The Long-Run Effects of Wage Replacement and Job Protection: Evidence from Two Maternity Leave Reforms in Great Britain

Jenna Stearns

University of California, Davis

June 4, 2018

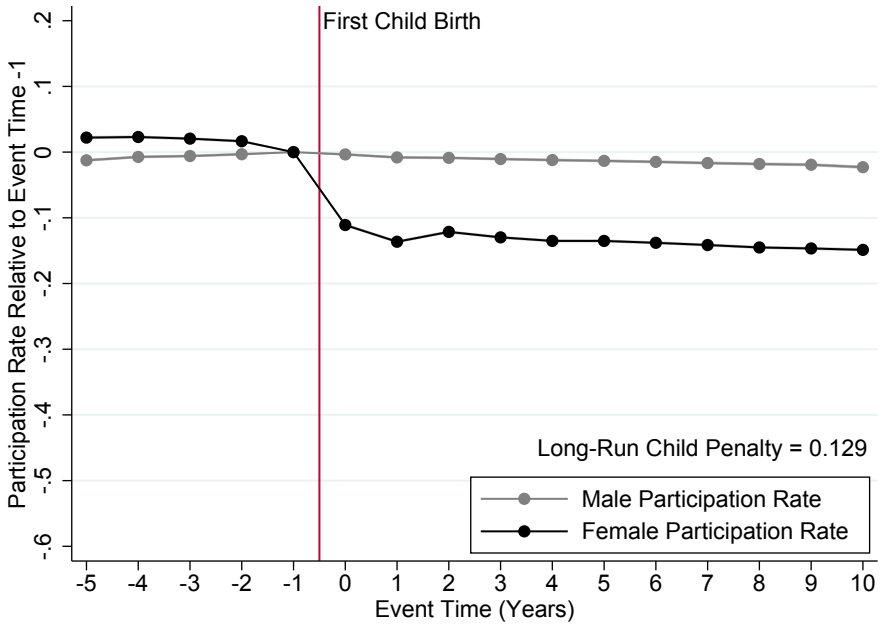
The Motherhood Gap

Source: Kleven et al. 2016

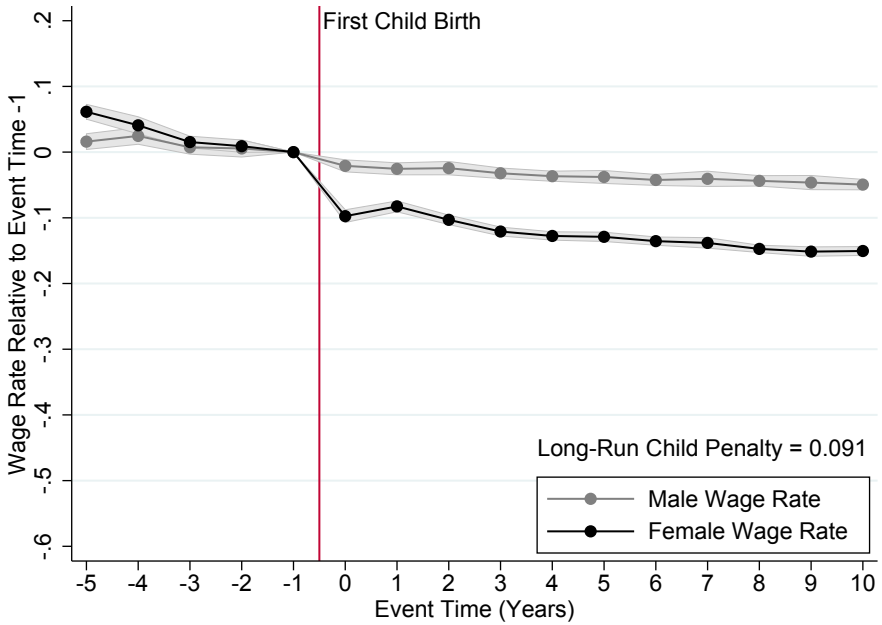
The Motherhood Gap

Is only partially explained by changes in labor supply

Labor Force Participation



Wage Rate



Source: Kleven et al. 2016

◂ More UK Evidence

Questions

Can we use mandated maternity leave policies to reduce the motherhood penalty in the labor market?

- How do **wage replacement** and **job protection** maternity leave benefits affect the employment outcomes and career trajectories of mothers?
  - How do changes in wage replacement and job protection benefits differentially affect short and long-term employment rates of mothers?
  - Do these policies affect long-run earnings?
  - What are the effects on job tenure and promotions?

Main Results

Wage replacement and job protection differentially affect employment outcomes:

- **Wage replacement:**
  - Doubles probability of being on leave
  - Increases short-term employment only

Main Results

Wage replacement and job protection differentially affect employment outcomes:

- **Wage replacement:**
  - Doubles probability of being on leave
  - Increases short-term employment only
- **Job protection** + wage replacement:
  - Substantially increases in leave-taking
  - Increases long-term employment rates by 8 percent
  - Substantial increases in job tenure and probability of working for pre-birth employer
  - No positive effects on earnings
  - Highly educated mothers are significantly less likely to be promoted

Literature Shows Mixed Evidence of Employment Effects:

- Maternity leave policies:
  - Mixed evidence on employment (Baker & Milligan, 2008; Han et al., 2009; Berger & Waldfogel, 2004; Ruhm, 1998; Schönberg & Ludsteck, 2014)
  - **This paper: Shows job protection and wage replacement have different effects on employment outcomes**
- A broader literature:
  - Work absences are bad (Spivey, 2005; Kleven et al., 2016)
  - Family friendly policies reduce the cost of "workplace flexibility" (Goldin & Katz, 2012)
  - But increase costs to employers (Das & Polachek, 2014; Blau & Kahn, 2016)
  - **This paper: Suggests short maternity leave policies may not offset the negative career costs of having children**

Maternity Leave in Great Britain

- Maternity leave since 1976
  - Most (over 60%) workers not eligible for wage replacement
  - Strong employer-specific work requirements to qualify
  - Benefit: 90 percent wages for 6 weeks, flat rate for 12 weeks ($\sim$30% avg. weekly wage)
- **Eligibility reform in 1994**
  - Wage replacement coverage becomes almost universal
  - 26 weeks of near-continuous employment (not employer-specific): Eligible for same wage benefits
  - Otherwise flat rate for whole period
- **Job protection reform in 2000**
  - Same eligibility requirements
  - Increase to one year of job-protected leave

Wage Replacement is Low-Cost for Employers

- Employers initially pay workers during leave
- 92 percent is deductible from employer's National Insurance contribution
  - Mandatory monthly tax/insurance premium paid to government
  - Provides pension, unemployment, illness/disability, maternity, and bereavement benefits to all workers
  - Workers contribute as well
- Direct costs to employers are minimal
- Information about policies/benefits is well known

Data

British Household Panel Survey

- Yearly Panel 1991-2009
- Nationally representative, household based
- 330,000 adult observations
- Detailed questions about household composition, education and training, labor market activity, income
- Can construct employment, fertility histories prior to 1991
- ▸ Summary Statistics

Identification: Difference-in-Differences Model

$$Y_{i,t+b} = \alpha + \beta_1 \textit{Eligibility*Infant}_{it} + \beta_2 \textit{JP*Infant}_{it} + \beta_3 \textit{Infant}_{it} + \beta_4 \textit{Eligibility}_{it} + \beta_5 \textit{JP}_{it} + X'_{i,t+b}\gamma + \delta_i + \theta_t + \varepsilon_{i,t+b}$$

