km) between Dhaka and		
Type	Mymen.	Jamalpur	Narail
Road	110	170	366
St. line	107	129	102
River widths	0.15	0.20	5.40



Constructing the Instrument

- Construct CZ:

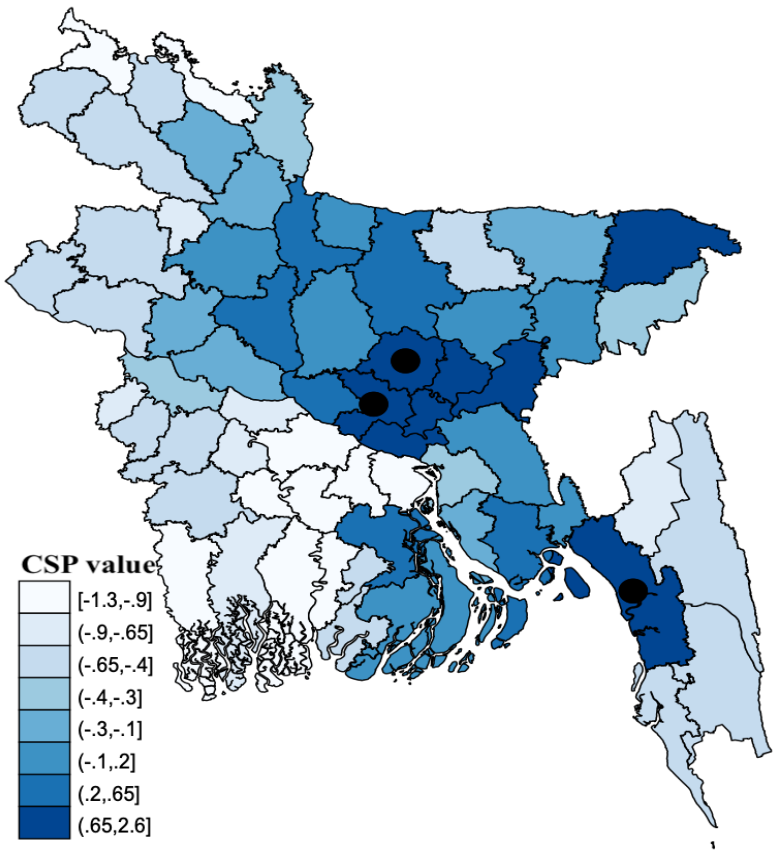
$$CZ_{cs} = \underbrace{ln\left(\sum_{d=1}^{64} \delta_{sd}^{-\psi} \times \frac{1}{RW_{sd}} \times GW_d\right)}_{Z_s} \times \underbrace{ln\left(\sum_{t=15}^{35} GarExp_{ct}\right)}_{GX_c} \quad (3)$$

  - δ_{sd} = straight-line distance between sub-district s and district d
  - RW_{sd} = total length of river widths along that straight-line
  - GW_d = share of district d in total export/garment jobs
  - $GarExp_{ct}$ = annual garment export exposed by a woman of birth-cohort c at age t.

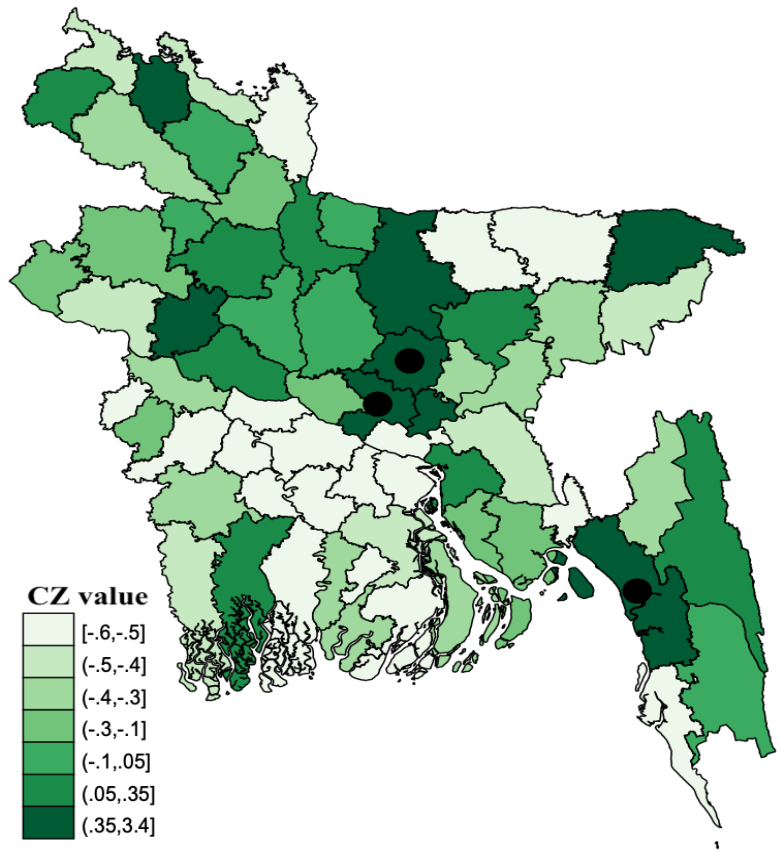
IV Assumption: Relevance

- Straight-line distance and river-widths along that straight-line are natural barriers for road distance
  - Only 30% rivers have bridges (Geofabrik, 2021)

(i) CSP



(ii) CZ



●= Garment hubs

SP & Z

IV Assumption: Exclusion restriction

- Potential violations:
  - Women living closer to the rivers may prefer fewer sons
  - Areas with rivers $\Rightarrow$ more agricultural activities $\Rightarrow$ more son preference
  - Economic activities near the rivers affecting through fertility
    - ⋆ Sub-district fixed effects take care of those local time invariant shocks
  - Women travelling through rivers have less/more son preference
    - ⋆ Drop sub-districts with river transport facility
  - Instrument affects some individual and household characteristics
    - ⋆ Use those characteristics as additional controls

