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Universal Early Childhood Education and Adolescent Risky Behavior

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Social Benefits of Early Childhood Education

Positive Externalities from Early Childhood Education (ECE)

- Perry Preschool Project: 50% benefits from crime reduction
- Decreased welfare dependency, improved health
- Justification for policy intervention, public expenditure

Limited Knowledge on ECE Effects on Risky Behavior

- Large-scale, universal program effectiveness?
- Scant evidence outside North America

Assessing the Effects of a Preschool Reform in Japan

Preschool Reform in 1964-1970

- Universal
- It enabled 1.4M children to enroll (enrollment rate: 18% ⇒ 39%)

Main Outcomes

- Violent and non-violent crime rates

  Large social cost

- Teenage pregnancy rate

  Linked to weaker labor market outcomes and greater welfare dependence, children's poor school performance, poor health, and criminal activity.

Empirical Method

Difference-in-Differences Approach

- Leveraging variation in enrollment growth across provinces
- No evidence of pre-trends

Province-level Panel Data

- Administrative data
  (reduced measurement error compared to self-reporting)

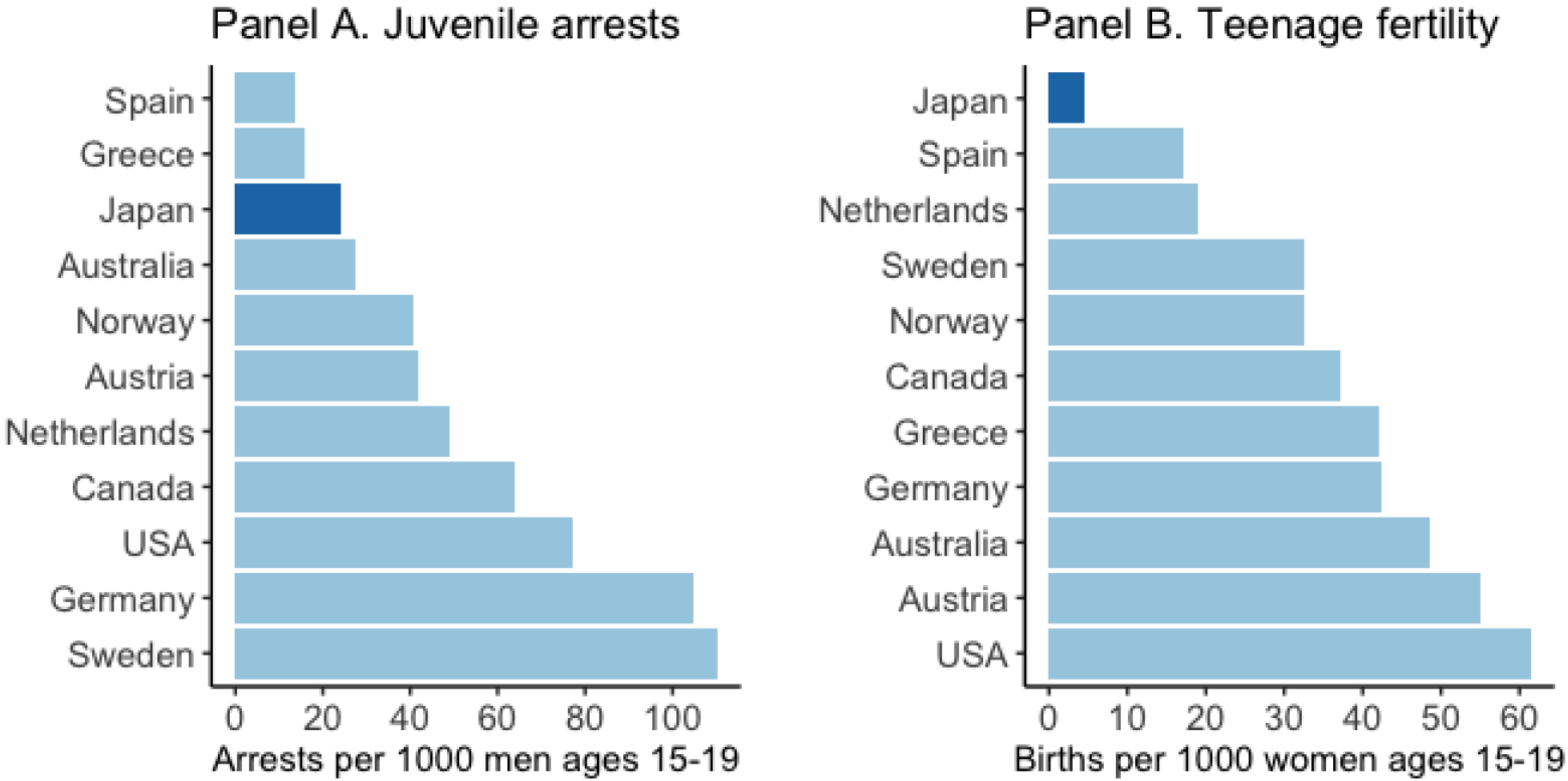
Why Japan?

1. Large Universal Program
   - 1.7 M (vs. 0.4 M in U.S. Head Start)
   - Universal
2. Lower Crime and Teenage Fertility Rates
   - Refer to Fig. 1.

Both factors could potentially weaken ECE efficacy.

Significant effects would bolster confidence in ECE.

Figure 1: International comparison of juvenile arrests and teenage fertility



How Does Early Childhood Education Reduce Risky Behavior?

Additional Years of Education

- Less time for risky behavior ("incapacitation" effects)
- Higher opportunity cost of risky behavior

Improved Non-Cognitive Skills

- Childhood externalizing behaviors predict later criminal involvement
- Effects on non-cognitive skills often persist into adulthood

Main Findings

Effects of the Preschool Reform

- Violent crime: -1.052*** per 1,000 individuals (= -38%)
- Non-violent crime rate: -1.138 per 1,000 individuals (= -8%)
- Teenage pregnancy: -1.325* per 1,000 individuals (= -17%)

No Treatment Effect Heterogeneity

No difference by women's education.

No Effects on High School Enrollment

Inconsistent with "incarceration" effects.

Japanese Preschools

Curriculum

Influenced by U.S. curriculum (e.g., Head Start and HighScope)

Emphasis on social-emotional skills over academic skills

Quality

– Teachers require two years of post-secondary education.

– Pupil-teacher ratio = 24

Comparisons: Norway = 17-19, US = 17-20.

Preschool Reform (1964-70)

Background

1,709 out of 3,388 municipalities lacked preschool by 1966.

Goal

Establish at least one preschool in each municipality with 10,000+ Residents.

Outcomes

- # of preschools: 7687 → 11180 (+45%)
- # of teachers: 37041 → 68607 (+84%)
- Many preschools remained oversubscribed, indicating that slots were utilized.

Juvenile Arrest Rates

Definition: Arrests per 1,000 individuals in ages 14-19.

- Administrative record (not self-reported)

Violent crimes

- Assaults, assembling with offensive weapons, arson, murders, robberies, rapes, criminal intimidation, and extortion
- Pre-reform mean = 2.743

Non-violent crimes

- Pre-reform mean = 14.000

Teenage Pregnancy Rates

Def: Childbirths and abortions per 1,000 women in ages 15-19.

- Abortion is legal.
- Doctors required to report each abortion and childbirth case.
- Pre-reform mean = 7.857.