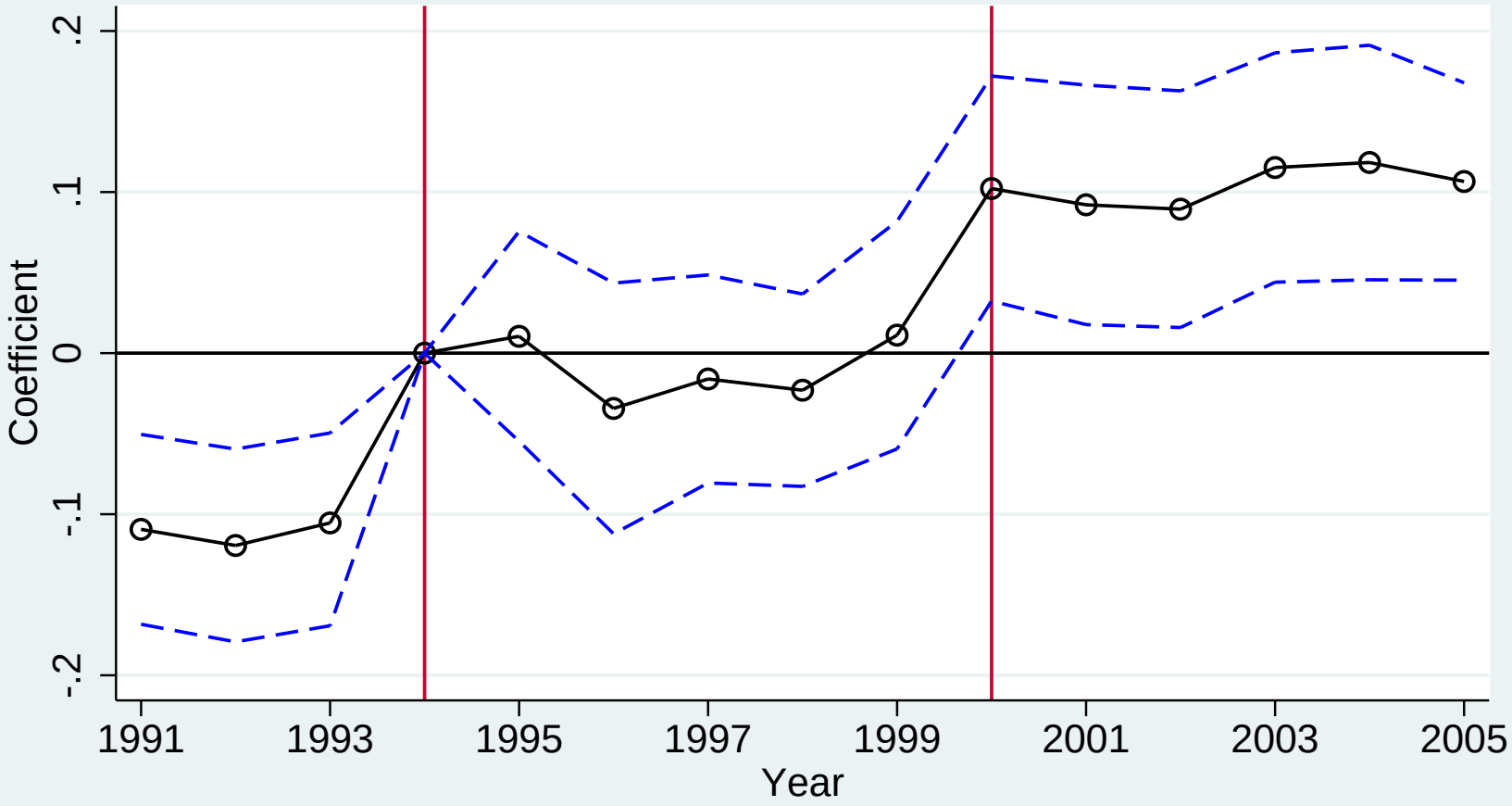
- $Y_{i,t+b}$: Outcome of individual i measured b years after survey year t
- *Eligibility* = indicator for eligibility expansion reform, *JP* = indicator for job protection reform
- X includes dummies for age, marital status, educational attainment, and age of the youngest child
- Control group: mothers of youngest child age 3-4 ▸ Parallel Trends
- Treatment effects identified with three years of data on either side of each policy change ▸ Graphical Representation

Effect of Maternity Leave on Short-Run Outcomes

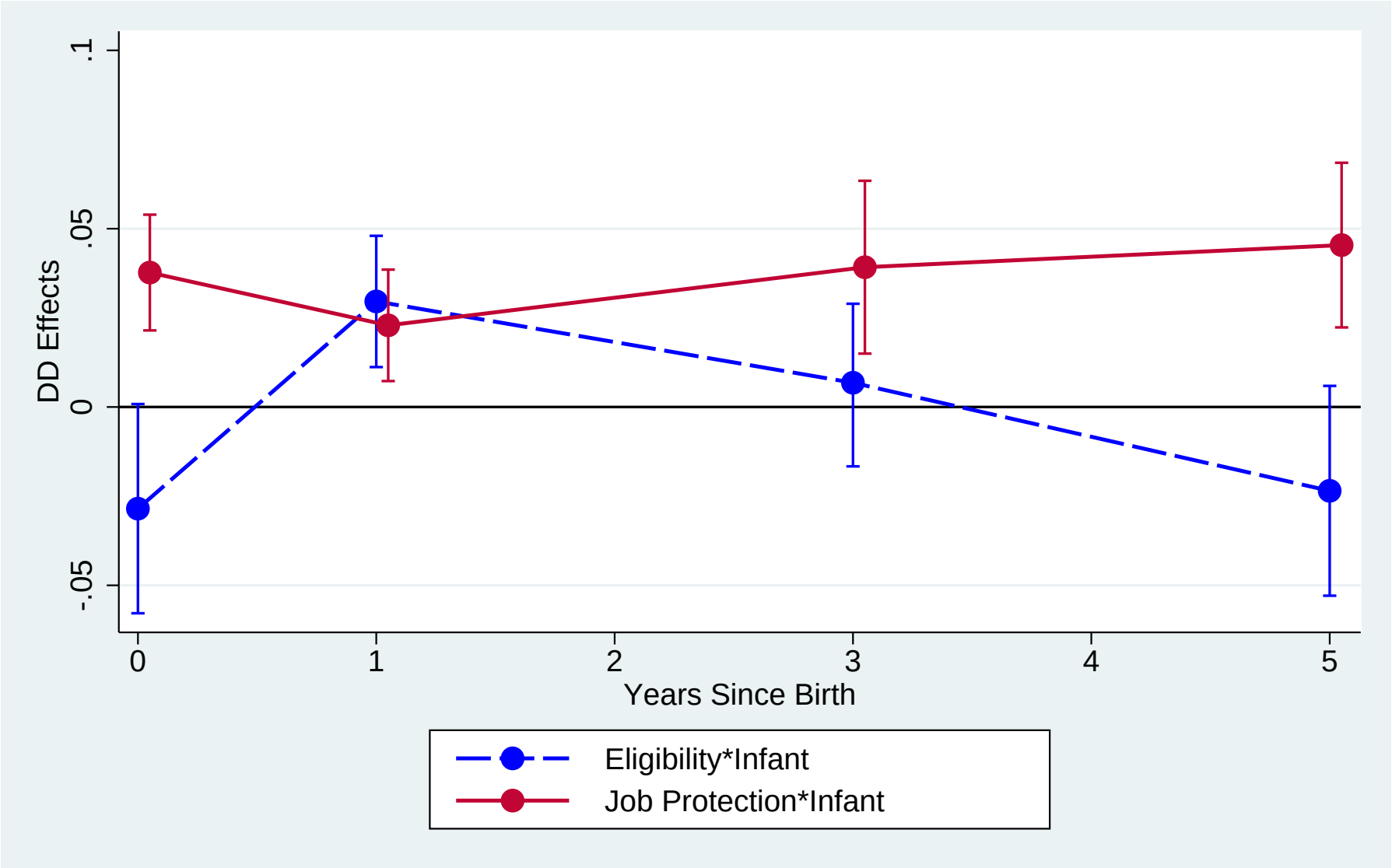
	On Leave	Currently Employed
Eligibility*Infant	0.104***	-0.0285
	(0.0201)	(0.0282)
Job Protection*Infant	0.102***	0.0377***
	(0.0182)	(0.0156)
Observations	11,257	11,257
R-squared	0.405	0.714
Individual Controls	YES	YES
Time FE	YES	YES
Individual FE	YES	YES

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Event Study: Effect on Probability of Being on Leave



Effect of Maternity Leave on Long-Run Employment Outcomes



▸ Heterogeneity by Parity ▸ Event Study ▸ Heterogeneity by Prior Work Eligibility

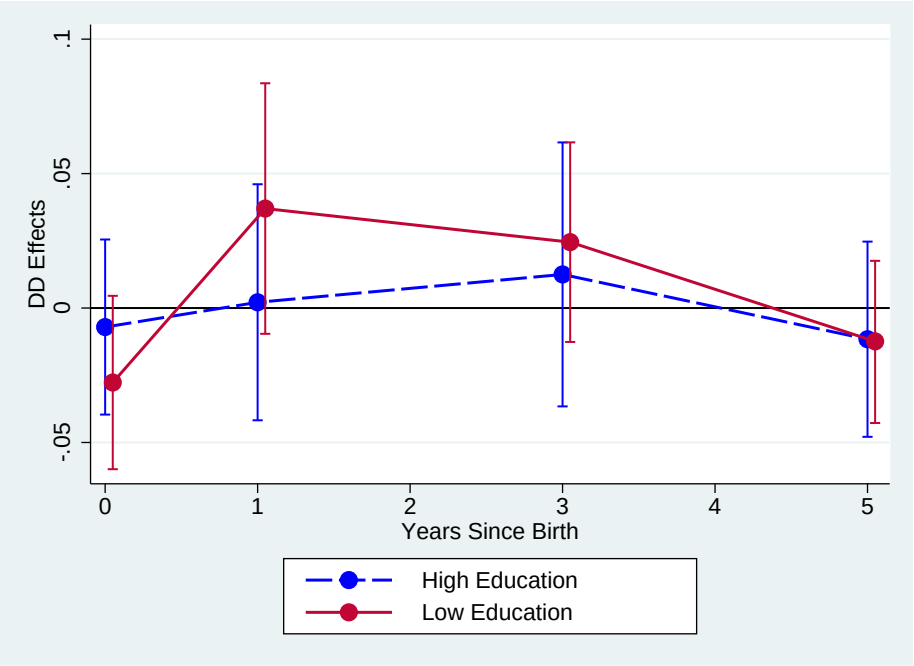
Heterogeneity by Prior Work Eligibility

	Maternity Leave	Employed This Year	Employed in 1 Year	Employed in 3 Years	Employed in 5 Years
Eligibility*Infant					
Effect for Those Who	0.1460***	-0.0606**	0.0563	0.0377	0.0151
Gained Eligibility	(0.0494)	(0.0279)	(0.0480)	(0.0405)	(0.0429)
Effect for Already Eligible	0.0320	0.0350	-0.0297	0.0148	-0.0096
	(0.0268)	(0.0626)	(0.0696)	(0.0618)	(0.0722)
Job Protection*Infant					
Effect for Those Who Gained	0.1112***	0.0615*	0.0344	0.0694*	0.0634**
Eligibility Under Eligibility Reform	(0.0295)	(0.0370)	(0.0355)	(0.0360)	(0.0337)
Effect for Already Eligible	0.0955**	0.0663*	0.0367	0.0568	0.0684*
Under Eligibility Reform	(0.0411)	(0.0385)	(0.0391)	(0.0363)	(0.0410)
Observations	11,257	11,257	9,927	9,743	9,247
R-squared	0.527	0.716	0.716	0.719	0.764