Results

Outcome variable: CSP/Son preference

	Son preference	CSP	Son preference
Variables	(1)	(2)	(3)
CSP	0.049		-0.266**
	(0.080)		(0.130)
CZ		0.720***	
		(0.029)	
Specification	OLS	First stage	Second stage
Observations	11922	11922	11922
R^2	0.062		0.000
KP rk Wald F stat.			602.638

Notes: (1) All specifications use indicators for muslim and gender of HH head as controls, and use birth-year and sub-district fixed effects. (2) Robust standard errors are clustered at sub-district-cohort level. Legend: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

- 1 SD increase in CSP reduces probability of prefering sons by 0.27 pp
  - OLS biased upward

Reasons for OLS upward bias

- Consider two models:
  - OLS model: $SonPref = \beta_0 + \beta_1 CSP + error$
  - True model: $SonPref = \beta_0 + \beta_1 CSP + \beta_2 Progress + error$ in which *Progress* is a measure of progressiveness
  - Thus, $\beta_1^{OLS} = \beta_1^{True} + \beta_2^{True} \cdot \rho$ where $\rho = corr(CSP, Progress)$
- Since $\beta_2^{True} < 0$, **more roads in relatively more progressive areas** explains the upward bias in OLS.
- Construct road access measure for sub-district s:

$$RA_s = ln\left(\sum_{d=1}^{64} \tau_{sd}^{-\psi}\right) \tag{4}$$

where τ_{sd} = measure of costs of road travels from sub-district s to district d and $\psi = 1.5$.

Road placements and Progressiveness (OLS)

Outcome variable: Measures of progressiveness

	Years of education	Currently working	Adopt modern contraception	Any antenatal visits
Variables	(1)	(2)	(3)	(4)
Road Access	0.393***	0.023***	0.043***	0.077***
	(0.064)	(0.007)	(0.008)	(0.011)
Observations	11923	11920	11923	4239
R^2	0.090	0.099	0.098	0.109

Notes: (1) All specifications use indicators for muslim and gender of HH head as controls, and use birth-year and district fixed effects. (2) Robust standard errors are clustered at sub-district-cohort level. Legend: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

- #Roads in respective sub-district also explains the upward bias in a similar way.

Identification concerns

- Migration: progressive mothers may move closer to export jobs
  - CSP does not significantly affect in-migration (LFS 2016) In-migration
- Ultrasound: women with better access to jobs are less likely to go for ultrasounds
  - CSP does not affect antenatal scans and ultrasound uses Ultrasound
- Other major concerns:
  - Retrospective preference:women with fewer sons have higher job access
  - Occupational mobility: women leave agriculture and join service/industry
  - Market access: women with more market access prefer fewer sons
  - Others shocks: programs providing incentives for girls
    - ★ Available data rules out those above concerns Check for others

Robustness

- Major robustness checks:
  - Samples based on childbearing ages Samples
  - CSP/CZ variants CSP/CZ variants
  - Garment export variants GX variants
- Minor robustness checks: Robustness results
  - S.E. clustered at district-cohort level
  - Exclusion of sub-districts with ferry terminals
  - Inclusion of additional controls
  - Drop 1999 birth-cohort SonPref-Dist.
  - Drop women without explicit child-sex preference

Takeaways

- Women with higher access to export-jobs prefer fewer sons
- A labour market opportunity for women may reduce the missing women problem

WELCOME FEEDBACK

THANK YOU

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Summary Statistics Data

Variables	All women	Rural women	Urban women
Son preference	0.090 (0.286)	0.096 (0.294)	0.075 (0.264)
Muslim	0.906 (0.292)	0.912 (0.284)	0.892 (0.310)
HH head is male	0.890 (0.312)	0.889 (0.314)	0.893 (0.310)
HH head/head's wife	0.668 (0.471)	0.657 (0.475)	0.697 (0.460)
Current age (years)	25.679 (5.509)	25.597 (5.525)	25.887 (5.464)
Age at first cohabitation	15.972 (2.758)	15.755 (2.559)	16.528 (3.146)
Total birth given	1.864 (1.312)	1.946 (1.345)	1.653 (1.199)
Mother's years of education	5.978 (3.808)	5.630 (3.641)	6.871 (4.073)
Partner's years of education	5.662 (4.571)	5.123 (4.331)	7.044 (4.871)
Currently working	0.309 (0.462)	0.315 (0.464)	0.295 (0.456)
Partner is currently working	0.993 (0.084)	0.992 (0.089)	0.995 (0.068)
Observations	11923	7843	4080

Notes: (1) All statistics are for ever-married women aged 15-35 years. (2) Standard deviations are shown in parentheses.

Administrative units in Bangladesh

	District	Sub-district	City
# Units	64	544	-
Average area (sq. km) - All districts	2,185	257	-
	(1,080)	(185)	
Average area (sq. km) - Garment hubs	2,581	169	268
	(1,628)	(178)	
Of which:			
Chittagong area (sq. km)	4,451	217	168
		(189)	
Dhaka area (sq. km)	1,476	66	306
		(108)	
Gazipur (sq. km)	1,817	363	329
		(102)	

Notes: (1) Garment hubs include the three districts: Chittagong, Dhaka and Gazipur. (2) Standard deviations in parenthesis.

