Lifecycle Fertility and the Impact of Family Planning Programs: Evidence from Southern Africa

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Introduction

- Impact of contraceptive access on individual fertility behavior critical to:
  - Understanding role of modern contraceptives in facilitating fertility reductions
  - Understanding if women can better achieve desired fertility
- Impact of contraceptive access on fertility behavior remains contested:
  - Demand factors: Pritchett (1994), etc.
  - Supply factors: Bongaarts (1994, 1995), Bailey (2012), etc.
- Policy-relevance remains high as demographic transition stalled in sub-Saharan Africa

What we do

- Build a dynamic model of fertility control choice
- Test model using legalization of injectables in Zambia
  - Match Zambia with bordering administrative regions and use women residing in these regions as control group
  - Use individual-level data in 5 unique datasets constructed from Demographic and Health Surveys
  - Estimate difference-in-difference specifications that account for heterogeneity by sector and age:

$$y_{irsat} = \alpha + \beta T_{irsat} + \delta_{sar} + \gamma_{sat} + \xi X_{irsat} + \varepsilon_{irsat}$$

Summary of Theoretical Results

- Theoretical impact of improved modern contraceptive access is ambiguous:
  - Asymmetric traditional fertility control creates precaution
  - Modern contraceptives alter intertemporal fertility incentives
- Model predicts (amplified in rural areas):
  - Take-up of contraceptives
  - Substitutions away from traditional postpartum methods and abortions, the latter more so for older women
  - Flow fertility increases, and birth-spacing decreases, for women younger than 45.
  - Larger fertility increases for childless women. Decreases in completed fertility.

Contraceptive Adoption

	Injectables		Modern Contraceptives		Condoms		Pills	
Post Inj	0.064***	0.064***	0.064***	0.066***	-0.008	-0.008	0.011+	0.011+
	(0.013)	(0.013)	(0.020)	(0.020)	(0.005)	(0.005)	(0.006)	(0.006)
Obs	76,126	75,493	76,126	75,493	76,126	75,493	76,126	75,493
Mean	0.109	0.109	0.255	0.255	0.0355	0.0355	0.0706	0.0706
Clusters	18	18	18	18	18	18	18	18
Controls	N	Y	N	Y	N	Y	N	Y

- Adoption is strong across subgroups:

  Urban Areas | Rural Areas | Age | Education

- Adoption is stronger for women at higher parities: Parity

Substitution from Traditional Methods

	Sex	Abortions	Postpartum Outcomes	Breast-feeding	Postpartum Abstinence	Modern Contra
Rural Women	Increase Frequency	Decrease Use	Reduce Duration	—	Reduce Duration	Increase Use
Urban Women	—	—	Reduce Duration	Reduce Duration	—	Increase Use

- Consistent with model predictions:
  - Substitutions larger in rural areas
  - Substitutions away from abortions higher for older women and women at higher parities: Parity Age

Fertility responses

- Flow fertility increases for rural women:

$$y_{isbt} = \alpha + \beta T_{isbt} + \gamma_{st} + \lambda_b + \phi_i + \varepsilon_{isbt}$$

	All Areas		Rural Areas		Urban Areas	
Post Inj	0.0250***	0.0439***	0.0311***	0.0509***	0.0090	0.0247**
	(0.0063)	(0.0099)	(0.0064)	(0.0103)	(0.0069)	(0.0090)
Observations	417,976	417,976	288,419	288,419	129,557	129,557
Number of Women	44,227	44,227	30,242	30,242	13,985	13,985
Mean	0.211	0.211	0.231	0.231	0.168	0.168
Clusters	18	18	18	18	18	18
Controls	N	Y	N	Y	N	Y

- Birth-spacing decreases for rural women. Results stronger for childless women, absent for women 45+. Completed fertility falls. Spacing 45+ Childless

Takeaways and Caveats

- Theoretical proof of concept that modern contraceptives can erode precautionary fertility motives
- Empirical confirmation of this mechanism in Zambian context.
- Policy Implications:
  - Need nuanced evaluation of FPPs
  - Modern contraceptive access is welfare-improving
  - Need better understanding of women's lifecycle contraceptive use patterns[1]
- Caveats:
  - Results are context-specific.
  - Additional data from next 5 years useful for empirical tests