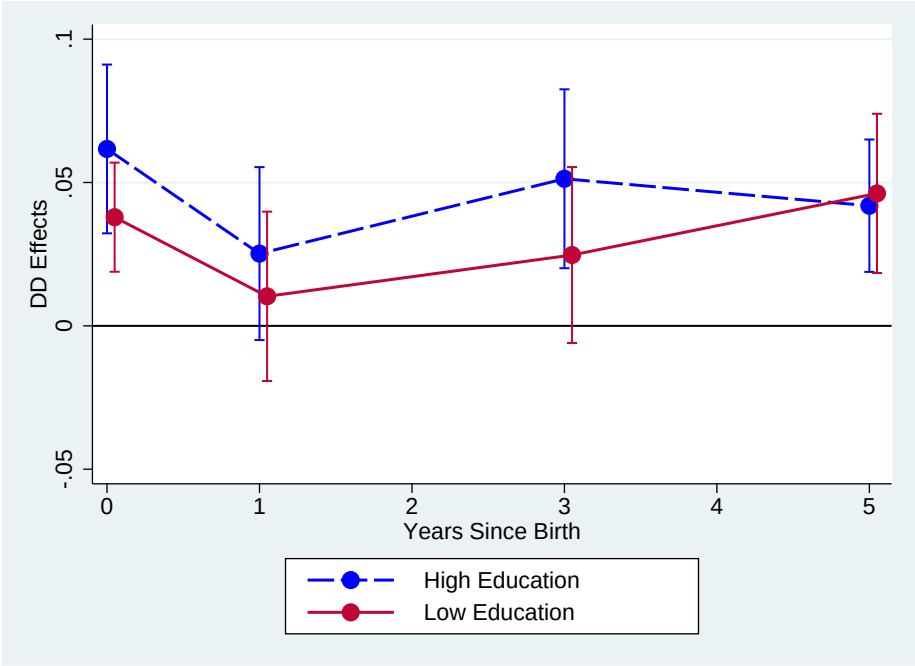
Became Eligible is an indicator for individuals who would not have been eligible for maternity leave under the pre-1994 policy, measured by their employment history in 1993. Already Eligible is an indicator for individuals who would have been eligible in 1993.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Heterogeneity by Mother's Education

Eligibility*Infant



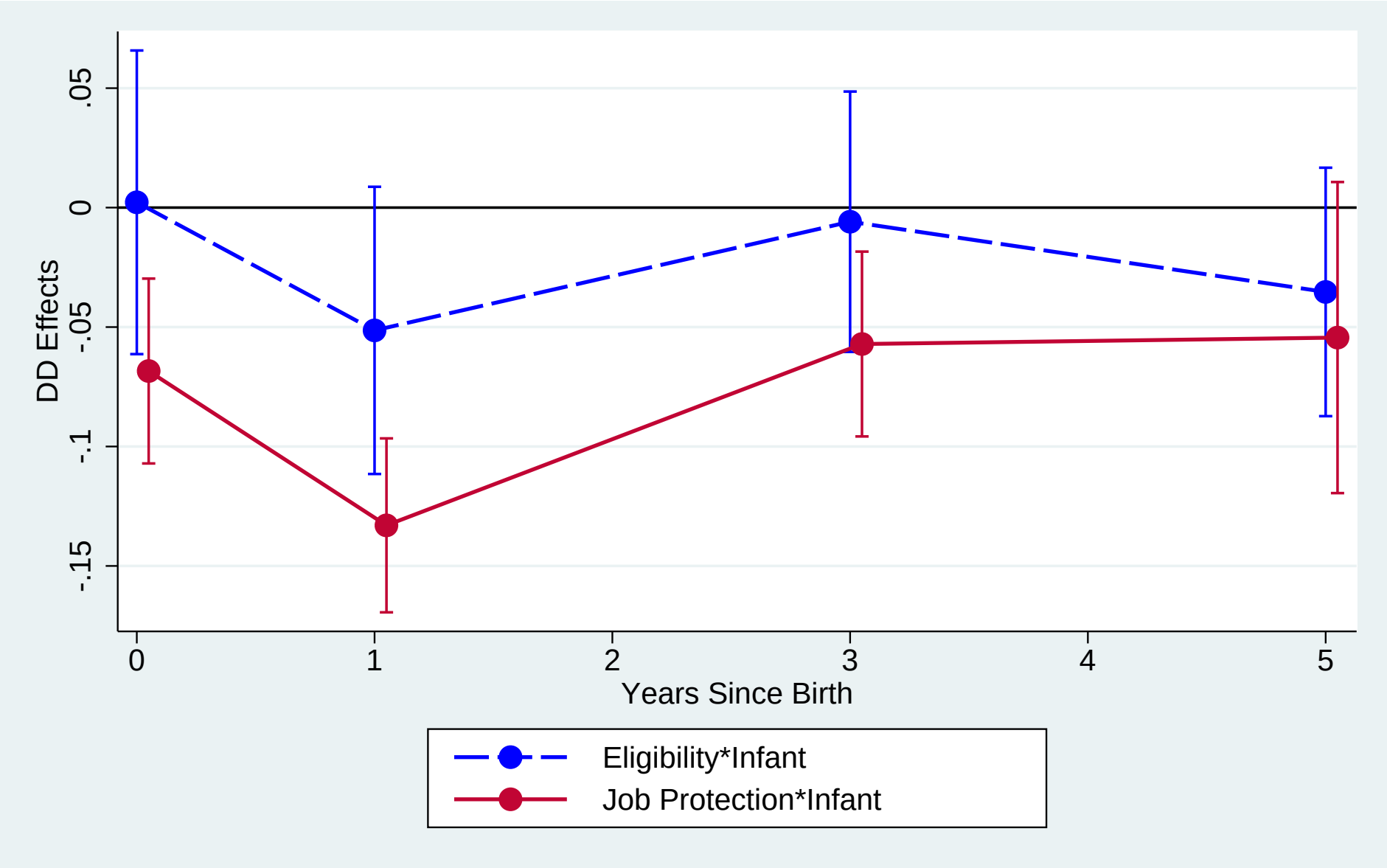
Job Protection*Infant



High education is defined as one year of post-secondary education or more. Low education is defined as completing secondary education or less.

No differences in effects on probability of being on leave.