Econometric Model

$$Y_{it} = \sum_{h \in \{1964,\ldots,1995\}} \{\alpha_h \Delta Enroll_i \times 1[t = h] + \beta_h X_i \times 1[t = h]\} + \pi_i + \mu_t + \epsilon_{it}.$$

- Y_{it}: outcome (e.g., arrest rate) in province i in year t.
- $\Delta Enroll_i$: growth of the preschool enrollment rate during the reform.
- X_i: pre-reform characteristics.
- π_i: province fixed effects
- μ_t: year fixed effects

Main Results

(1) Simple, Graphical Evidence

– Treated provinces (growth of enrollment is above median)

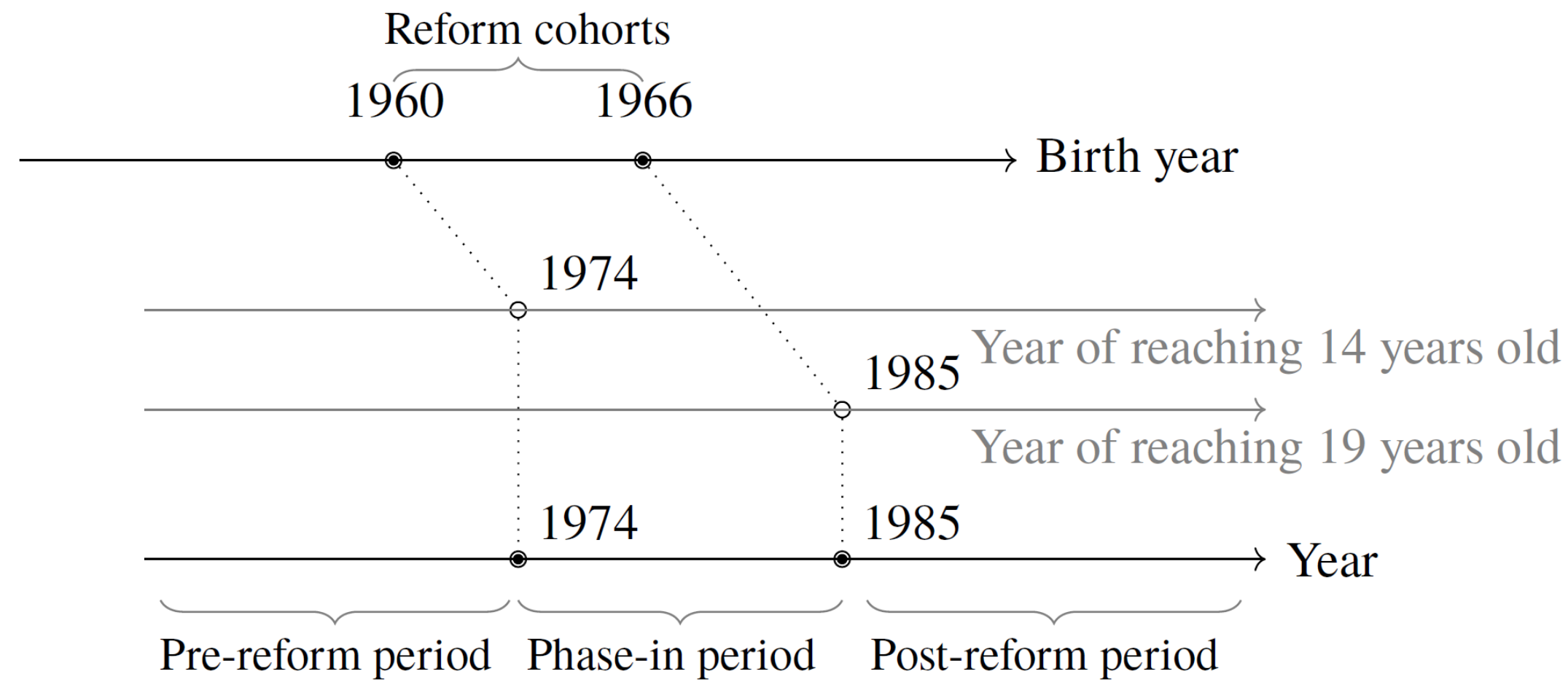
– Control provinces (growth of enrollment is below median)

– No control variables.