[1] See Gupta & Rajani (2017) `https://ssrn.com/abstract=3054894`

Appendix

Contraceptive Adoption in Urban Areas

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	Injectables		Modern Contraceptives		Condoms		Pills	
Post Inj	0.057***	0.059***	0.063**	0.066**	-0.013	-0.013	0.012	0.012
	(0.014)	(0.013)	(0.028)	(0.028)	(0.013)	(0.012)	(0.013)	(0.013)
Observations	23,466	23,331	23,466	23,331	23,466	23,331	23,466	23,331
Mean	0.111	0.111	0.299	0.299	0.0519	0.0519	0.0900	0.0900
Clusters	18	18	18	18	18	18	18	18
Controls	N	Y	N	Y	N	Y	N	Y

Contraceptive Adoption in Rural Areas

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	Injectables		Modern Contraceptives		Condoms		Pills	
Post Inj	0.066***	0.066***	0.065***	0.066***	-0.006	-0.006	0.011	0.011
	(0.016)	(0.015)	(0.021)	(0.020)	(0.006)	(0.006)	(0.007)	(0.007)
Observations	52,660	52,162	52,660	52,162	52,660	52,162	52,660	52,162
Mean	0.109	0.109	0.235	0.235	0.0282	0.0282	0.0619	0.0619
Clusters	18	18	18	18	18	18	18	18
Controls	N	Y	N	Y	N	Y	N	Y