Effects on Probability of Working Full-time



Maternity Leave Has Little Effect on Long-Term Earnings

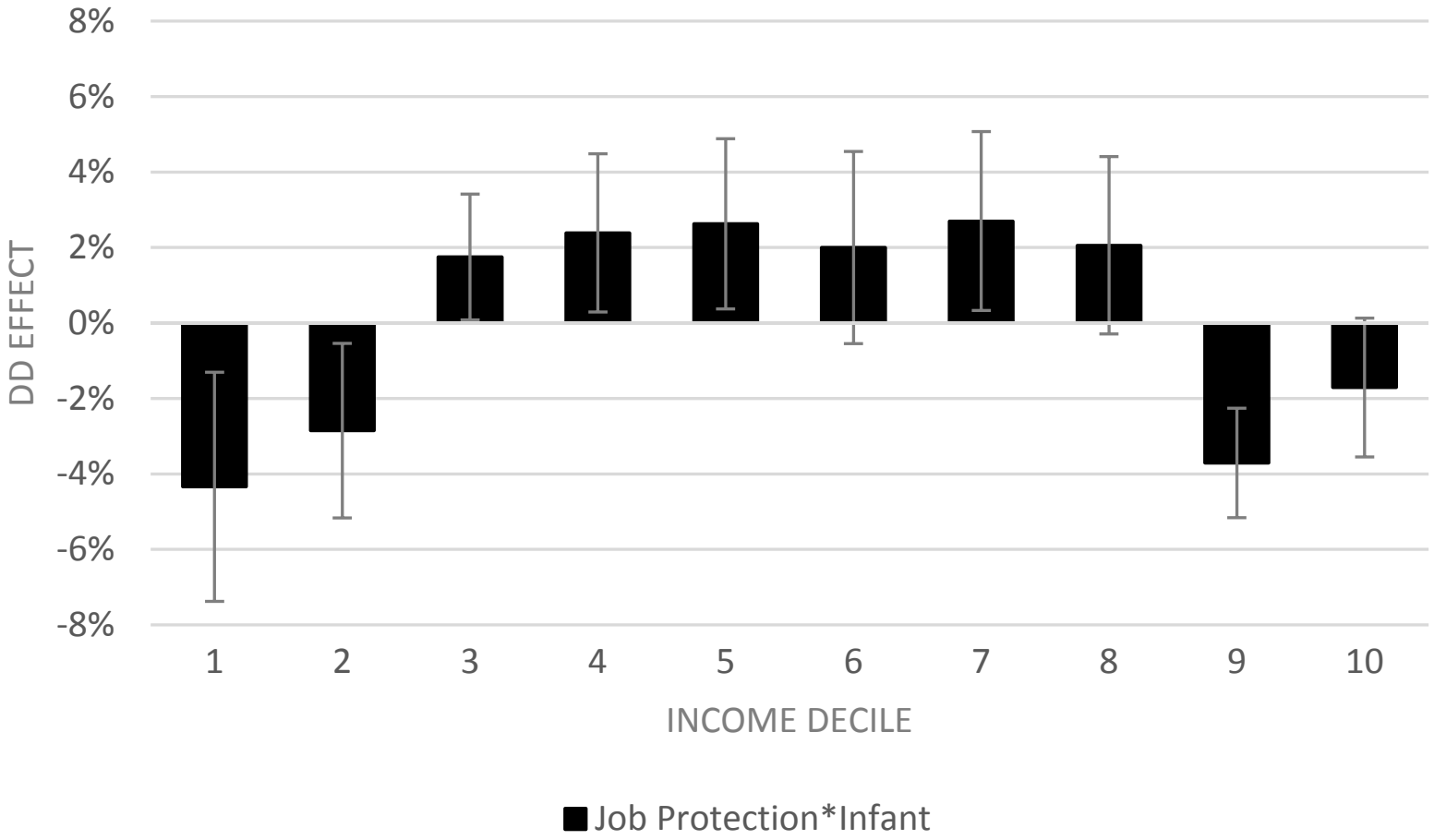
	Mean Monthly Earnings in 5 Years	
	All Women	Conditional on Employment
Eligibility*Infant	48.39	-42.48
	(50.35)	(68.59)
Job Protection*Infant	10.22	-70.90*
	(33.23)	(37.47)
Mean of Outcome	£972	£1,304
Observations	9,247	6,202
R-squared	0.695	0.791

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Job Protection Changes Monthly Earnings Distribution

Effects on Share of Mothers of Infants in Each Decile of Earnings Distribution, Measured 5 Years Later



◂ Pre-Reform Distribution

Effects on Job Characteristics

	Job Tenure (Months) in 5 Years	Is a Manager in 5 Years	Promoted within 5 Years
Panel A: Mothers with High Education			
Eligibility*Infant	1.198	-0.0518	0.0027
	(12.26)	(0.2233)	(0.0805)
Job Protection*Infant	19.77**	-0.1250***	-0.0749*
	(8.082)	(0.0521)	(0.0402)
Mean of Outcome	68.26	0.444	0.484
Panel B: Mothers with Low Education			
Eligibility*Infant	5.822	-0.0509	-0.1062***
	(8.871)	(0.152)	(0.0451)
Job Protection*Infant	6.093	0.0637	0.0633
	(7.440)	(0.1113)	(0.0917)
Mean of Outcome	44.13	0.258	0.445

Each column in each panel is a separate regression.

◂ Effects not driven by selection.

*** p<0.01, ** p<0.05, * p<0.1

Conclusions

Job-protected maternity leave has substantial effects on employment outcomes that persist long after leave ends

- Mothers are more likely to be employed more than 5 years later
- But no evidence of positive effects on wages after 5 years
- And some evidence high skilled women hold lower quality jobs

Conclusions

Job-protected maternity leave has substantial effects on employment outcomes that persist long after leave ends

- Mothers are more likely to be employed more than 5 years later
- But no evidence of positive effects on wages after 5 years
- And some evidence high skilled women hold lower quality jobs

Suggests maternity leave can exacerbate gender inequality in some settings

- Job protection might not be enough to change within-firm cost of taking leave
- Institutional norms still consider women as primary caregivers
- Important to consider when designing U.S. policy

Evidence of Statistical Discrimination?

Effect of Maternity Leave Policies on Probability of Being Hired

	All Workers	21-39 Year Olds	High Education 21-39 Year Olds	Low Education 21-39 Year Olds
Eligibility*Female	0.01192	0.00008	0.01181	-0.01507
	(0.00894)	(0.01814)	(0.02803)	(0.02382)
Job Protection*Female	0.00663	0.00253	0.00093	0.00493
	(0.00600)	(0.01624)	(0.02750)	(0.02012)
Observations	84,941	25,990	11,146	14,844
R-squared	0.597	0.658	0.688	0.640

Each column is a separate regression comparing females to males. High education is defined as one year of post-secondary education or more. Low education is defined as completing secondary education or less. Regressions include time fixed effects and individual controls.

*** p<0.01, ** p<0.05, * p<0.1

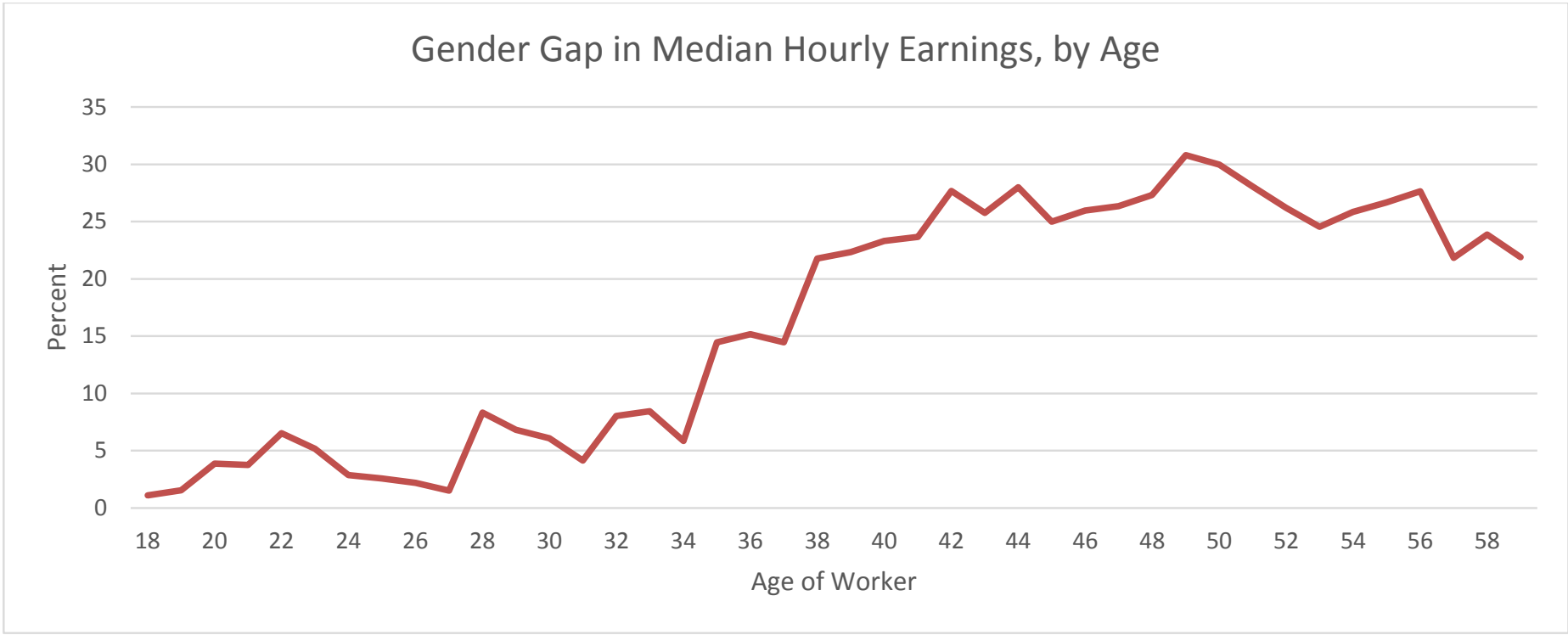
Effect of Maternity Leave on Probability of Being Hired by a Small Firm

	(1)	(2)	(3)	(4)
	All Workers	21-39 Year Olds	High Education 21-39 Year Olds	Low Education 21-39 Year Olds
Eligibility*Female	-0.0043	-0.0043	-0.0215	0.0207
	(0.0120)	(0.0268)	(0.0339)	(0.0347)
Job Protection*Female	-0.0339***	-0.0607***	-0.0926***	-0.0319
	(0.0080)	(0.0217)	(0.0363)	(0.0277)
Observations	52,679	14,770	5,978	8,792
R-squared	0.643	0.696	0.697	0.672

Each column is a separate regression comparing females to males. A small firm is defined as having less than 50 workers. Regressions include time fixed effects and individual controls.