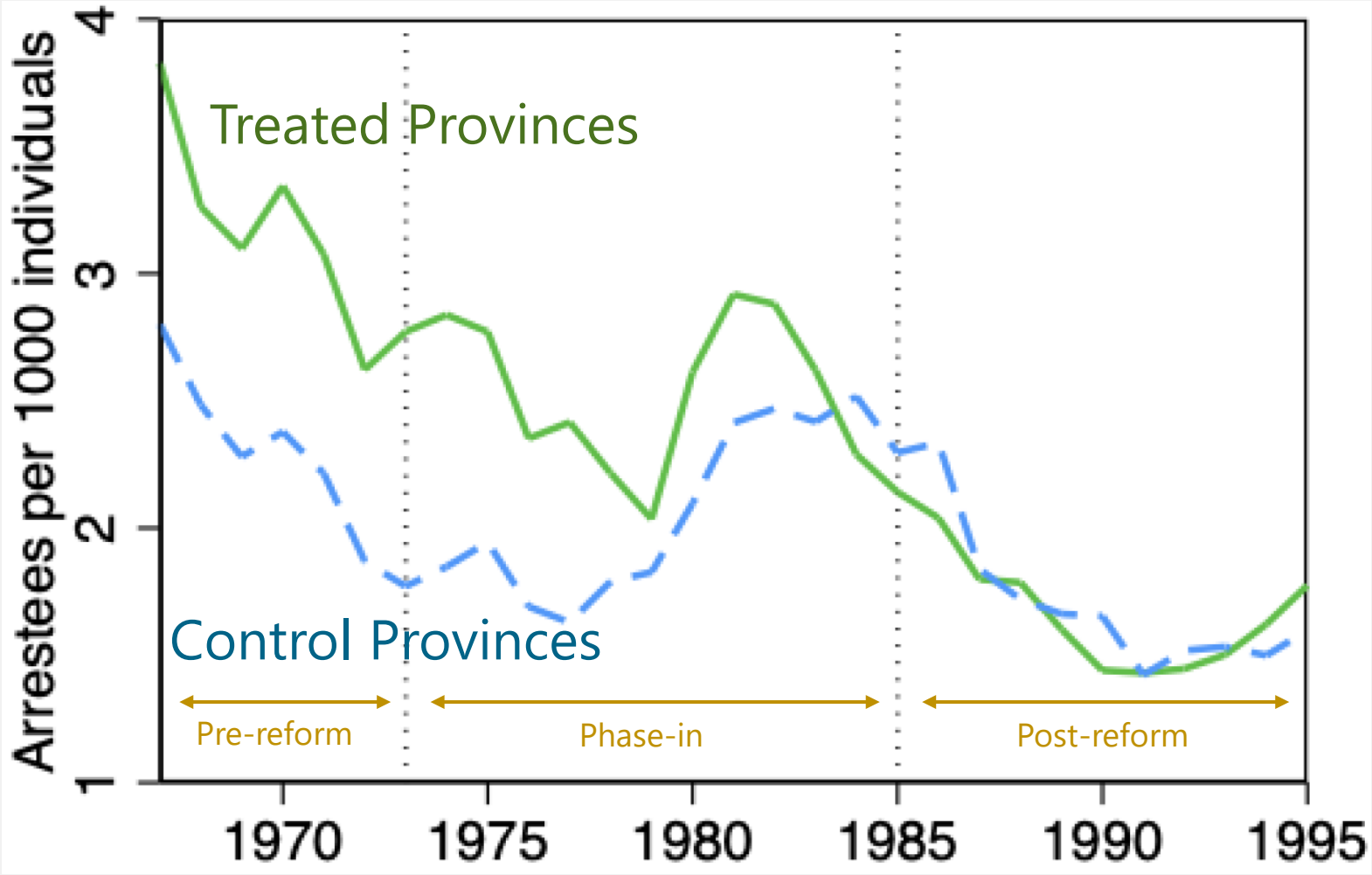
(2) Regression Analysis

– Plot coefficients from the event-study model

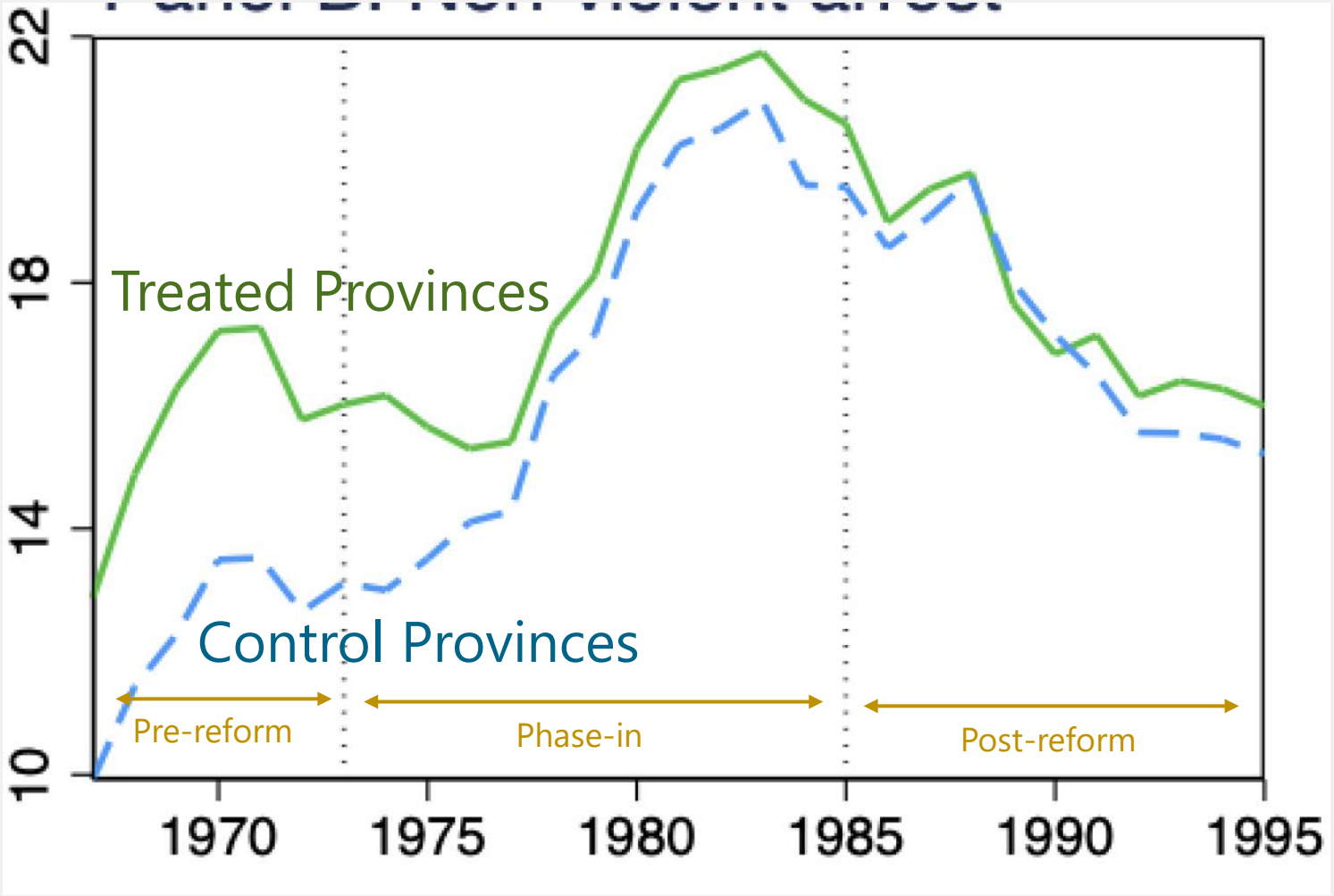
Timing of the Reform and Juvenile Outcomes