Heterogenous Contraceptive Adoption by Age Group

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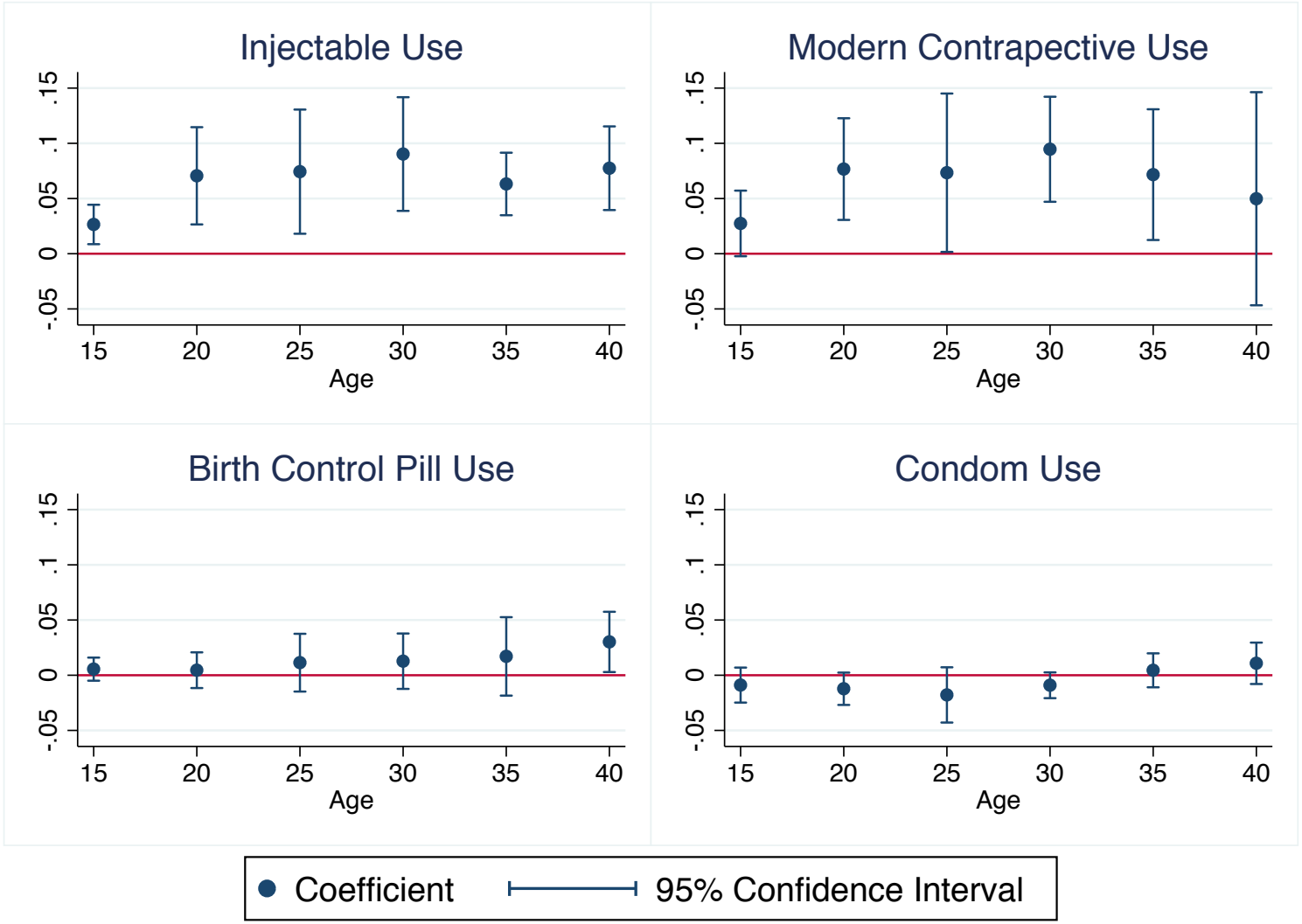
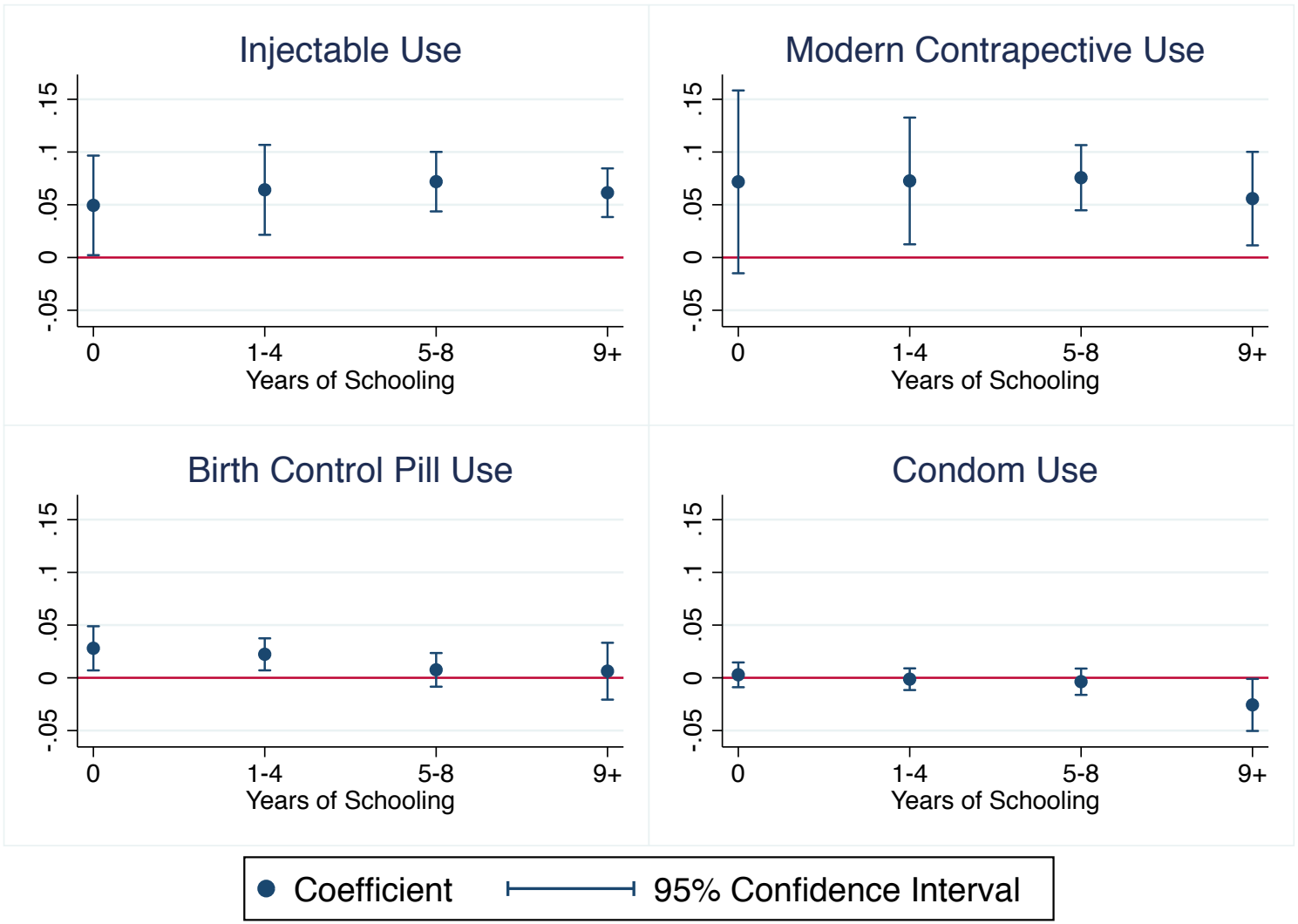