*** p<0.01, ** p<0.05, * p<0.1

The Work/Family Trade-Off



Source: New Earnings Survey Panel Dataset, Annual Survey of Hours and Earnings

◂ Go Back

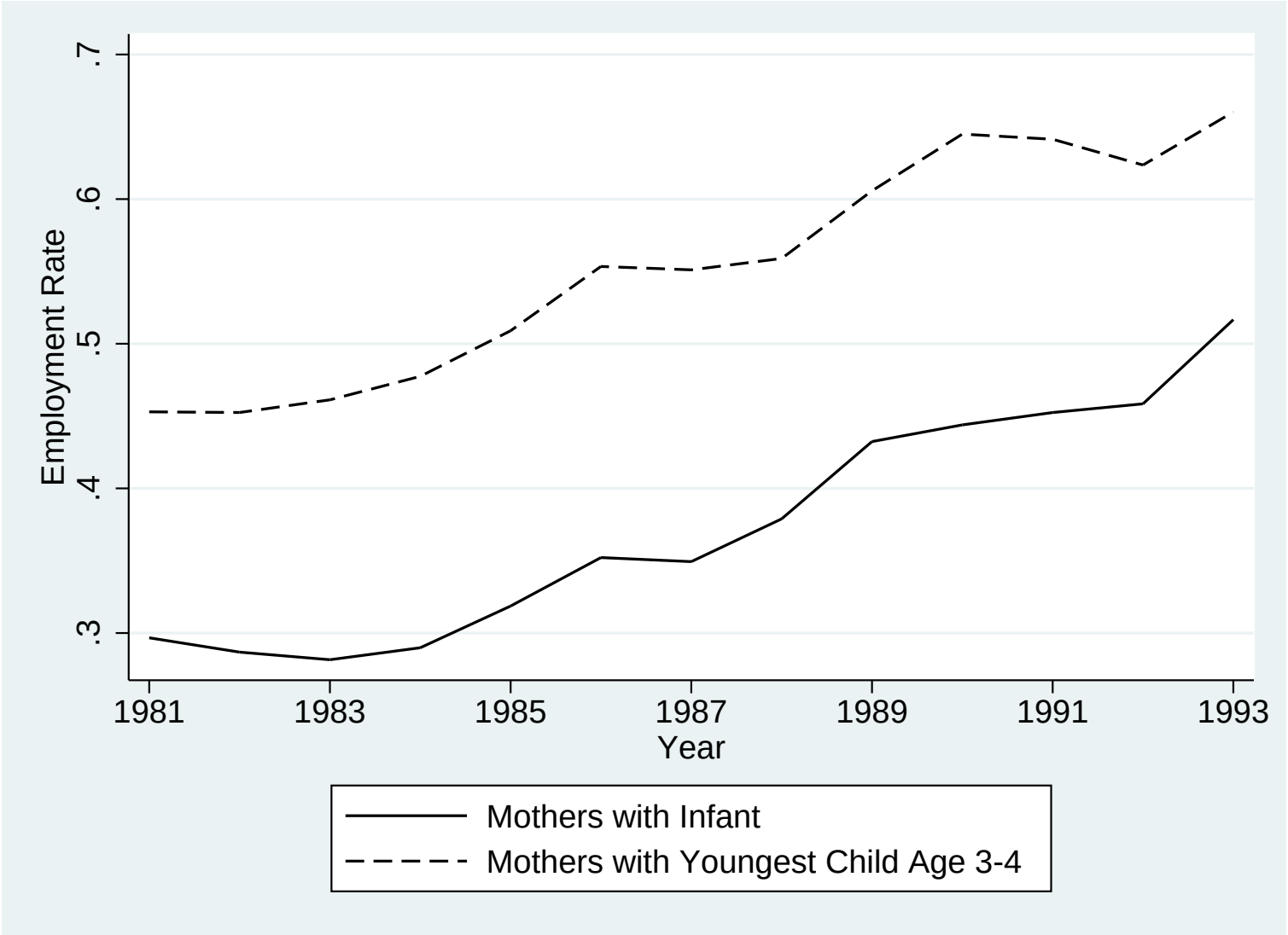
Summary Statistics

	Mothers of Infants	Mothers of Youngest Child Age 3-4
Age	29.328	33.189
	(5.919)	(5.726)
Married	0.660	0.680
	(0.474)	(0.466)
Couple	0.870	0.815
	(0.336)	(0.388)
White	0.937	0.943
	(0.244)	(0.231)
Black	0.015	0.017
	(0.120)	(0.128)
Asian	0.040	0.033
	(0.195)	(0.178)
Currently at Work	0.330	0.629
	(0.449)	(0.494)
Employed	0.558	0.660
	(0.500)	(0.488)
N	7,794	12,129

Standard deviations in parentheses

Go Back

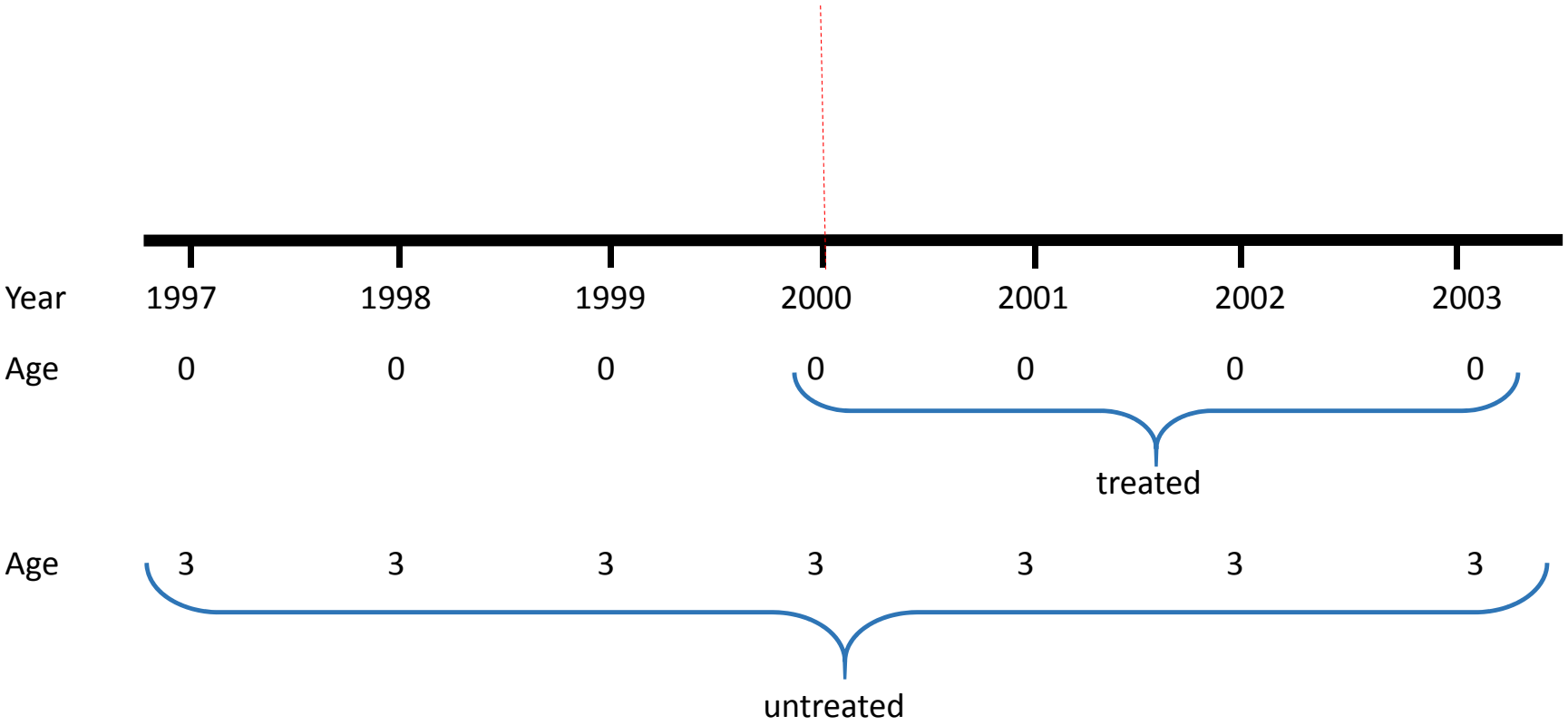
Evidence of Parellel Trends in Employment Rates