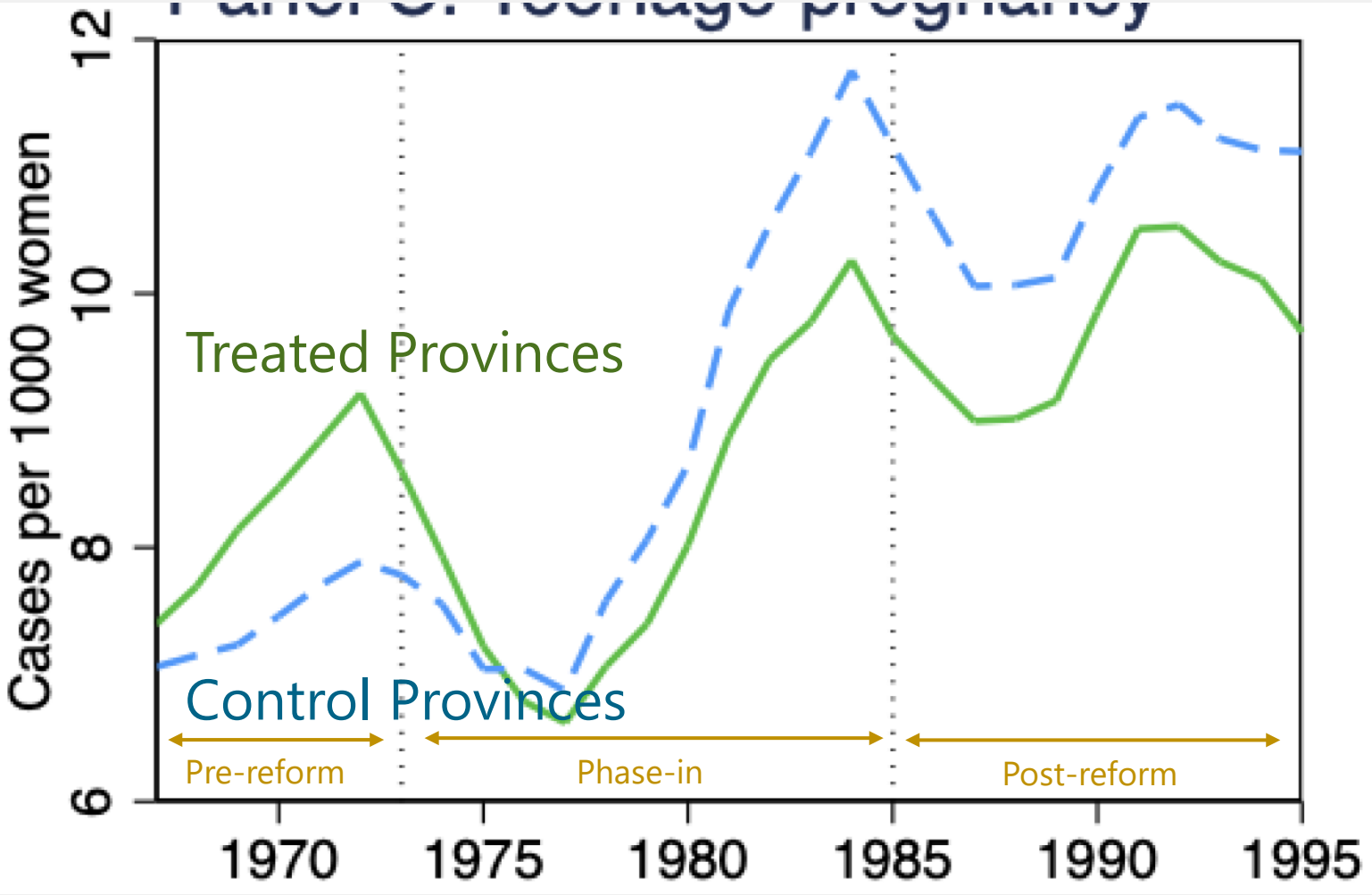
Violent Arrest Rates



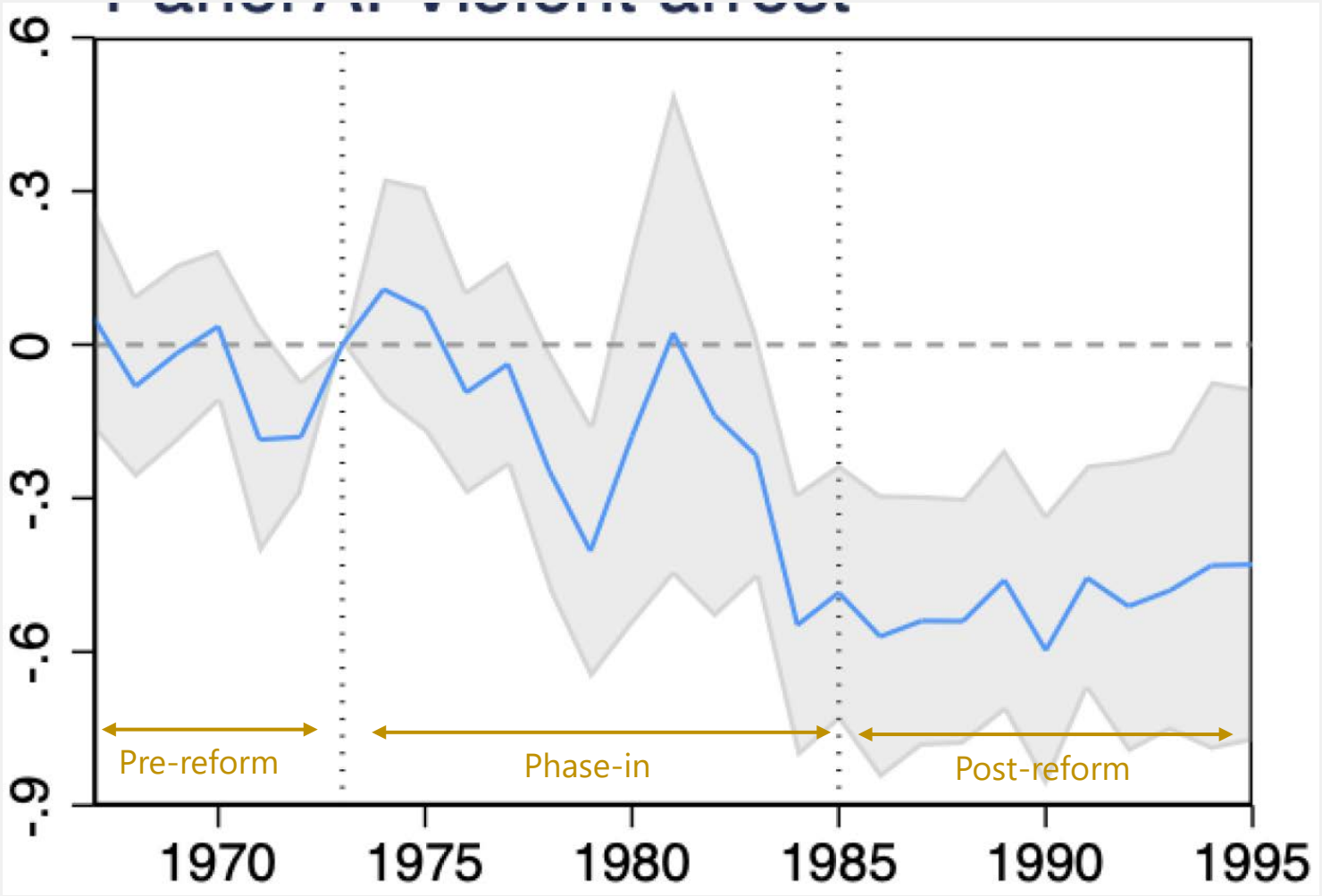
Non-Violent Arrest Rates



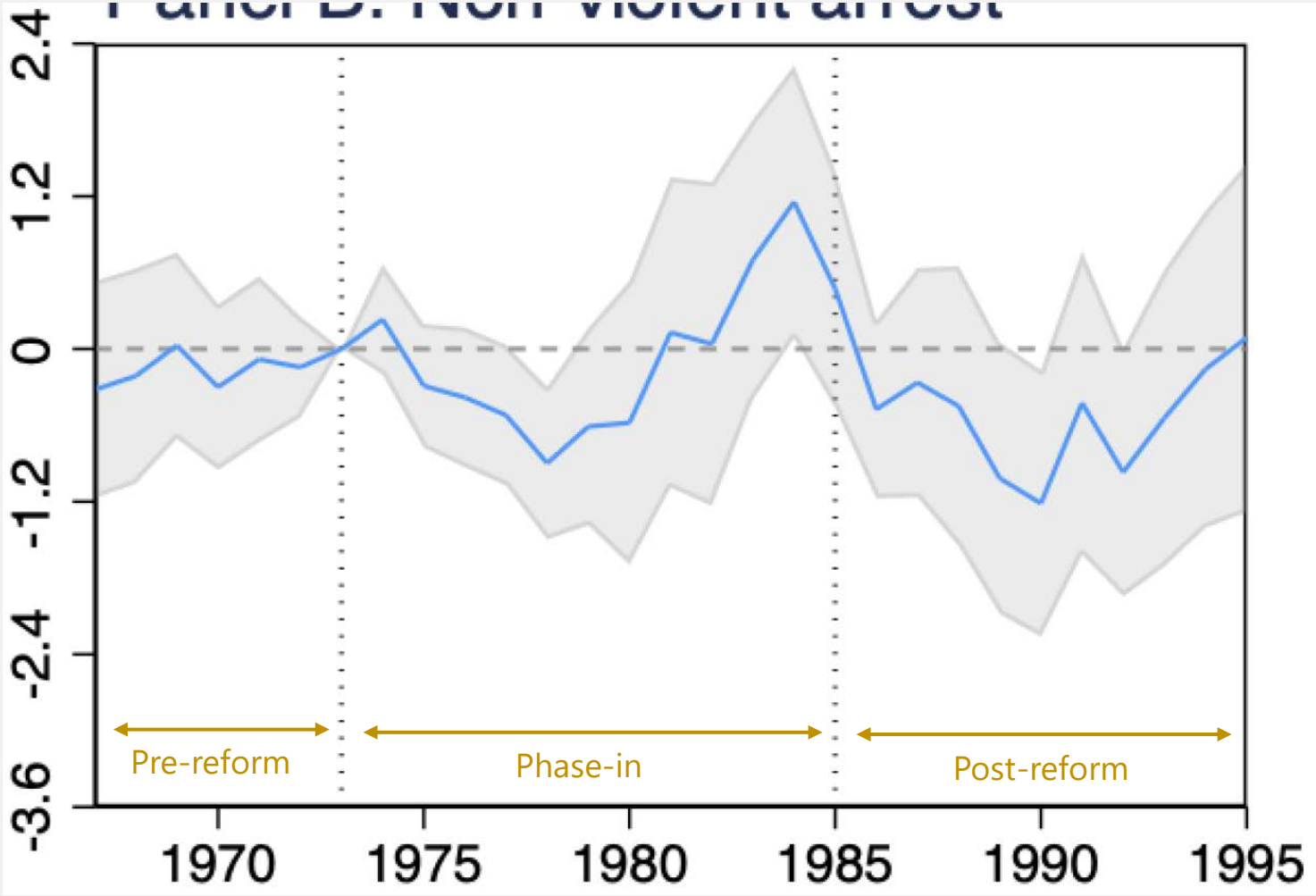
Teenage Pregnancy Rates



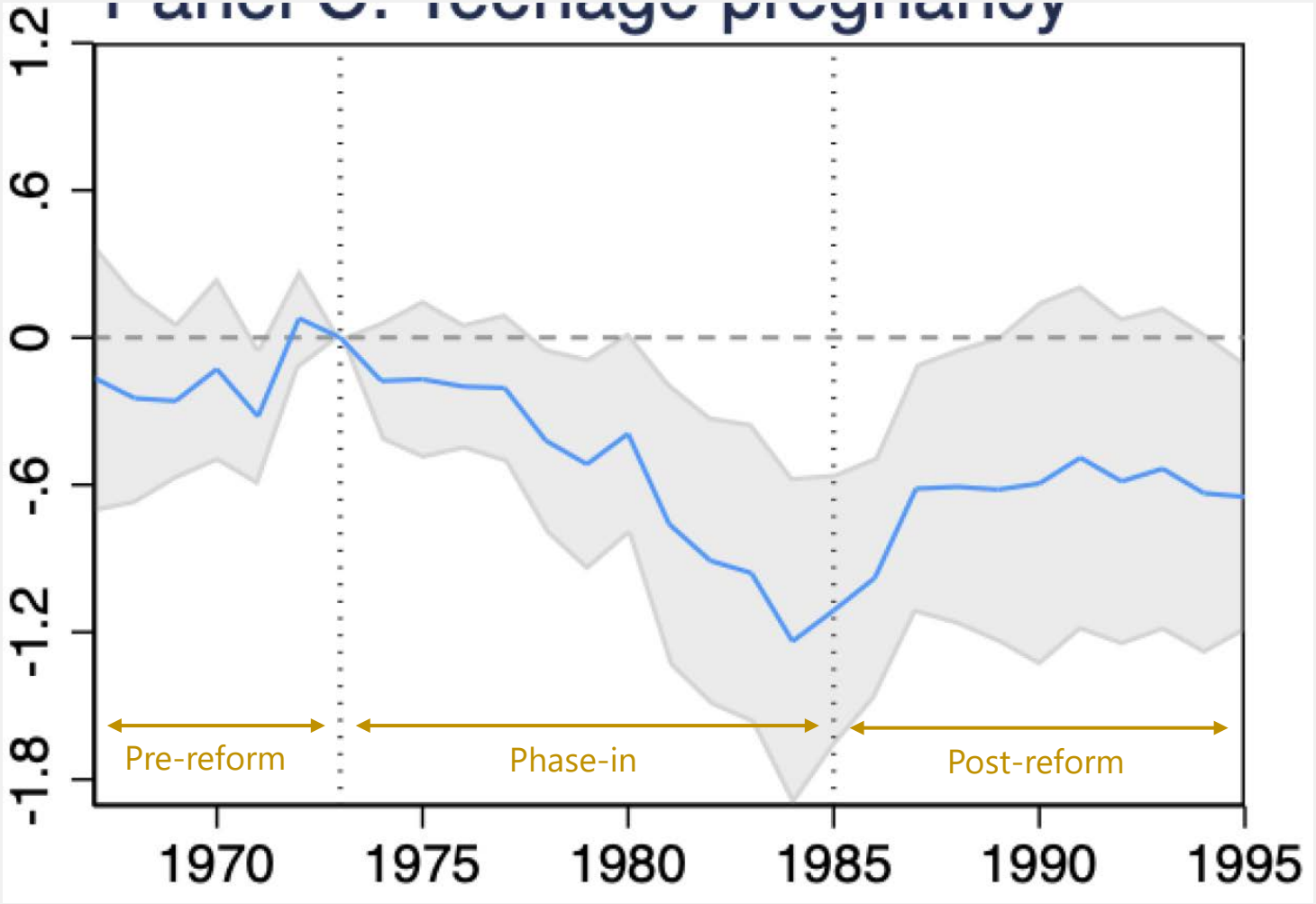
Event-Study Estimates: Violent Arrest Rates