CSP and In-migration

Variables	Any in-migration (1)	Marriage in-migration (2)	Family in-migration (3)	In-migration in last 5 years (4)	In-migration in last 10 years (5)
CSP	0.004	-0.051	-0.000	-0.011	-0.012
	(0.029)	(0.033)	(0.018)	(0.042)	(0.028)
Observations	18701	18646	18646	18626	18626
R^2	0.009	0.012	0.000	0.002	0.004
KP rk Wald F stat.	113.102	113.095	113.095	113.108	113.108

Notes: (1) Results based on LFS 2016 and the sample includes all ever-married women aged 15-35 years. (2) All specifications use indicators for muslim and gender of HH head as controls, and use birth-year and sub-district fixed effects. Legend: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Concerns

CSP and Antenatal scans

Variables	Any antenatal visit (1)	#Antenatal visits (2)	Did ultrasound (3)
CSP	0.529	3.607	0.632
	(0.322)	(2.221)	(0.410)
Observations	4274	4270	4274
R^2	0.004	0.006	0.003
KP rk Wald F stat.	460.130	459.345	460.130

Notes: (1) Antenatal scans are available for only the last birth in 2011 and afterwards. (2) All specifications use indicators for muslim and gender of HH head as controls, and use birth-year and sub-district fixed effects. Legend: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Concerns

Check for Other concerns

Outcome variable: Son preference

Concerns

Variables	(1)	(2)	(3)	(4)	(5)
CSP	-0.740***	-0.279**	-0.512**	-0.620**	-0.443**
	(0.236)	(0.132)	(0.231)	(0.288)	(0.174)
Type of women	Non-mothers	All	All	All	All
Controls for partner's occupation		✓			
Control for Agri.Wage × Agri.Land			✓		
Control for MA × GX				✓	
Controls for Facilities × GX					✓
Observations	1613	11773	9574	11922	10655
KP rk Wald F stat.	144.209	663.059	155.468	201.457	385.110

Notes: (1) Partner's occupation includes indicators for service, agriculture and manual tasks. (2) Sub-district level average agricultural wage is calculated using LFS 2016 and women's birth-year specific total agricultural harvested land per person is collected from Our World in Data (2022). (3) MA is defined as $MA_s = ln\left(\sum_{d=1}^{64} \delta_{sd}^{-\psi} \times Pop_d\right)$. (4) Facilities include the indicators for education, health and transport facility status at the sub-district level. (5) All specifications use indicators for muslim and gender of HH head as controls, and use birth-year and sub-district fixed effects. Legend: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Impact across variants of Time varying exposure

Outcome variable: Son preference

Robustness

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CSP: Annual Gar. Exp. (Age 15-35)	-0.266**								
	(0.130)								
CSP: Cumul. Gar. Exp. (Age 15-35)		-0.294**							
		(0.139)							
CSP: 5yr avg Gar. Exp. (Age 15-35)			-0.253**						
			(0.122)						
CSP: Annual Gar. Exp. (Age 15-Cur.Age)				-0.276**					
				(0.132)					
CSP: Annual Gar. Exp. (Born-Age 35)					-1.997				
					(1.504)				
CSP: Annual Gar. Exp. (Born-Cur.Age)						-3.529**			
						(1.575)			
CSP: Annual Gar. Exp. (Age 15-35 in 2003-14)							-0.388**		
							(0.174)		
CSP: All Gar. Worker (Age 15-35)								-0.063**	
								(0.031)	
CSP: Fem Gar. Worker (Age 15-35)									-0.057**
									(0.029)
Observations	11922	11922	11922	11922	11922	11922	11922	11922	11922
R^2	-0.000	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.000	-0.000
KP rk Wald F stat.	602.638	643.538	666.826	606.240	576.105	829.622	425.944	873.649	944.420

Notes: (1) All specifications use indicators for muslim and gender of HH head as controls, and use birth-year and sub-district fixed effects. (2) Robust standard errors are clustered at sub-district-cohort level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Robustness results