Source: General Household Survey

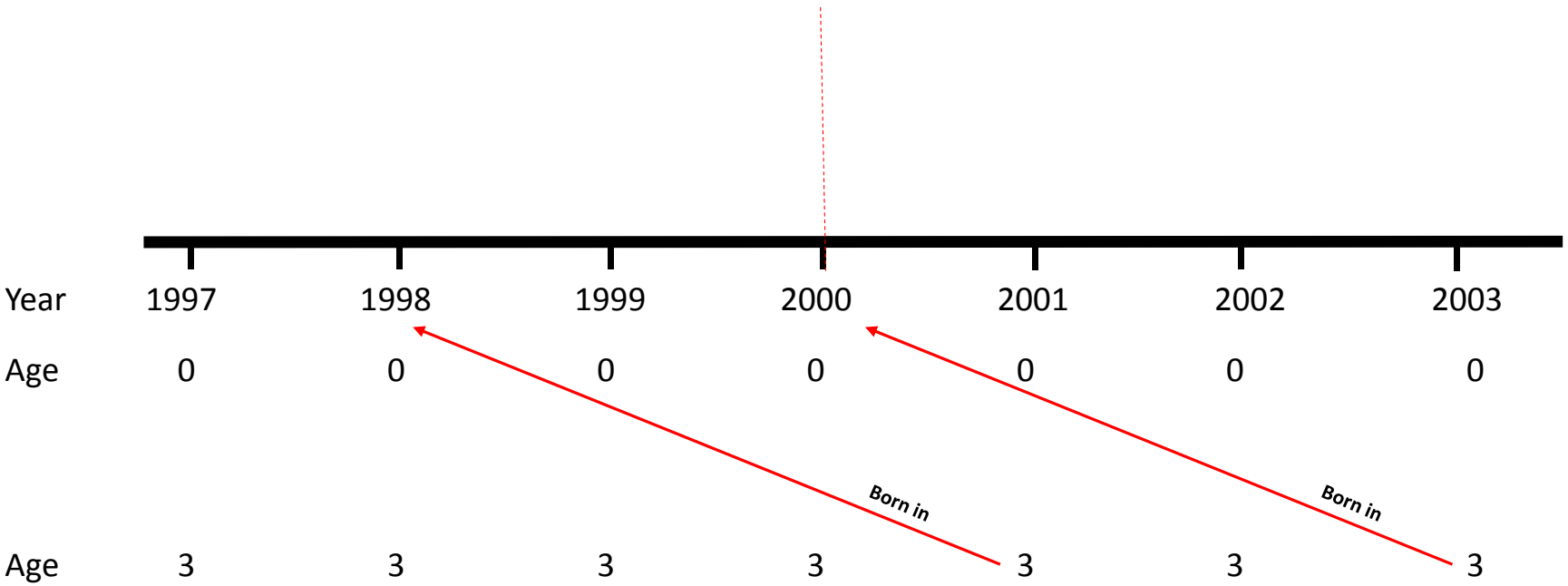
◂ Go Back

Long-Run Employment Effects - Mothers



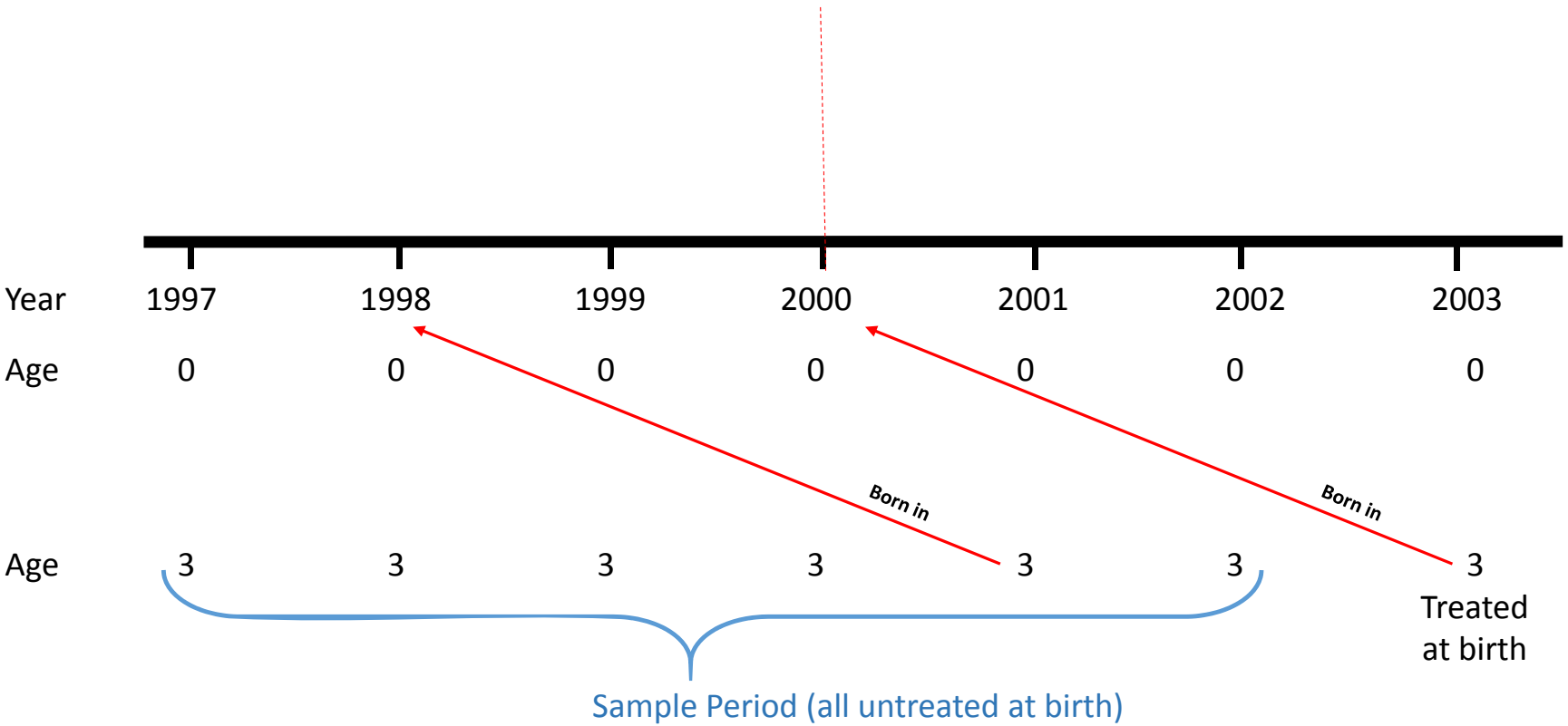
◂ Go Back

Long-Run Employment Effects - Mothers



◂ Go Back

Long-Run Employment Effects - Mothers



◂ Go Back

Results are Robust to Alternate Control Groups

Effect of Maternity Leave on Probability of Being On Leave

	(1)	(2)	(3)	(4)	(5)	(6)
	Women with Youngest Child Age 1-2	Mothers with Youngest Child Age 3-4	Mothers with Youngest Child Under Age 15	Women without Children	Fathers with Infant	DDD
Eligibility*Infant	0.110***	0.104***	0.101***	0.146***		
	(0.0220)	(0.0201)	(0.0198)	(0.0305)		
Benefits*Infant	0.105***	0.102***	0.0976***	0.105***		
	(0.0184)	(0.0182)	(0.0178)	(0.0231)		
Eligibility*Female					0.0721*	
					(0.0406)	
Benefits*Female					0.0927***	
					(0.0122)	
Eligibility*Female*Infant						0.105***
						(0.0213)
Benefits*Female*Infant						0.108***
						(0.0185)
Observations	10,669	11,257	43,891	32,891	7,308	19,231
R-squared	0.439	0.405	0.395	0.483	0.721	0.451

Robust standard errors in parentheses. Each column is a separate regression DDD compares mothers of infants to fathers of infants, compared to the difference between parents with a youngest child age 3-4. Regressions include individual fixed effects, time fixed effects, and individual controls.

*** p<0.01, ** p<0.05, * p<0.1

◂ Go Back

No Effect on Demographic Characteristics or Fertility

	(1) Has Infant	(2) Mean Age	(3) Married	(4) Couple	(5) Mean Age of Youngest Child	(6) High Education	(7) White	(8) Black	(9) Asian	(10) Other
Eligibility	0.00503									
	(0.00938)									
Job Protection	-0.00112									
	(0.0105)									
Eligibility*Infant		0.0237	-0.00448	-0.0285	-0.435	-0.0157	-0.0190	-0.00473	0.0171	0.0001
		(0.0319)	(0.0445)	(0.0446)	(0.516)	(0.0429)	(0.0256)	(0.0164)	(0.0168)	(0.0116)
Job Protection*Infant		0.0136	-0.00635	-0.0314	0.291	-0.0186	0.0233	0.0144	-0.0320**	-0.00349
		(0.0212)	(0.0228)	(0.0212)	(0.300)	(0.0328)	(0.0181)	(0.00903)	(0.0147)	(0.00611)
Observations	11,257	11,257	11,257	11,257	11,257	11,257	11,257	11,257	11,257	11,257
R-squared	0.909	0.999	0.852	0.780	0.990	0.075	0.043	0.047	0.067	0.013
Individual Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Individual FE	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO

Robust standard errors in parentheses. Each column is a separate regression comparing mothers of infants to mothers whose youngest child is 3-4 years old in the reference year. Controls include age, marital status, number of kids, indicators for age of youngest child, and race and education dummy variables, excluding the outcome and other mutually exclusive dummy variables. High education is defined as completing any schooling beyond secondary school.
*** p<0.01, ** p<0.05, * p<0.1

◂ Go Back

Results are Robust to Alternate Control Groups

Effect of Maternity Leave on Long-Run Employment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Control Group:								
	Women without Children			Women with Youngest Child Age 3-15			Fathers of Infants		
	Employed in 1 year	Employed in 3 Years	Employed in 5 Years	Employed in 1 year	Employed in 3 Years	Employed in 5 Years	Employed in 1 year	Employed in 3 Years	Employed in 5 Years
Eligibility*Infant	0.0650**	0.0451	0.0337	0.0502***	0.0409	0.0325	0.0733	0.0366	0.0168
	(0.0323)	(0.0303)	(0.0305)	(0.0195)	(0.0307)	(0.0294)	(0.0669)	(0.0730)	(0.0680)
Job Protection*Infant	0.0445*	0.0411*	0.0624**	0.0121	0.0615***	0.0449**	0.0450	0.0399	0.0489*
	(0.0234)	(0.0235)	(0.0256)	(0.0186)	(0.0194)	(0.0196)	(0.0293)	(0.0261)	(0.0291)
Observations	30,999	26,943	22,739	41,489	36,392	30,926	6,919	6,076	5,153
R-squared	0.530	0.612	0.700	0.608	0.626	0.695	0.845	0.851	0.867