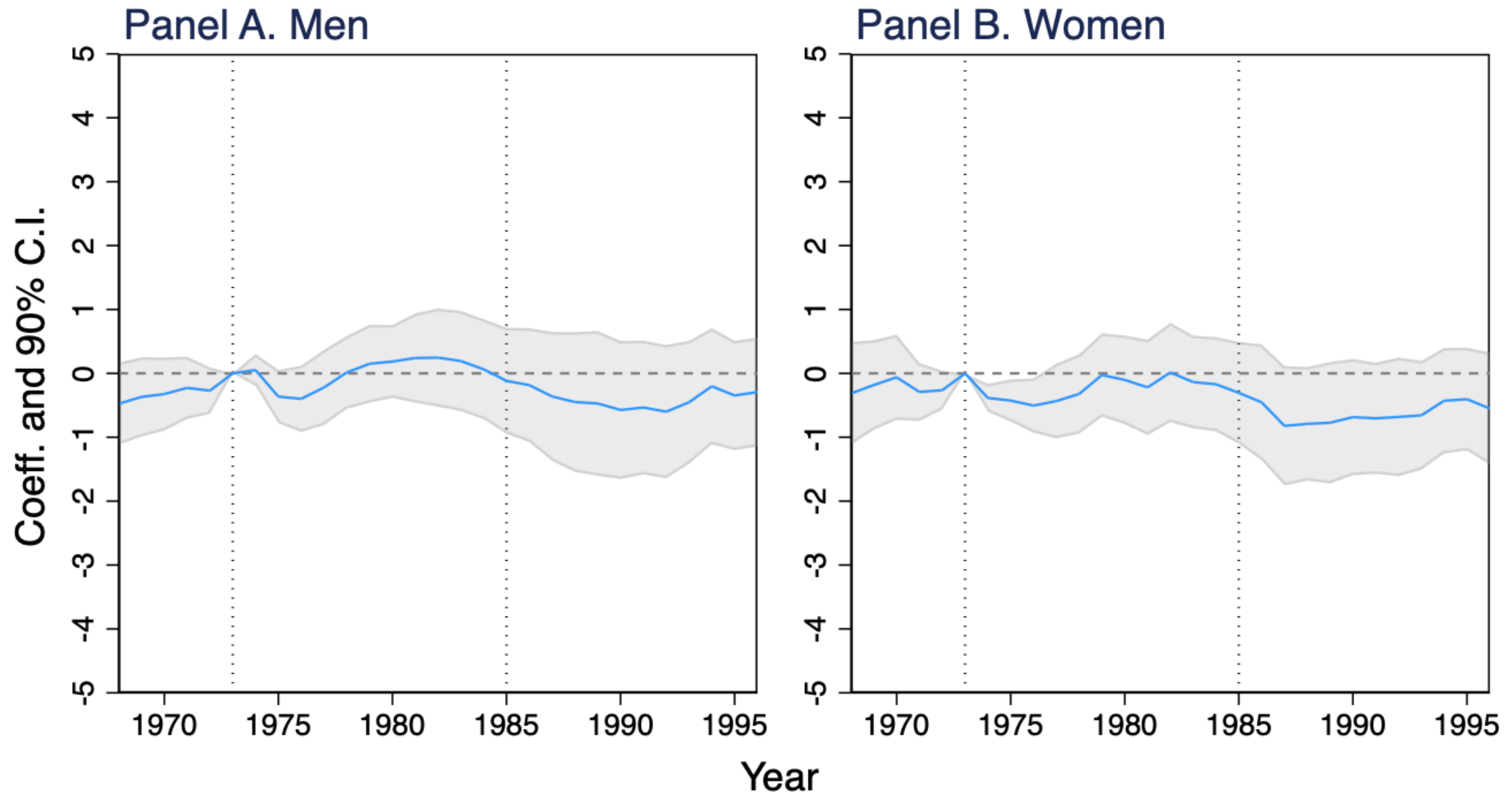
Event-Study Estimates: Non-Violent Arrest Rates



Event-Study Estimates: Teenage Pregnancy Rates



No Effects on High School Enrollment



Interpreting the Main Results: How did the reform reduce risky behaviors?

No change in high school enrollment rate

- "Incarceration" hypothesis rejected.

Potential mechanism: Improved non-cognitive skills

- Crime reduction linked to non-cognitive skills (Heckman et al 2013)
- Worse child behavior, increased adult crime (Baker et al 2008, 2019)
- Reduced ADHD symptoms, aggressive behavior in Japanese daycare program (Yamaguchi et al 2018)

Placebo Tests

Motivation

There may be confounders correlating w/ treatment and outcomes.

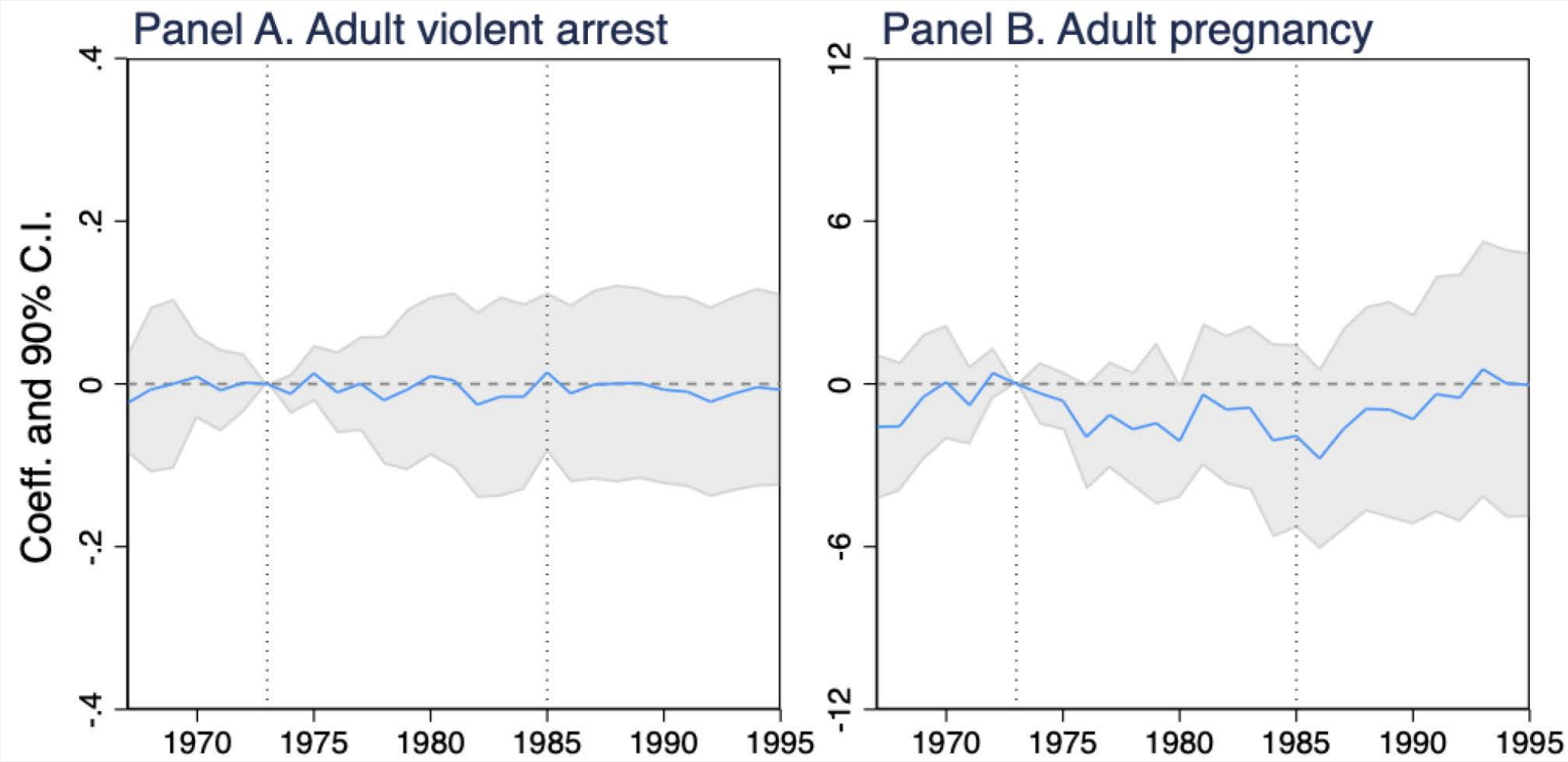
- Unobserved local labor demand shocks
- Unobserved province-level policy changes

Our Approach

– Use *older cohort's* arrest and pregnancy rates as outcomes.

