

Coverage of Infertility Treatment and Fertility Outcomes: Do Women Catch Up?

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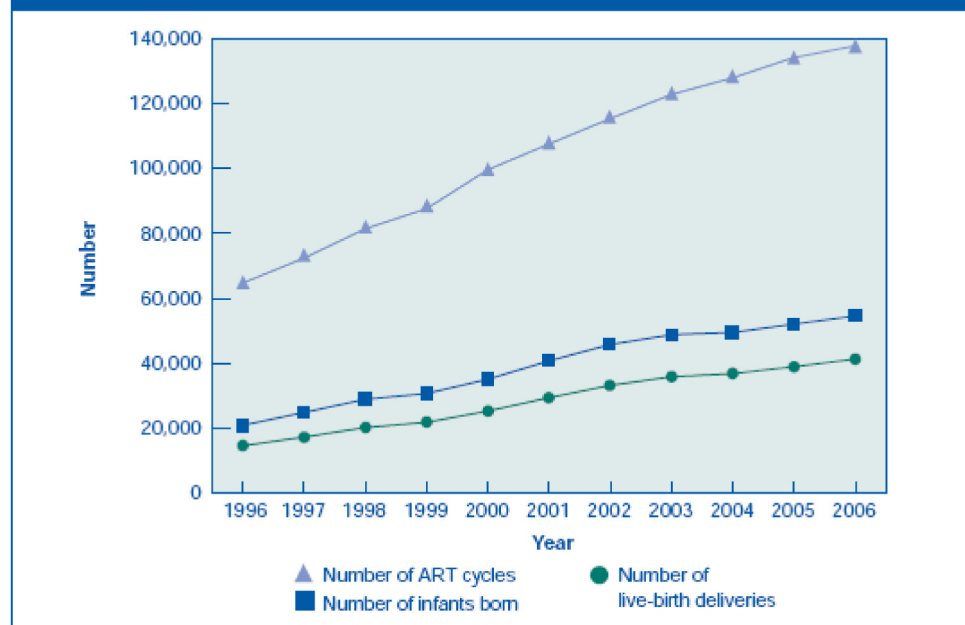
Introduction: Brief History of ART

ART? Assisted Reproductive Technologies

- First human in vitro fertilization (IVF): UK, 1978
- First IVF in the US: 1981. Since then:
 - Rapid increase # of clinics
 - Increase in success rates
- These trends have reduced ART costs (delivery from IVF [**\$44,000-\$211,942**] in 1992 USD).

Introduction: Brief History of ART

Figure 49
Numbers of ART Cycles Performed, Live-Birth Deliveries,
and Infants Born Using ART, 1996–2006



Introduction: ART Across the Atlantic

- In the US:
 - HI is mostly available through the workplace
 - By 1995, 13 states had enacted mandates forcing insurers to consider infertility treatments to different extents
 - HI mandates have considerably reduced ARTs costs for those with coverage
- In Europe:
 - Many countries with complete public coverage of infertility treatment: Belgium, Denmark, France, Greece, Slovenia, and Sweden (IFFS Surveillance 07, Ziebe and Devroey, 2008)
 - Other European countries e.g. Spain and UK: partial public coverage but long waiting lists.

Motivation

- Ongoing debate in Europe on possible solutions to the problem of population ageing
- Can ART be part of a package of policies intended to increase TFR in Europe (1.5 in EU25)? (Grant, 2006, Ziebe and Devroey, 2008). Complex Answer:
 1. Non-strategic effect: in the short-run, TFR increases because of an increase in fertility rates among the eldest women and those who couldn't conceive naturally otherwise.
 2. Strategic effect: in the long run, TFR may be reduced.
 - Career concerns and human capital investment are the leading factors associated with fertility postponement, specially among highly productive women (large lit. on applied micro labor and quantitative macro)
 - By relaxing the “biological constraint”, the availability of ART may further delay childbearing under too optimistic perceptions about their effectiveness.
 - Survey “Britons put work and fun before babies” by The Guardian, May 2, 2006:
35% of men and women declare their willingness to postpone childbearing due to the availability of fertility treatments.