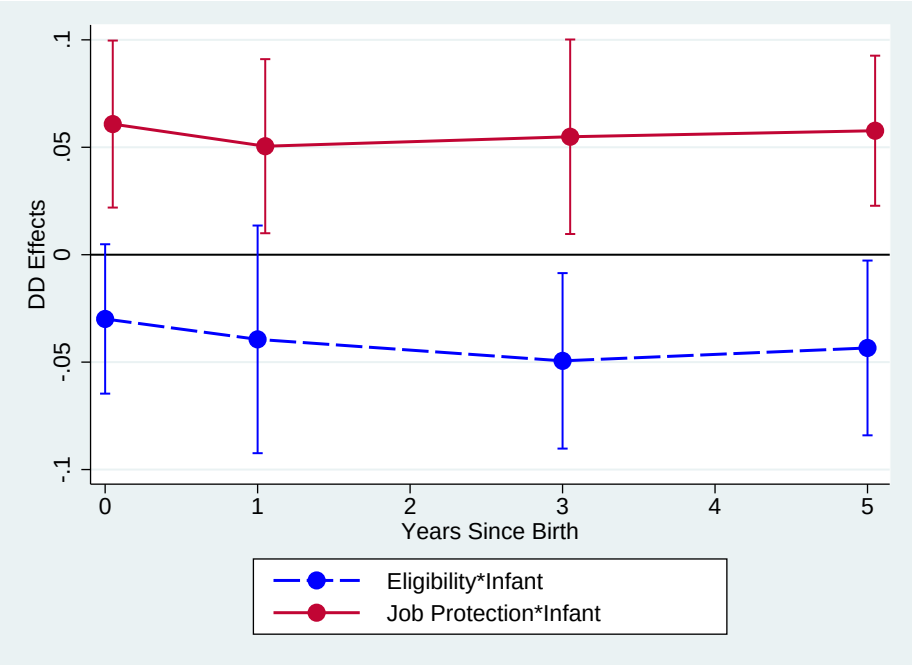
Robust standard errors in parentheses. Regressions include time fixed effects, individual fixed effects, and individual controls.