– Confounders should affect all cohorts.

Results of Placebo Tests



Concluding Remarks

Preschool reform reduced crime rates and teen pregnancy.

- Policy Context
  - Implemented as a universal and large-scale program.
  - The country had a lower crime rates and fertility among teenagers.
- These findings strengthen our confidence in the effectiveness of ECE.

Possible Mechanisms: improved non-cognitive skills?

- "Incarceration" hypothesis rejected.

Limitations

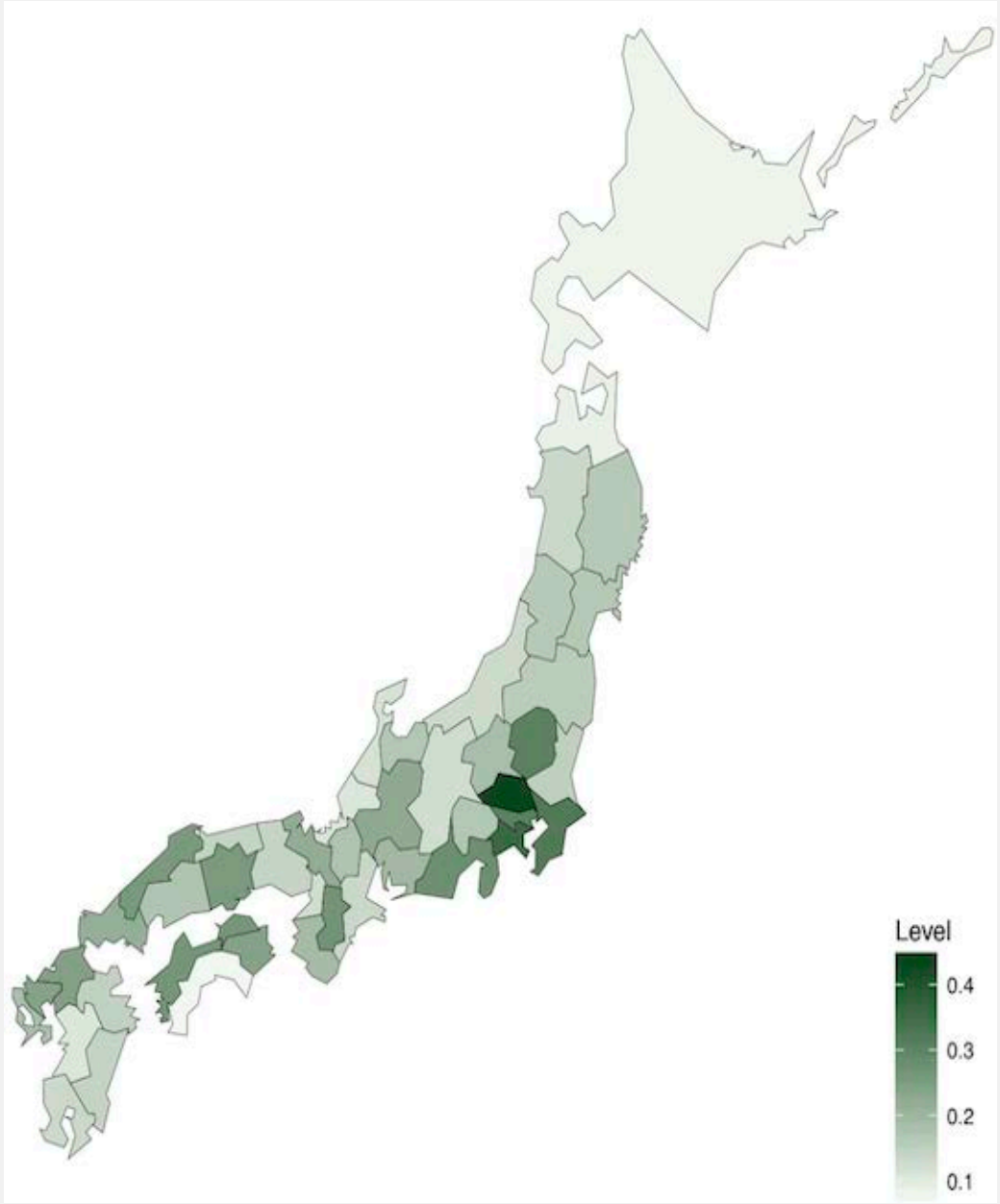
- No individual-level data.
- Lack of non-cognitive skill measurements.

APPENDIX

Early Childhood Education and Care in Japan

Preschool	Daycare
Education is the primary objective.	Care is the primary objective.
Age: 3-5	Age: 0-5
Half-day (4 hours) program.	Full-day program.
Parents' work is not required.	Parents' work is required.
Not means-tested	Not means-tested
Affordable fee thanks to subsidies (1-3% of household income)	Affordable fee thanks to subsidies.

Growth of the Preschool Enrollment Rate by Province



Corr. between Reform Rollout and Pre-Reform Characteristics

Dependent Variable: Growth of the Preschool Enrollment Rate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Kindergarten enrollment rate in 1960	0.632						0.955
	(0.145)						(0.357)
Real Provincial GDP per capita in 1960		0.012					-0.034
		(0.007)					(0.016)
Fiscal-equalization grants per capita in 1960			-0.615				-0.593
			(0.241)				(0.308)
Low-educated women's share in 1960				-0.531			-0.242
				(0.333)			(0.347)
Growth in low-educated women's share during 1950-1960				0.457			0.131
				(1.854)			(1.352)
Women's employment rate in 1960					-0.201		0.014
					(0.143)		(0.184
Growth in women's employment rate during 1955-1960					-0.146		-0.680
					(0.557)		(0.447)
Child population ratio						-0.125	-0.025
						(0.055)	(0.071)
Growth in child population ratio during 1955-1960						-0.297	-0.737
						(0.328)	(0.329)

Estimated Effects Averaged Over Time

	Pre-reform (1)	Phase-in (2)	Post-reform (3)
(A) Juvenile violent arrest	-0.063	-0.179	-0.501
	(0.073)	(0.137)	(0.150)
(B) Juvenile non-violent arrest	-0.172	-0.045	-0.542
	(0.321)	(0.441)	(0.586)
(C) Teenage pregnancy	-0.173	-0.588	-0.631
	(0.189)	(0.218)	(0.344)

Other Outcomes

High School Enrollment

- Not part of compulsory education
- Possible mediator for risky behaviors (e.g., “incarceration”)