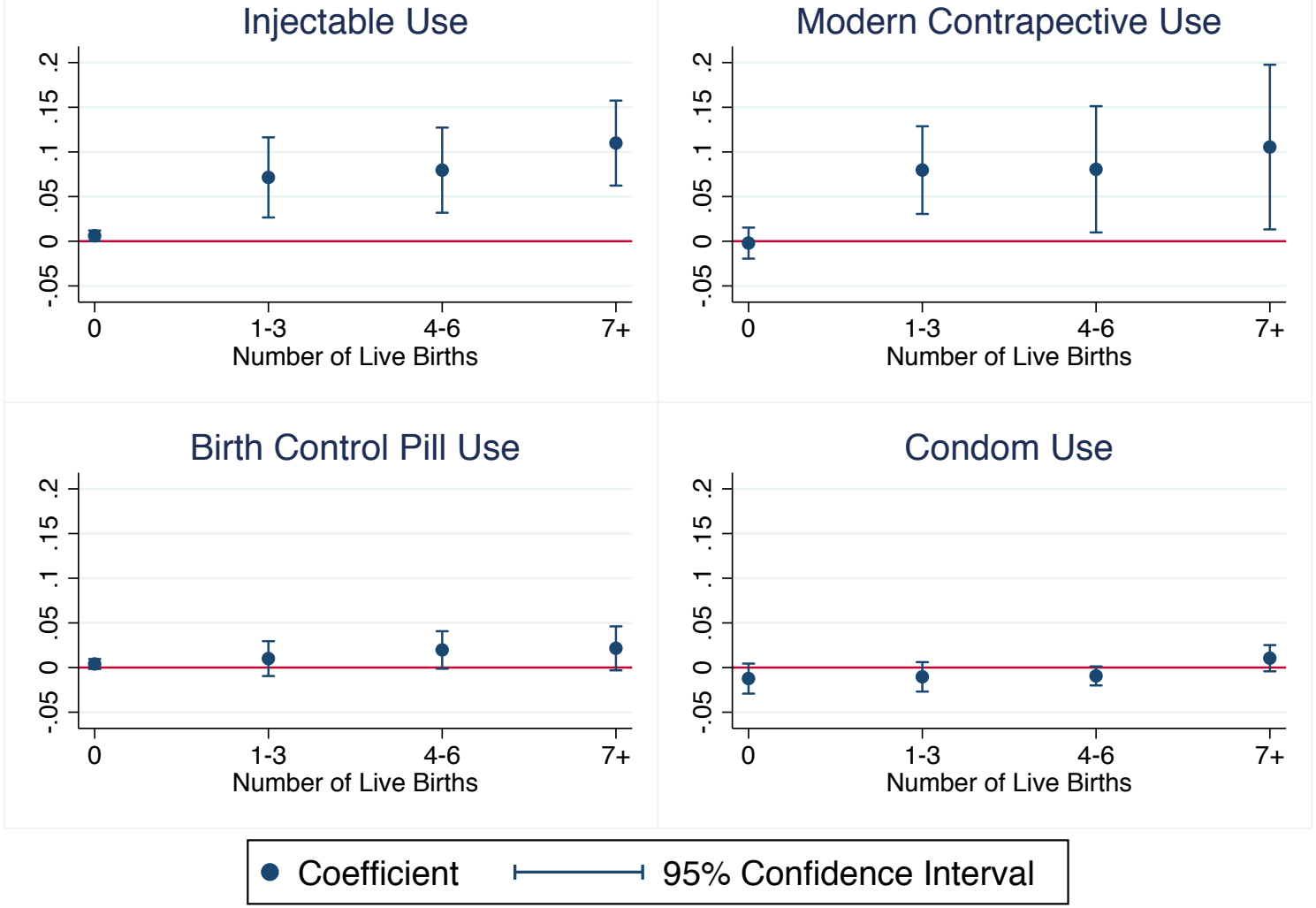
Heterogeneous Contraceptive Adoption Across Education