*** p<0.01, ** p<0.05, * p<0.1

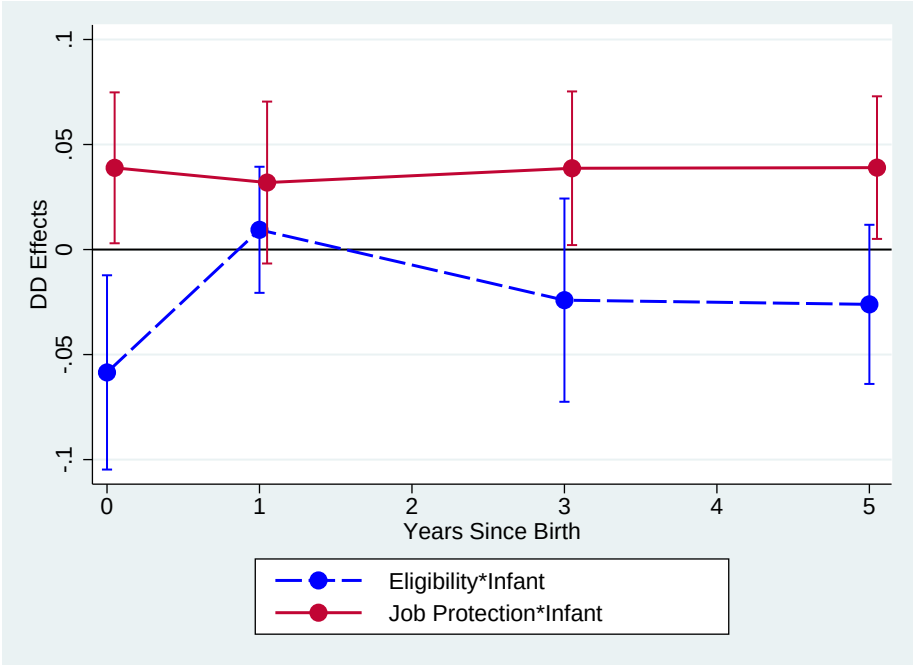
◂ Go Back

Effects are Similar for 1 and 2 Child Households

Mothers with One Child

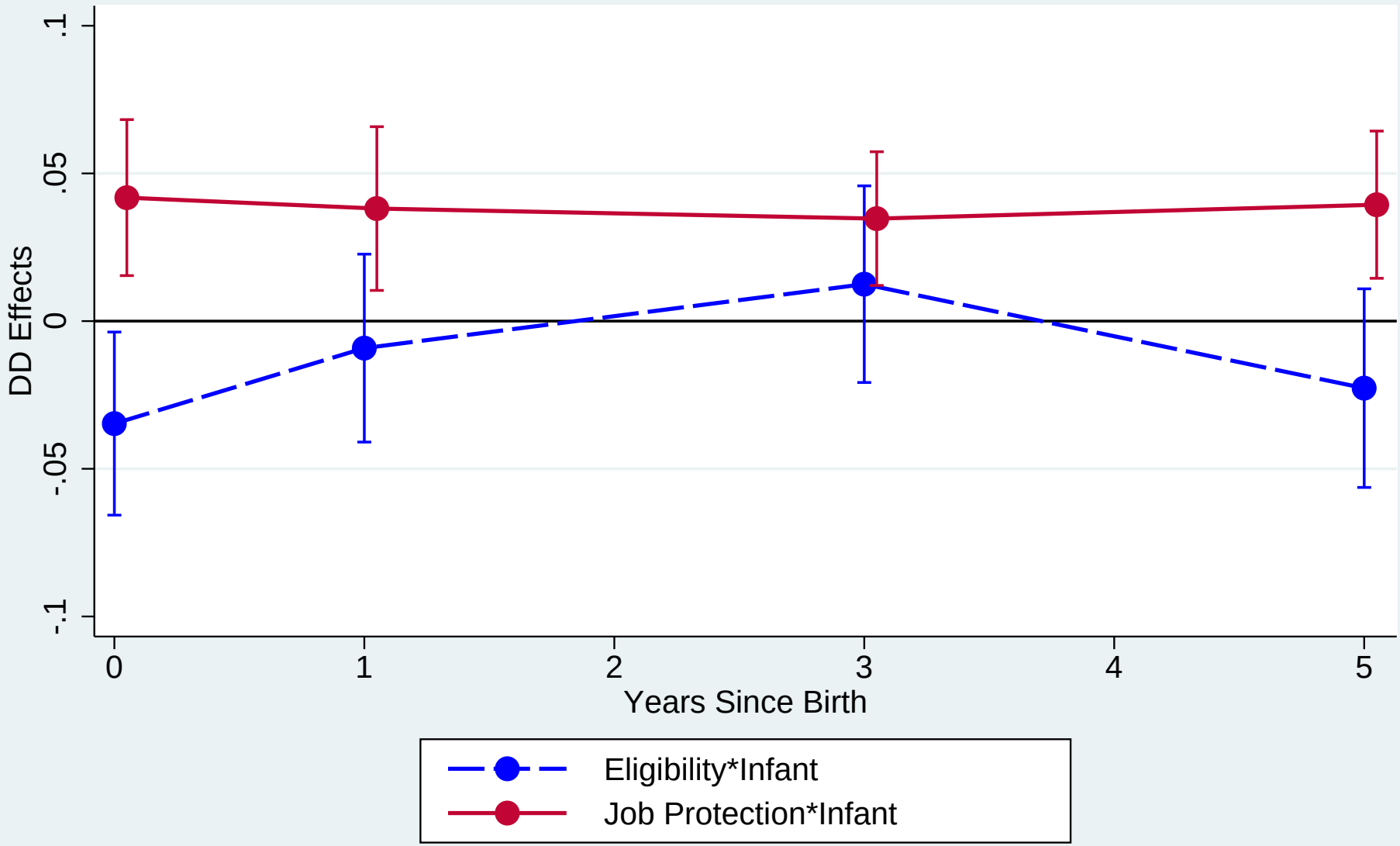


Mothers with Two Children



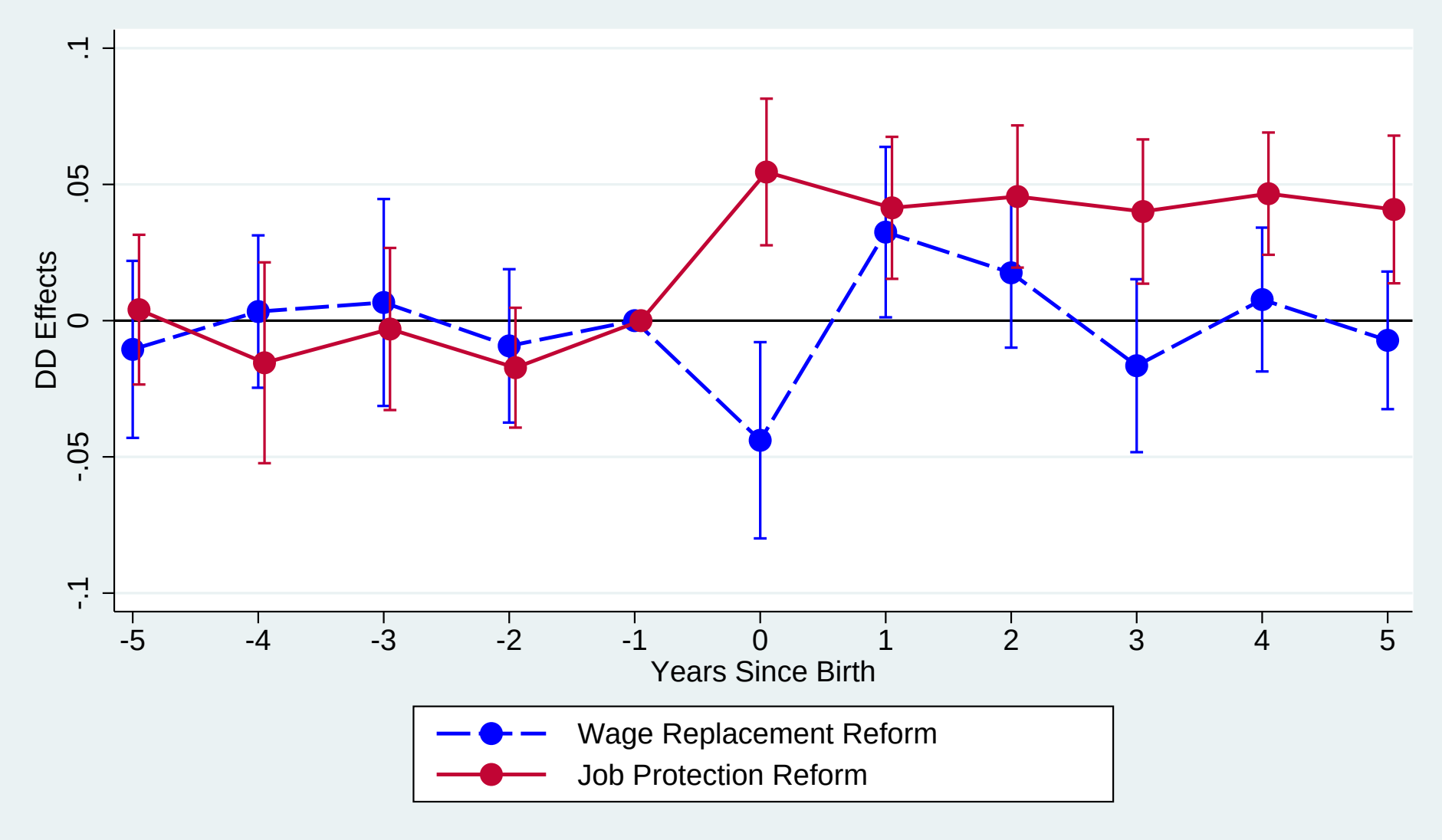
◂ Go Back

All Mothers - No Fixed Effects



Go Back

Alternative Specification: Event Study



◂ Go Back

Heterogeneity by Prior Work Eligibility

	Maternity Leave	Employed This Year	Employed in 1 Year	Employed in 3 Years	Employed in 5 Years
Eligibility*Infant					
Effect for Those Who	0.1460***	-0.0606**	0.0563	0.0377	0.0151
Gained Eligibility	(0.0494)	(0.0279)	(0.0480)	(0.0405)	(0.0429)
Effect for Already Eligible	0.0320	0.0350	-0.0297	0.0148	-0.0096
	(0.0268)	(0.0626)	(0.0696)	(0.0618)	(0.0722)
Job Protection*Infant					
Effect for Those Who Gained	0.1112***	0.0615*	0.0344	0.0694*	0.0634**
Eligibility Under Eligibility Reform	(0.0295)	(0.0370)	(0.0355)	(0.0360)	(0.0337)
Effect for Already Eligible	0.0955**	0.0663*	0.0367	0.0568	0.0684*
Under Eligibility Reform	(0.0411)	(0.0385)	(0.0391)	(0.0363)	(0.0410)
Observations	11,257	11,257	9,927	9,743	9,247
R-squared	0.527	0.716	0.716	0.719	0.764

Became Eligible is an indicator for individuals who would not have been eligible for maternity leave under the pre-1994 policy, measured by their employment history in 1993. Already Eligible is an indicator for individuals who would have been eligible in 1993.

*** p<0.01, ** p<0.05, * p<0.1

◂ Go Back

Effects of Eligibility Reform Driven by Mothers Who Have More Kids

	(1)	(2)	(3)	(4)	(5)	(6)
	Mother Has More Children			No More Children		
	Employed in 1 year	Employed in 3 Years	Employed in 5 Years	Employed in 1 year	Employed in 3 Years	Employed in 5 Years
Eligibility*Infant	0.0686***	0.0433***	-0.0127	-0.0311	-0.0233	-0.0222
	(0.0213)	(0.0102)	(0.0160)	(0.0369)	(0.0244)	(0.0376)
Job Protection*Infant	0.0399	0.0340	0.0418	0.0650*	0.0607***	0.0644**
	(0.0331)	(0.0362)	(0.0355)	(0.0346)	(0.0304)	(0.0317)
Observations	4,062	4,062	4,062	5,117	5,117	5,117
R-squared	0.694	0.784	0.857	0.763	0.760	0.801

Robust standard errors in parentheses. Columns (1)-(3) condition the sample on women who have at least one birth after the reference year. Columns (4)-(6) condition the sample on women who do not have more children after the reference year.

*** p<0.01, ** p<0.05, * p<0.1

◂ Go Back

Distribution of Mothers of Infants in 5 Years, Before Job Protection Reform

Earnings Decile	Percent of Mothers
1	12.75
2	10.27
3	8.52
4	11.27
5	9.75
6	9.85
7	9.98
8	9.42
9	9.56
10	8.62

◂ Go Back

Job Protection Increases Probability of Working for Pre-Birth Employer by 30%

	(1) Same Employer as Last Year	(2) Same Employer as Last Year (All Individuals)	(3) Same Employer in 5 Years	(4) Same Employer in 5 Years (All Individuals)
Eligibility*Infant	-0.0612	-0.0024	-0.0213	0.0073
	(0.0937)	(0.0470)	(0.0971)	(0.0406)
Job Protection*Infant	0.1620***	0.1082***	0.1345***	0.08544***
	(0.0496)	(0.0298)	(0.0507)	(0.0257)
Mean of Dependent Variable	0.620	0.260	0.427	0.179
Observations	5,202	9,283	5,202	9,283
R-squared	0.597	0.663	0.718	0.651

Robust standard errors in parentheses. Same employer is an indicator for working for the same employer as last year and same employer in 5 years is an indicator for working for the same employer as 5 years ago. Columns (1) and (3) condition the sample on mothers who were employed in the year of birth; columns (2) and (4) do not.

*** p<0.01, ** p<0.05, * p<0.1

◂ Go Back

Effects on Job Characteristics Cannot be Explained by Selection into Employment

Bounding exercise (Lee, 2009) to determine how much of the effects on the probability of being a manager or being promoted are driven by the increase in long-run employment.

- Sample trimmed by the number of "excess" women who select into employment as a result of the maternity leave policy
- Upper bound: trim only women whose outcome=0;
  Lower bound: trim only women whose outcome=1
- Monotonicity assumption for valid bounds not satisfied
  - de Chaisemartin (2016) shows bounds are still valid under much weaker assumptions:
    - More compliers than defiers
    - Pre-treatment outcome means are the same

Effects on Job Characteristics Cannot be Explained by Selection into Employment

	(1)	(2)	(3)	(4)	(5)	(6)
	Is a Manager in 5 Years			Promoted within 5 Years		
	Overall	Lower Bound	Upper Bound	Overall	Lower Bound	Upper Bound
Panel A: Mothers with High Education						
Eligibility*Infant	-0.0518	-0.0478	-0.0504	0.0027	-0.0020	0.0103
	(0.2232)	(0.2240)	(0.2844)	(0.0805)	(0.0835)	(0.0839)
Job Protection*Infant	-0.1251***	-0.0979*	-0.1342***	-0.0749*	-0.0690*	-0.0986***
	(0.0521)	(0.0511)	(0.0524)	(0.0402)	(0.0399)	(0.0397)
Observations	1,634	1,620	1,620	1,576	1,563	1,563
R-squared	0.797	0.796	0.798	0.710	0.712	0.708
Panel B: Mothers with Low Education						
Eligibility*Infant	-0.0509	-0.0489	-0.0733	-0.1063***	-0.0898*	-0.1290**
	(0.1522)	(0.1524)	(0.1513)	(0.0451)	(0.0499)	(0.0520)
Job Protection*Infant	0.0637	0.0491	0.0864	0.0633	0.0476	0.0880
	(0.1110)	(0.1141)	(0.1053)	(0.0917)	(0.0962)	(0.0905)
Observations	1,577	1,541	1,541	1,502	1,466	1,466
R-squared	0.747	0.748	0.750	0.704	0.706	0.709

Robust standard errors in parentheses. Regressions include time fixed effects, individual fixed effects, and individual controls.

*** p<0.01, ** p<0.05, * p<0.1

◂ Go Back