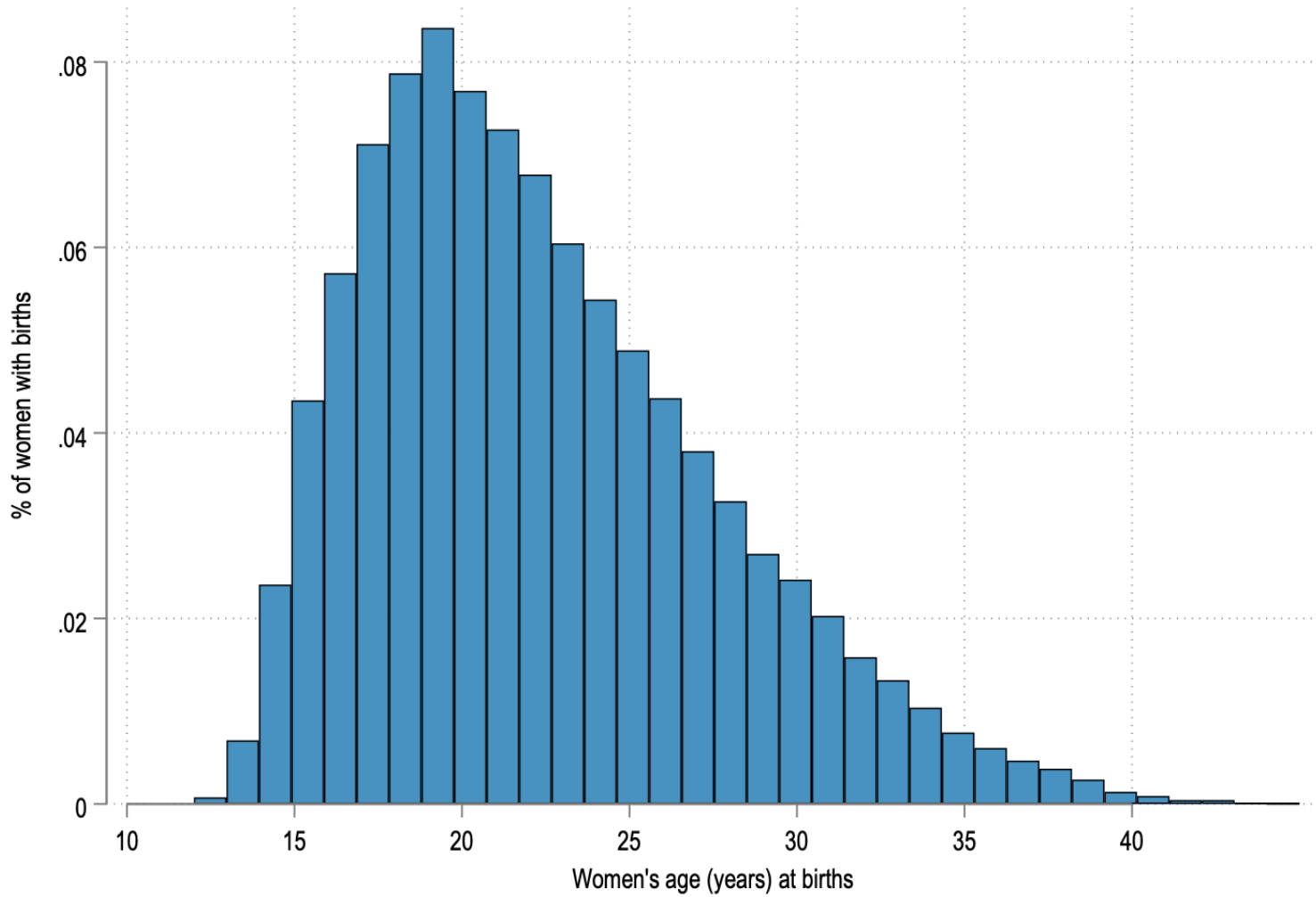
Outcome variable: Son preference

Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CSP	-0.266	-0.266	-0.266**	-0.524**	-0.221	-0.195	-0.435**
	(0.173)	(0.216)	(0.131)	(0.213)	(0.138)	(0.125)	(0.192)
S.E. cluster	S	D	DC	SC	SC	SC	SC
Drop sub-districts with ferry terminals				Y			
Additional controls					Y		
Drop 1999 birth-cohort						Y	
Drop women with no explicit sex preference							Y
Observations	11922	11922	11922	8491	11412	11790	8569
R^2	0.000	0.000	0.000	0.000	0.016	0.000	0.000
KP rk Wald F stat.	140.763	117.104	537.652	441.689	582.150	1026.646	416.627

Notes: (1) Additional controls include household and individual characteristics like number of male and female members in household, total births for women, level of education of women and their partners, indicator for women's pre-marriage education, women's age at first cohabitation (proxy for marriage), and indicators for pre- and post-marriage employment, agricultural employment for women and their partners etc. (2) All specifications use indicators for muslim and gender of HH head as controls, and use birth-year and sub-district fixed effects. (3) Robust standard errors are clustered at different levels (S=sub-district, D=district, DC=district-cohort, SC=sub-district-cohort). Legend: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Women's age (year) at births