Back



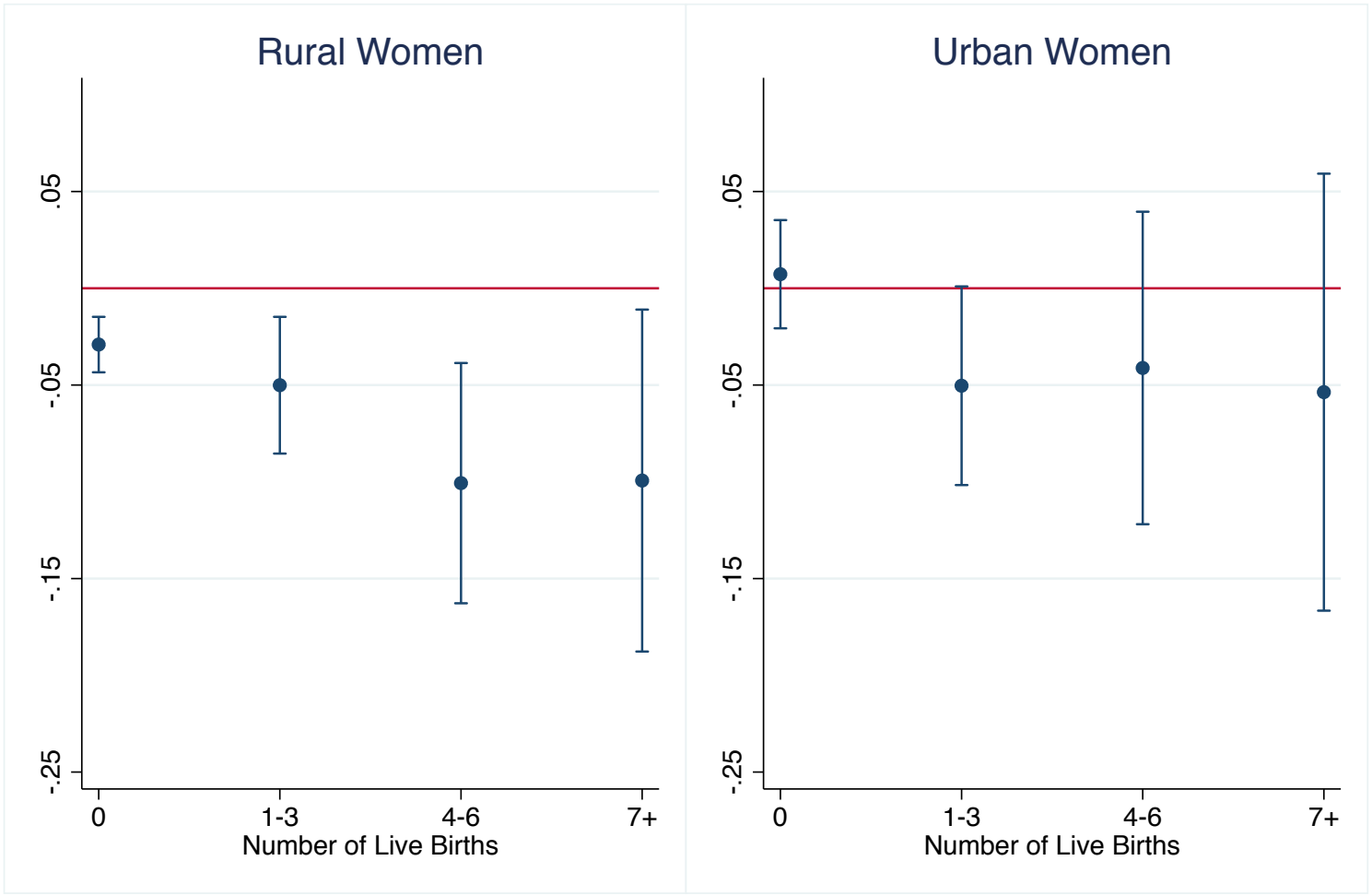
Heterogeneous Contraceptive Adoption Across Parity