Daycare Enrollment

Potential crowding out of daycare

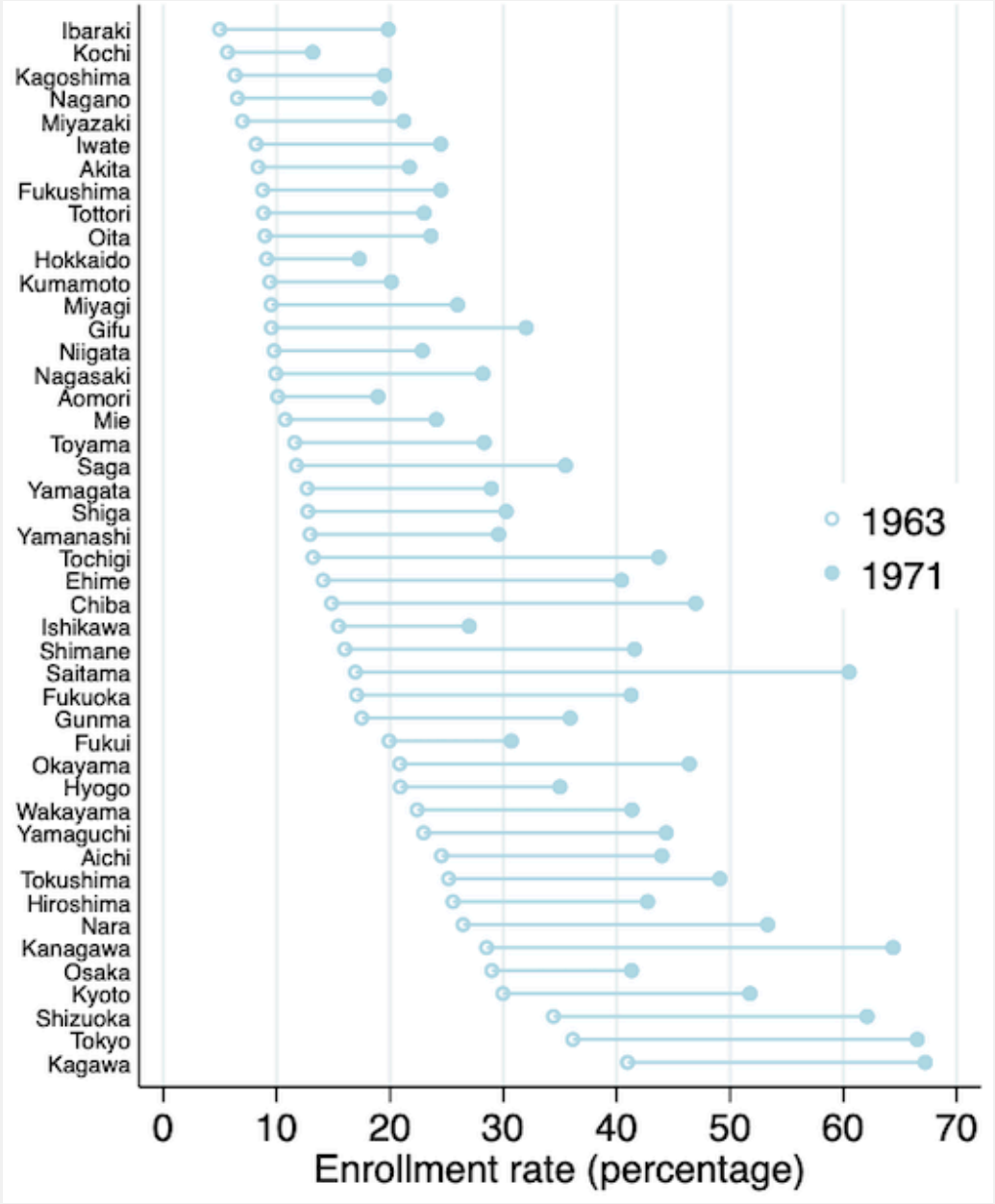
Female Employment

Mothers’ work may affect home environment, impacting child development.

Effects on Other Outcomes

	Pre-reform (1)	Phase-in (2)	Post-reform (3)
High school enrollment			
(A1) Men	-0.334	-0.042	-0.271
	(0.291)	(0.285)	(0.528)
(A2) Women	-0.249	-0.290	-0.502
	(0.260)	(0.329)	(0.489)
ECEC enrollment			
(B1) Daycare	0.297	-0.458	-2.103
	(0.234)	(0.313)	(0.780)
(B2) All ECEC (preschools and daycare)	0.151	4.423	9.234
	(0.407)	(0.571)	(0.846)
Female employment			
(C) Employment rate among women ages 25-44	0.852	-0.855	-0.384
	(0.497)	(0.753)	(0.959)

Regional Variations of preschool Enrollment Rate



Other Threats to Identification (1): Inter-Provincial Migration

Potential Issue

– Crime-prone youth may move from rural to urban areas.

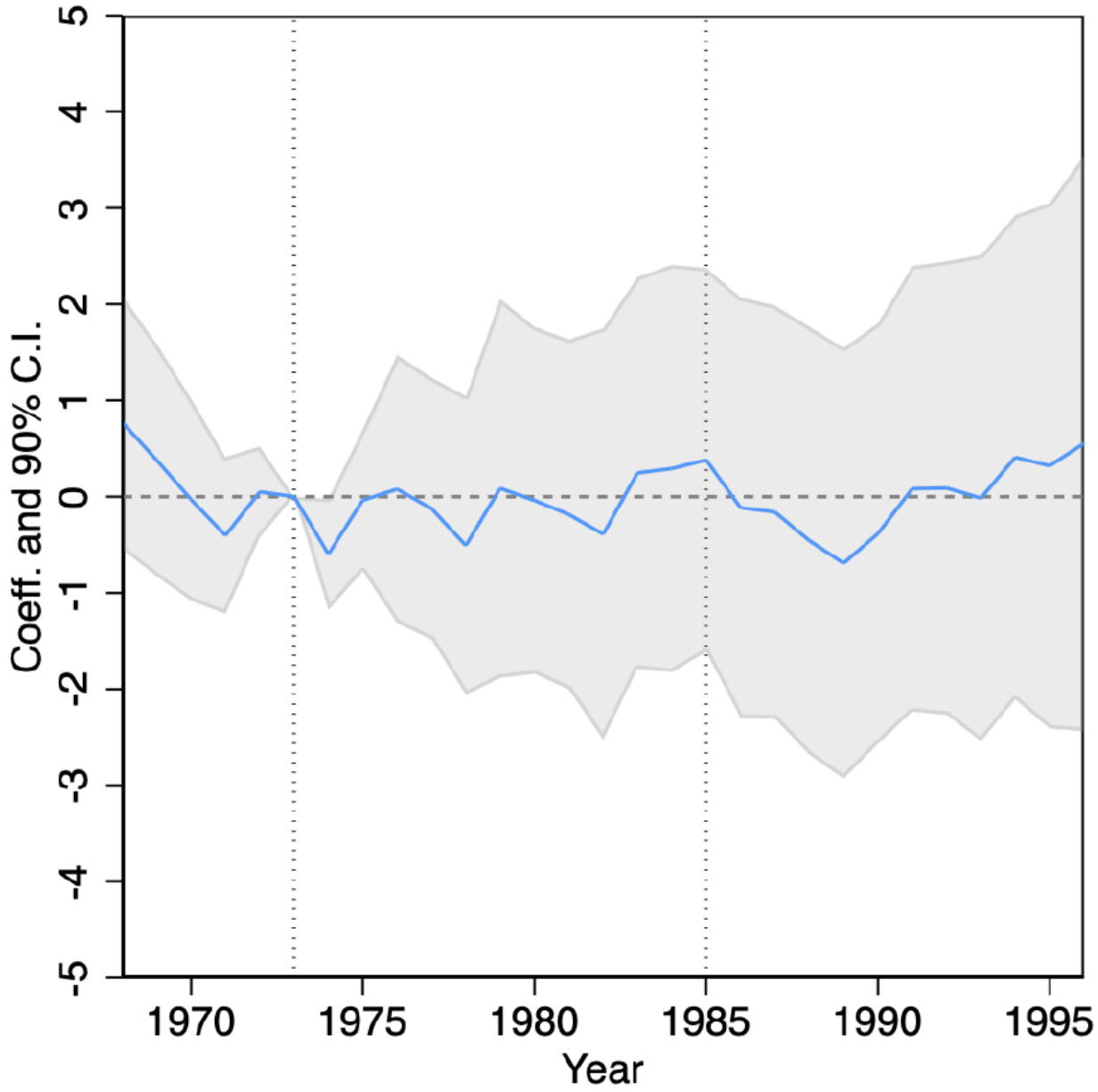
– Faster preschool enrollment growth in urban areas (e.g., Tokyo).

Our Approach

– Examine effects on migration rate (Fig. 8)

– Exclude observations of the two largest in-migration provinces.

Figure 8: Estimated effects on inter-provincial migration among individuals with less than high school education at age 15



Other Threats to Identification (2): Endogenous preschool Enrollment

Potential Issue

Preschool enrollment may correlate with other child investments (e.g., parental time & money).