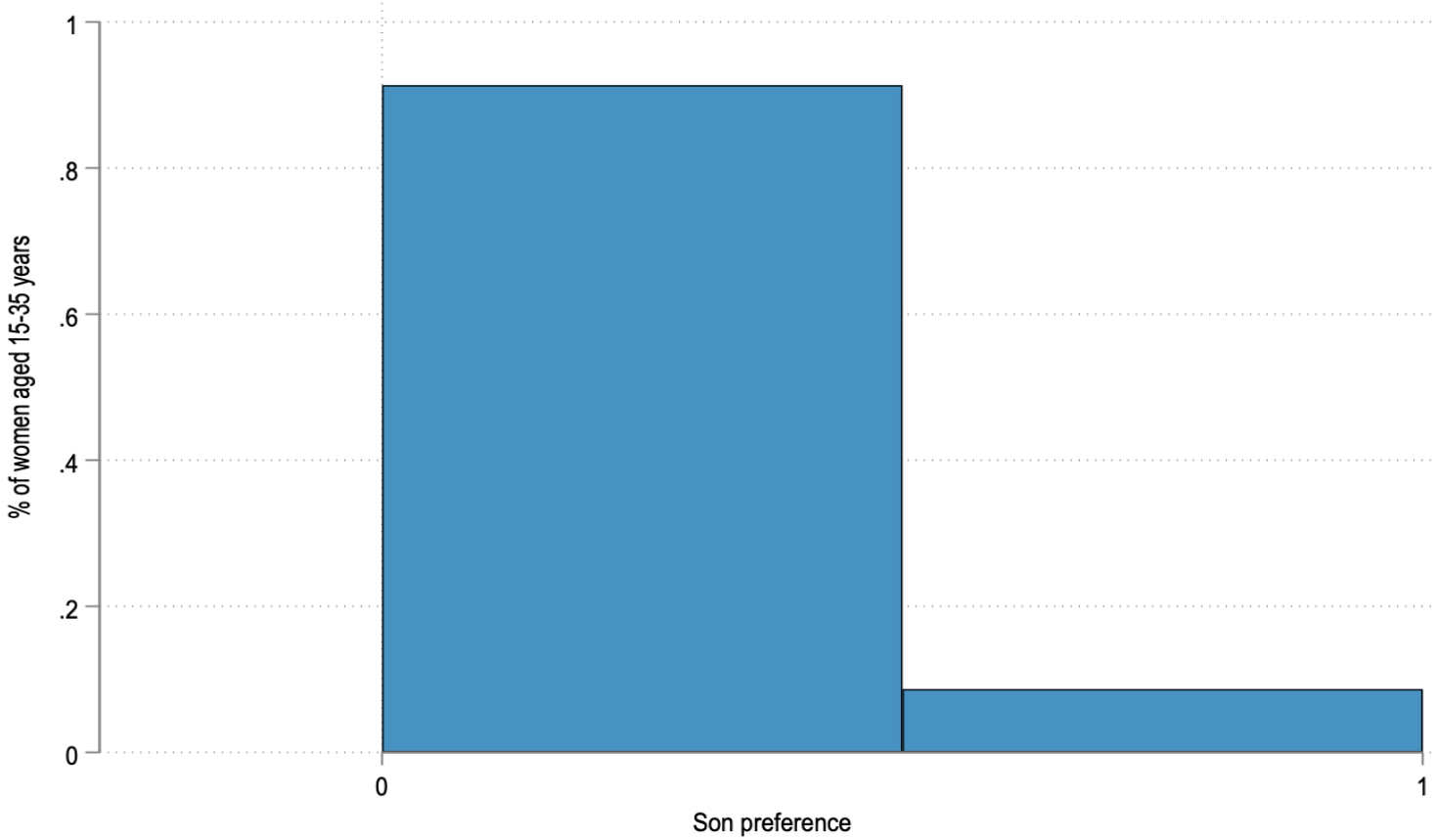
Data

DHS 2014 Question on Son preference

712	CHECK 216: HAS LIVING CHILDREN ☐ → If you could go back to the time you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be? NO LIVING CHILDREN ☐ → If you could choose exactly the number of children to have in your whole life, how many would that be? PROBE FOR A NUMERIC RESPONSE.	NONE . . . . . 00 → 714 NUMBER . . . . . ☐☐ OTHER _____ 96 → 714 (SPECIFY)
713	How many of these children would you like to be boys, how many would you like to be girls and for how many would it not matter if it's a boy or a girl?	BOYS GIRLS EITHER NUMBER ☐☐ ☐☐ ☐☐ OTHER _____ 96 (SPECIFY)