Back



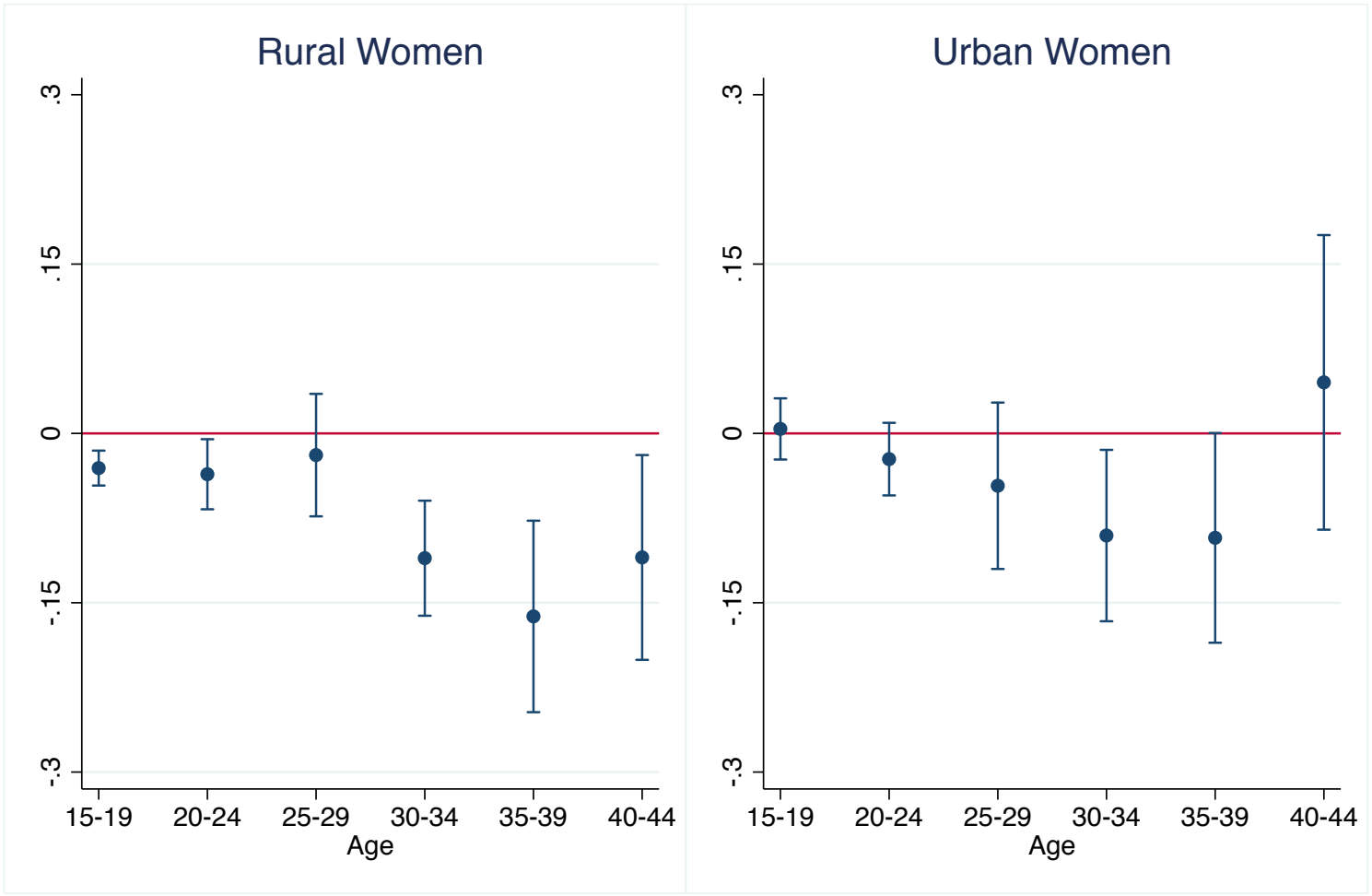
Heterogeneous Declines in Abortion Use by Parity