Our Approach

Instrument enrollment by no. of teachers per child (supply-side factor)

Other Threats to Identification (3): Time-Varying Factors

Potential Issue

Post-reform province-level characteristics (e.g., local economic conditions) may correlate with treatment and outcomes.

Note: Preferred specification doesn't control for post-reform characteristics as they may be influenced by treatment

Our Approach

Include in regression:

- Lagged real provincial GDP per capita
- Child welfare spending per capita
- Local allocation tax grants per capita
- Number of police officers per capita

Other Threats to Identification (4): More Control Variables

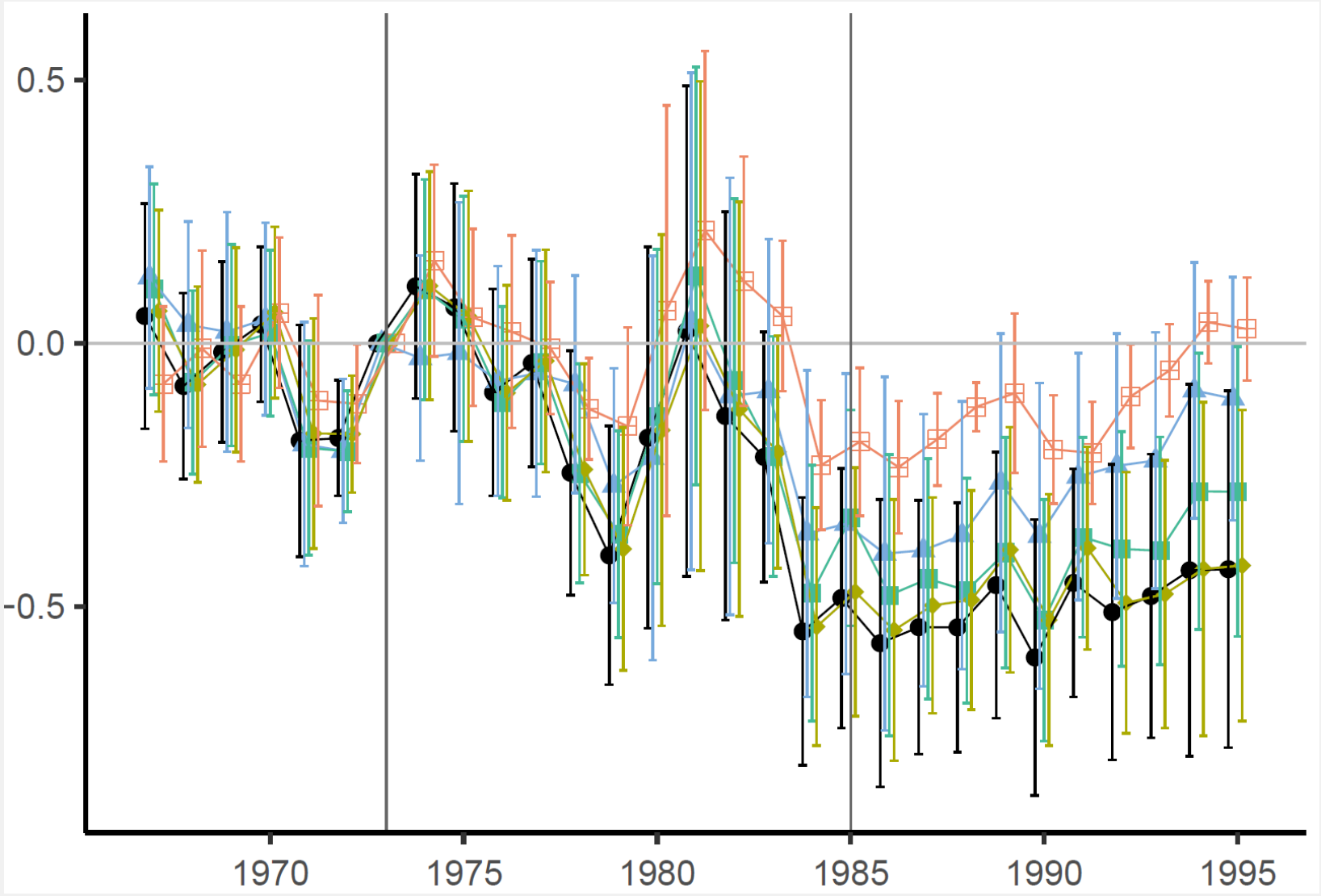
Potential Issue

Remaining uncontrolled pre-reform province-level characteristics may correlate with both treatment and outcomes

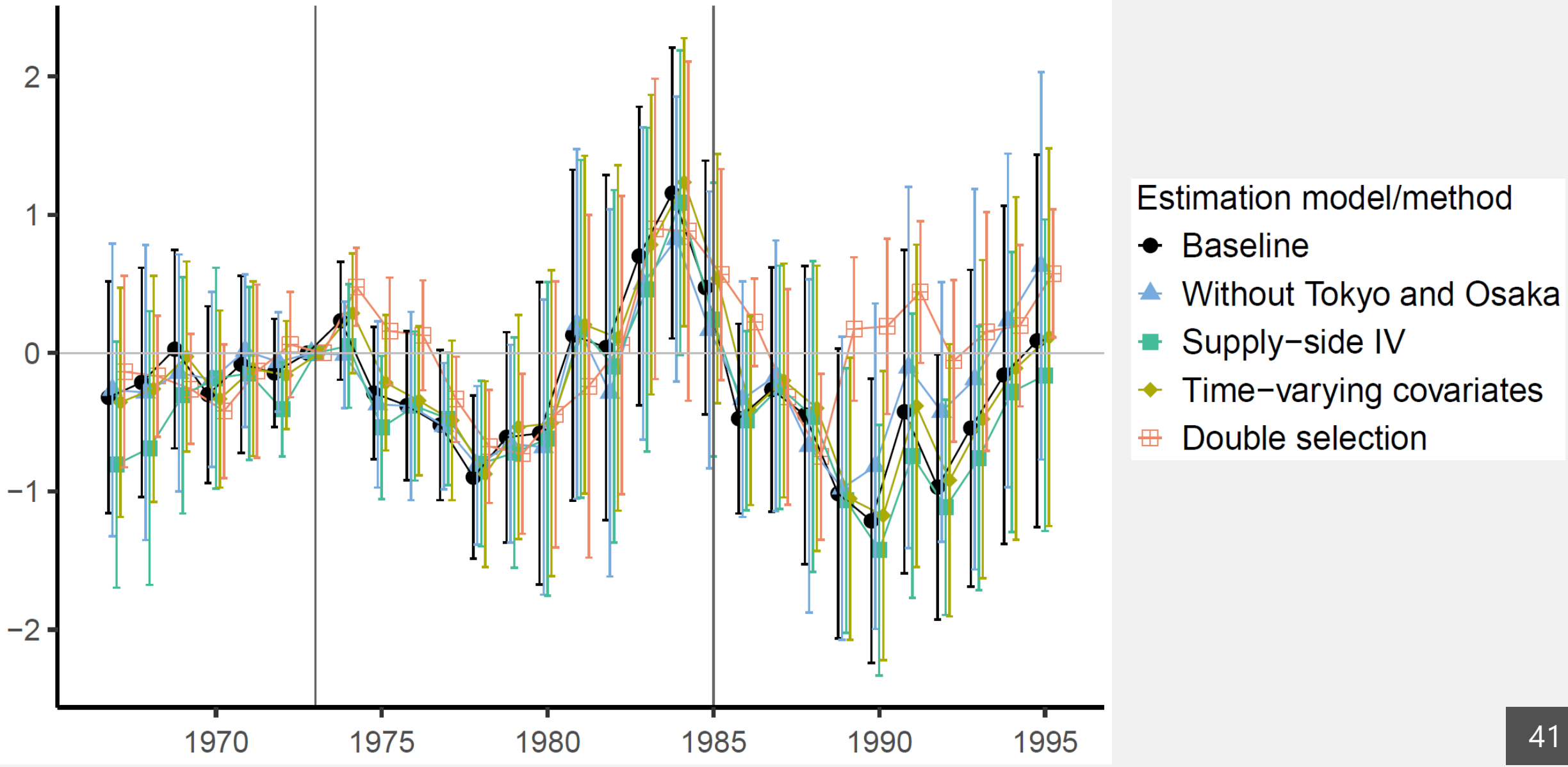
Our Approach

Expand the set of control variables (up to 104) and apply the post-selection lasso.

Violent Arrest Rates



Non-Violent Arrest Rates



Teenage Pregnancy