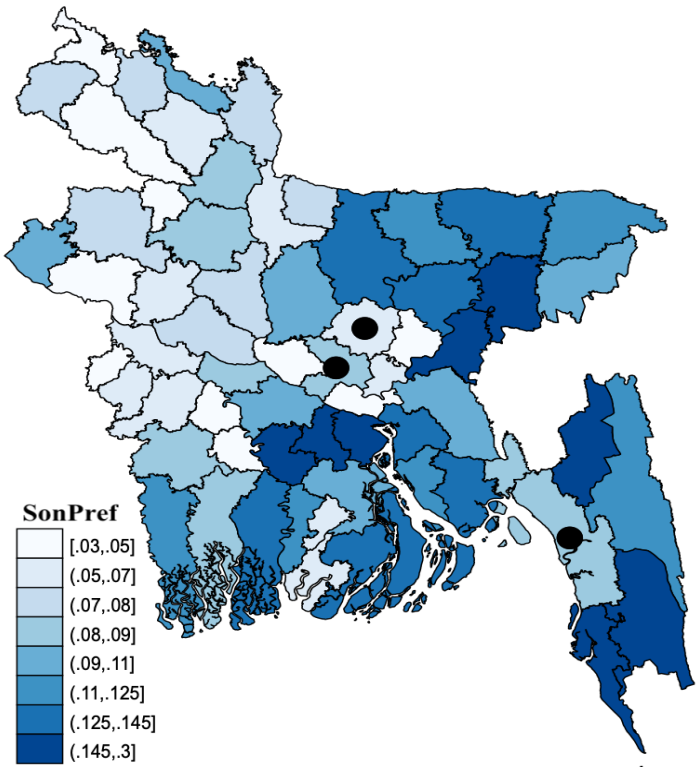
Data

Histogram for Son Preference



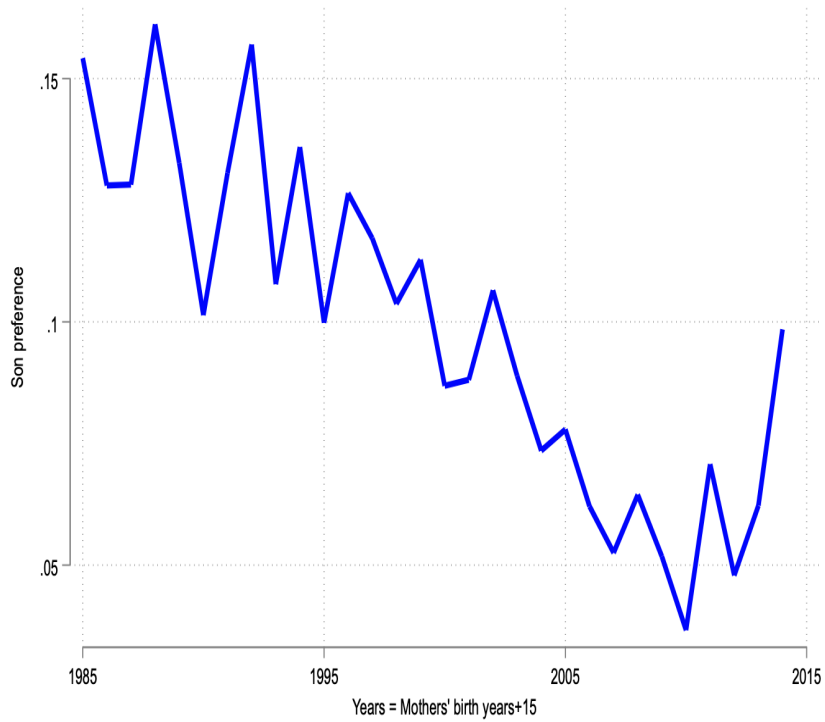
Distribution of Son Preference

(i) District-wise distribution



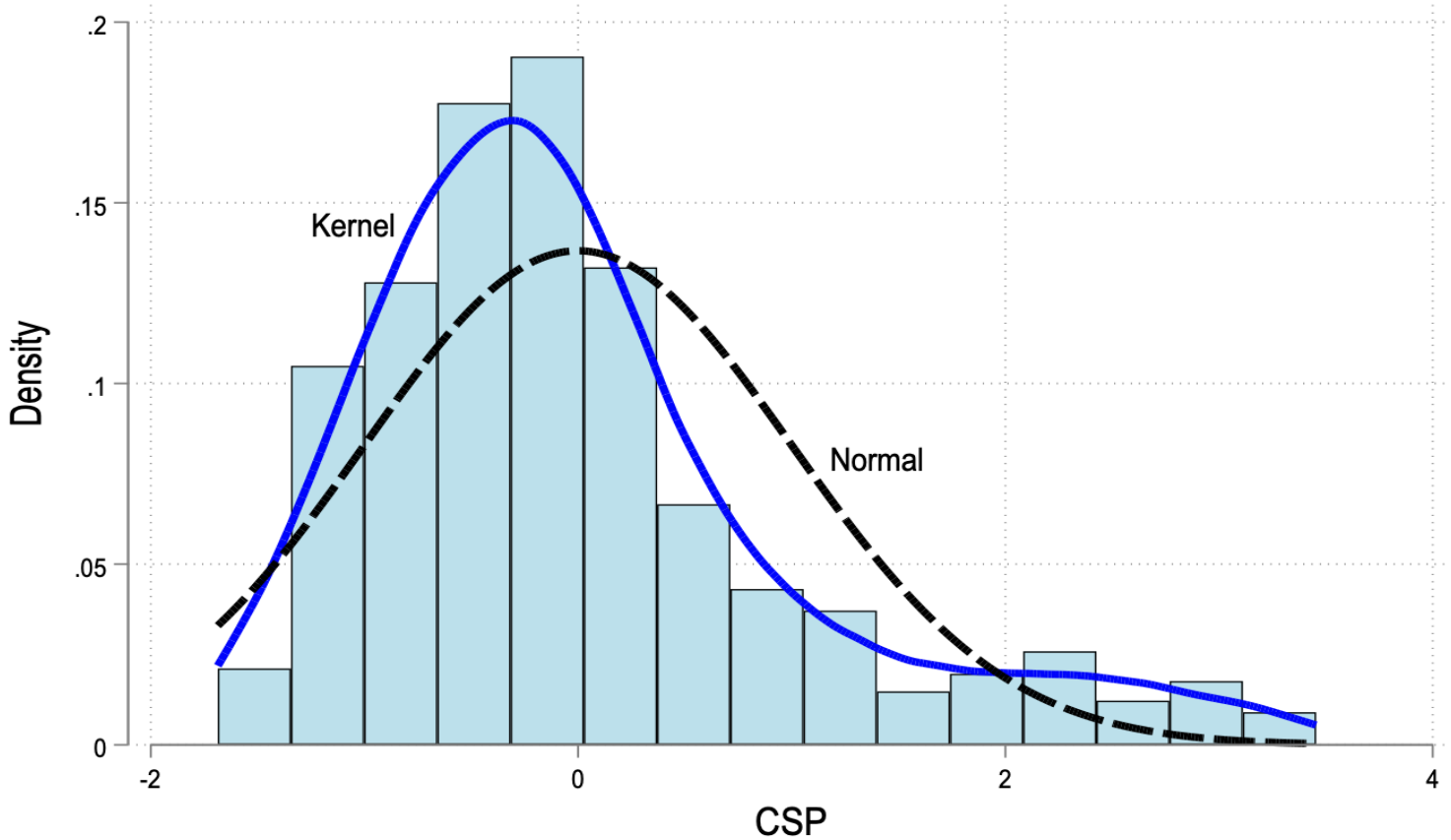
●= Garment hubs

(ii) Distribution across birth-cohorts



Identification Robustness

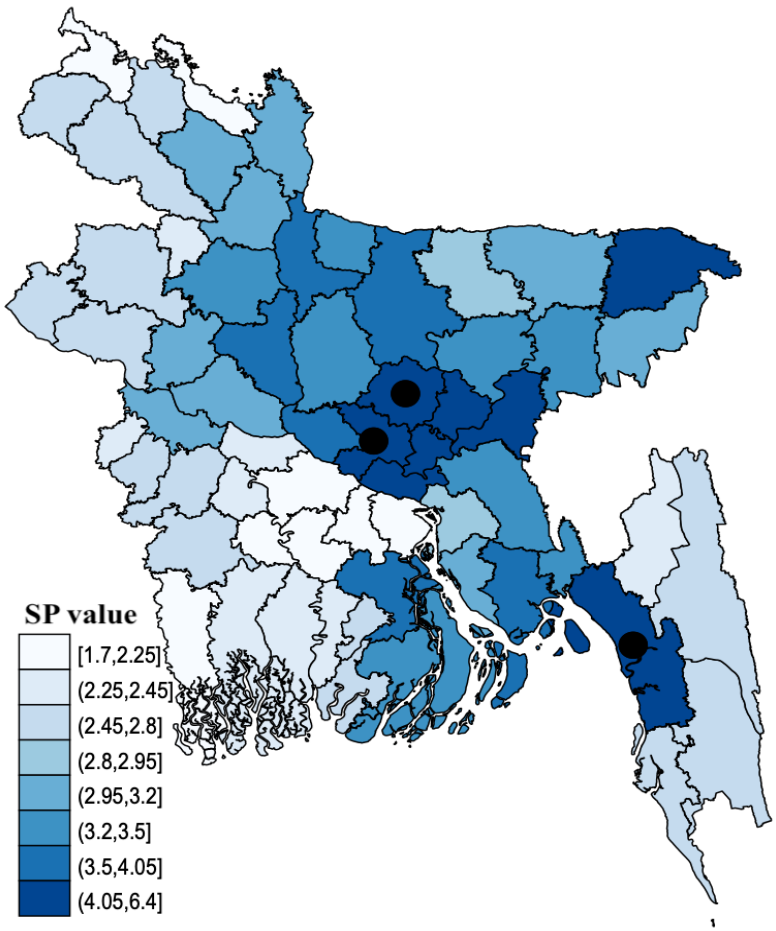
Density for CSP



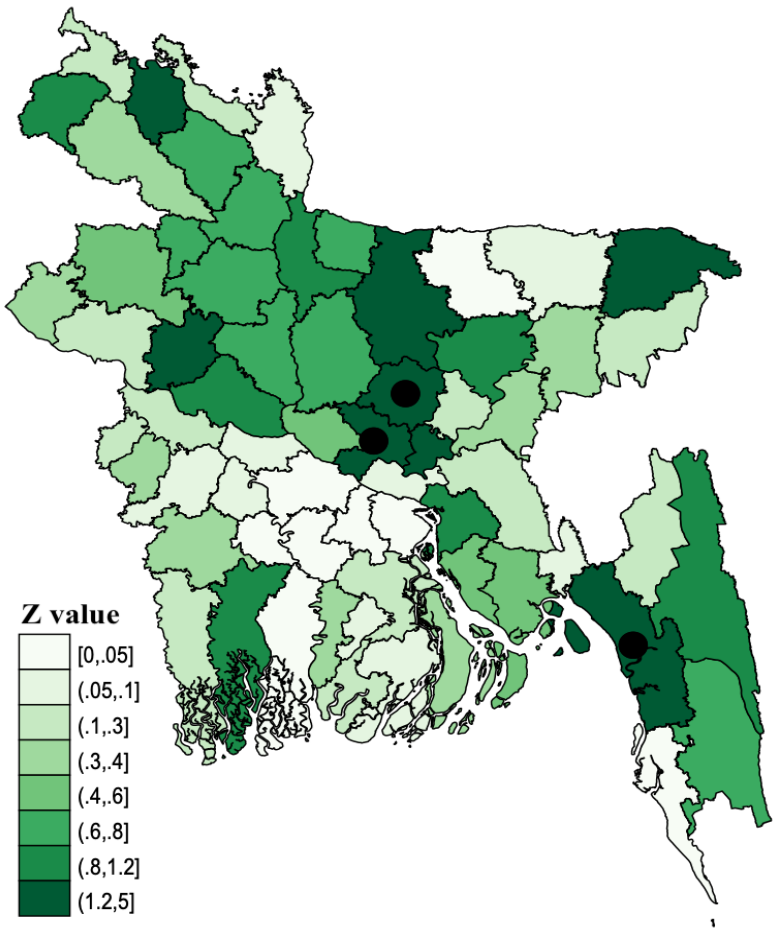
CSP

District-wise distribution of SP and Z

(i) SP



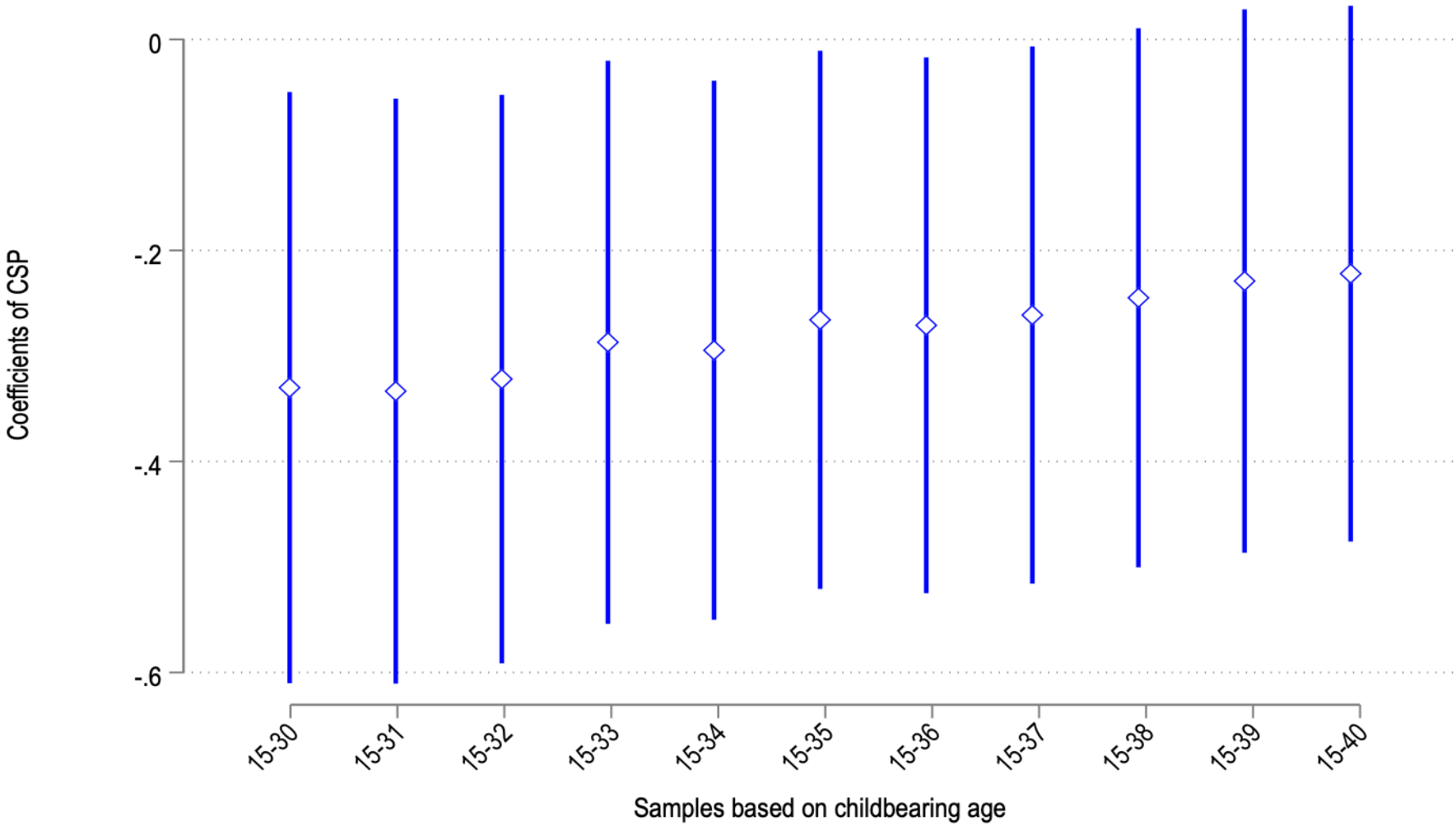