Back



Heterogeneous Declines in Abortion Use by Age

Back



Within-woman birth-spacing responses

	Year 1	Year 2	Year 3	Year 4
Panel A: Rural Women				
Post Inj	.0030***	.0081**	.0087*	.0192***
	(.0007)	(.0029)	(.0042)	(.0045))
Obs	742,457	556,371	301,976	163,019
Number of Women	22836	21566	18650	13283
Mean	.0088	.0357	.0481	.0379
Clusters	18	18	18	18
Panel B: Urban Women				
Post Inj	-.0004	.0008	.0064	.0027
	(.0010)	(.0040)	(.0062)	(.0067)
Obs.	242,655	192,902	123,616	78,737
Number of Women	9094	8564	7581	6050
Mean	.0070	.0259	.0328	.0268
Clusters	18	18	18	18

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Response of childless women

Panel A: Childless Women Age 20 and Older

	Rural Areas				Urban Areas			
	Injectables		Flow Fertility		Injectables		Flow Fertility	
Post Inj	-0.0055	-0.0044	0.0453***	0.0527***	0.0246	0.0251	0.0083	0.0111
	(0.0111)	(0.0102)	(0.0145)	(0.0102)	(0.0165)	(0.0171)	(0.0221)	(0.0177)
Obs.	2,339	2,309	22,483	22,466	2,449	2,433	17,231	17,217
Mean	0.0180	0.0180	0.272	0.272	0.0196	0.0196	0.175	0.175
Clusters	18	18	18	18	18	18	18	18
Controls	N	Y	N	Y	N	Y	N	Y

Panel B: All Childless Women

Post Inj	0.0050	0.0044	0.0129*	0.0249***	0.0083	0.0084	-0.0017	0.0106
	(0.0030)	(0.0032)	(0.0066)	(0.0045)	(0.0063)	(0.0065)	(0.0085)	(0.0070)
Obs.	11,701	11,597	99,841	99,753	7,305	7,262	55,616	55,579
Mean	0.0109	0.0109	0.180	0.180	0.0118	0.0118	0.132	0.132
Clusters	18	18	18	18	18	18	18	18
Controls	N	Y	N	Y	N	Y	N	Y

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Response of women aged 45–49

	Injectable Adoption		Completed Fertility		Flow Fertility	
Panel A: Rural Women						
Post Inj	0.027***	0.026***	-0.242	-0.259	0.0035	0.0020
	(0.008)	(0.008)	(0.206)	(0.195)	(0.0115)	(0.0110)
Obs.	4,082	4,048	4,185	4,151	6,115	6,115
Mean	0.0394	0.0394	7.188	7.188	0.0366	0.0366
Clusters	18	18	18	18	18	18
Controls	N	Y	N	Y	N	Y
Panel B: Urban Women						
Post Inj	0.032	0.024	-0.424	-0.247	-0.0064	-0.0096
	(0.024)	(0.021)	(0.326)	(0.267)	(0.0145)	(0.0153)
Obs.	1,314	1,306	1,333	1,325	1,576	1,576
Mean	0.0419	0.0419	6.385	6.385	0.0133	0.0133
Clusters	18	18	18	18	18	18
Controls	N	Y	N	Y	N	Y

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