(ii) Z



●= Garment hubs

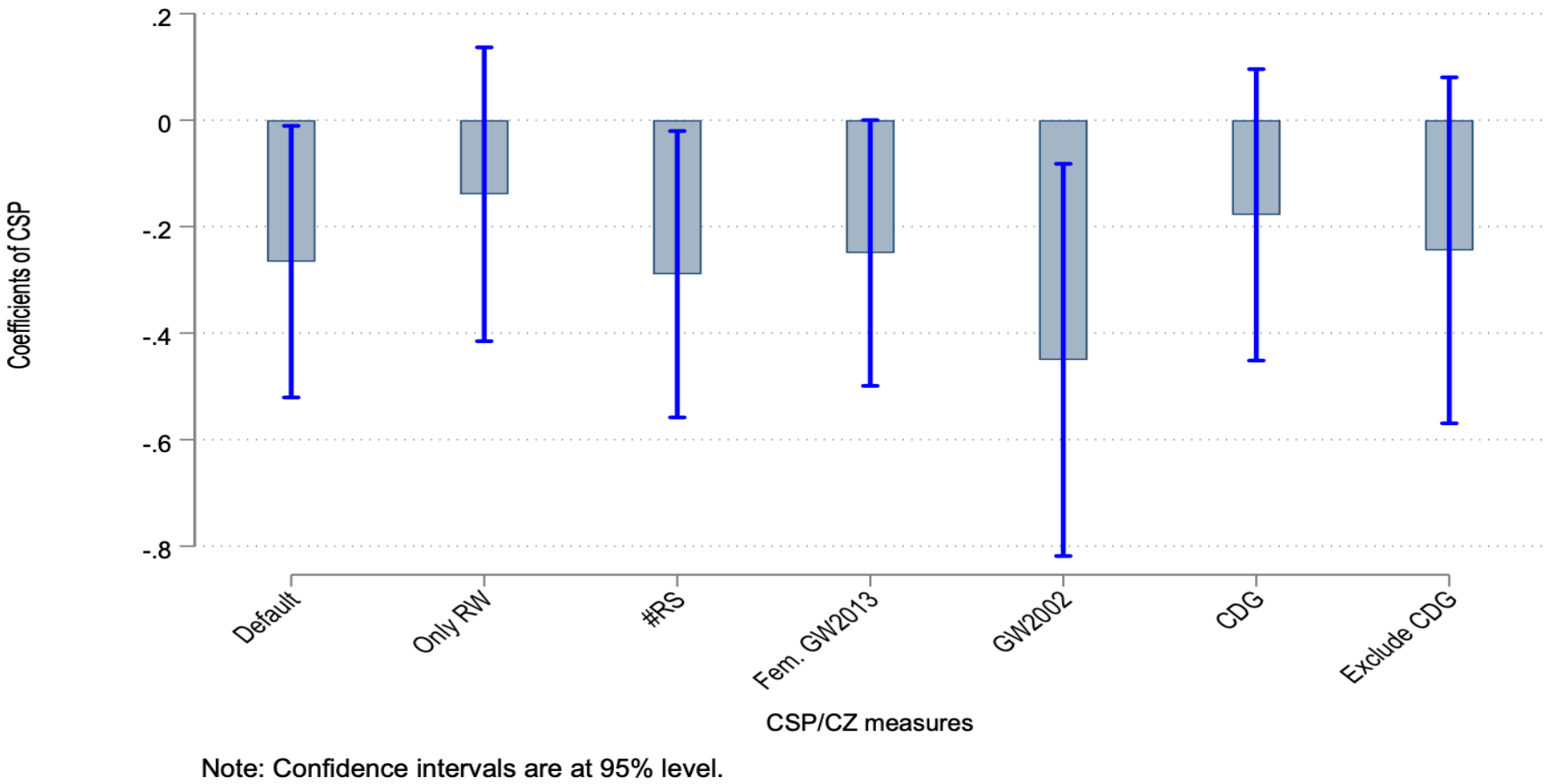
IV Assumptions

Impact across Samples



Note: Confidence intervals are at 95% level.

Impact across variants of Spatial exposure



Notes: (i) Default CSP and CZ are based on on all garment workers under LFS 2013, straight-line distance and length of river widths. (ii) Only RW refers to an instrument capturing spatial exposure based on length of river widths only. (iii) #RS refers to another instrument which is based on river counts. (iv) Female GW2013 refers to the set of CSP and CZ that uses female garment workers under LFS 2013. (v) GW02 refers to CSP and CZ measures contructed using the district-wise distribution of garment jobs under LFS 2002. (vi) CDG refers to the CSP and CZ measures that are based on proximity to Chittagong, Dhaka and Gazipur only. (vii) Exclude CDG refers to the CSP and CZ measures that are based on proximity to remaining districts, i.e., excluding Chittagong, Dhaka and Gazipur.