Objective

1. Do ART delay the arrival of the first child?
2. Even if ART delay first births, do women catch up in terms of TFR? Do ART users end up having the same number of children by the end of their reproductive lives as non-users (perhaps fewer or same $\#$ deliveries but more babies)?

We try to answer these questions by providing short and long-run estimates of the impact of infertility insurance mandates in several US states vs. their control counterparts.

Economics Literature on ART

- Impact of mandates on ART utilization, *direct* evidence: higher among highly educated >30 women from the NSFG (Bitler and Schmidt, 2008)
- Impact of mandates on various fertility outcomes (short-run impact of mandates, suggestive but no proof of delay):
 - Increase in first birth rates for white women >35 (Schmidt, 2007, Buckles, 2005)
 - Increase of multiple births among white women >30 (Buckles, 2005, Bitler, 2005, Bundorf et al., 2007)
 - These results are also *indirect* evidence of higher utilization, like the higher prevalence of less healthy twins (Bitler, 2005)

Outcome Measures

- We estimate the impact of the mandates on (new) outcomes that will better capture delay:
 - Mean age at first birth
 - % first deliveries by mothers older than 35/30 years old
- We expect an increase in both outcomes in treated relative to control states due to the non-strategic effect.
- The long-run effect: if the age at first birth gap widens over time, this should be evidence of delay.
- Cohort comparison: follow the same cohort on treated and control states and compare their fertility profiles timing and # kids. We expect the treated cohort to have lower fertility when young and increase it when old.

Identification and Methodology

- Some states passed mandates while some did not...
- ... and the timing of the mandates isn't always the same...
- So what if the passage of the mandates is endogenous, i.e., it is a response to unobserved (by the econometrician) differences between treated and control states that determine their outcome dynamics?
- Usual problem in observational studies, a valid control group is needed.

Methodology

Abadie et al. (2007)'s synthetic control method for the evaluation of policy interventions at the aggregate level. Advantages over the standard diff-in-diff models:

- data-driven procedure to construct an “ideal” control group
- synthetic control group=weighted average of potential control units that maximizes the similarity with the treated group in terms of **pre-treatment** characteristics and outcome measures. Transparency:
 - weights are explicit
 - so are the disparities in terms of outcomes and predictors
- more general identifying assumptions: unobs. het. need not be fixed
- inferential techniques that capture the uncertainty about the ability of the control group to reproduce the counterfactual. Placebo tests.

Methodology

Abadie et al. (2007)'s synthetic control method. Features in common with:

- matching methods, since it tries to minimize observable differences between treated and control units
- diff-in-diff models, from which it departs in order to rely on more general assumptions regarding the unobservables

This is in line with the concerns regarding selection on observables discussed in the recent matching literature that highlights the advantages of using diff-in-diff + matching strategies (see, for ex: Smith and Todd, 2005, 2003, Heckman et al. 1998)

Infertility Treatment Mandates (I)

Mandates Classifications					
State	Schmidt (2007)			Buckles (2005)	Bundorf et al. (2007)
	Mandate-to-cover/offer	IVF	plans	Mandate	Mandate
Arkansas	cover (87, 91)	yes	-	cover-strong (87)	limited (87)
California	offer (89)	no	all	offer (89)	offer (89)
Connecticut	offer (89)	yes	-	offer (89)	offer (89)
Hawaii	cover (87)	yes	all	cover-strong (87)	limited (87)
Illinois	cover (91)	yes	all	cover-strong (91)	comprehensive (91)
Maryland	cover (85)	yes	all	cover-strong (85)	limited (85)
Massachusetts	cover (87)	yes	all	cover-strong (87)	comprehensive (87)
Montana	cover (87)	no	-	cover-weak (87)	limited (87)
New York	cover (90)	no	-	cover-weak (90)	limited (90)
Ohio	cover (91)	yes	-	cover-weak (91)	limited (91)
Rhode-Island	cover (89)	yes	all	cover-strong (89)	comprehensive (89)
Texas	offer (87)	yes	all	offer (87)	offer (87)
West Virginia	cover (77)	no	-	cover-weak (95)	limited (77)

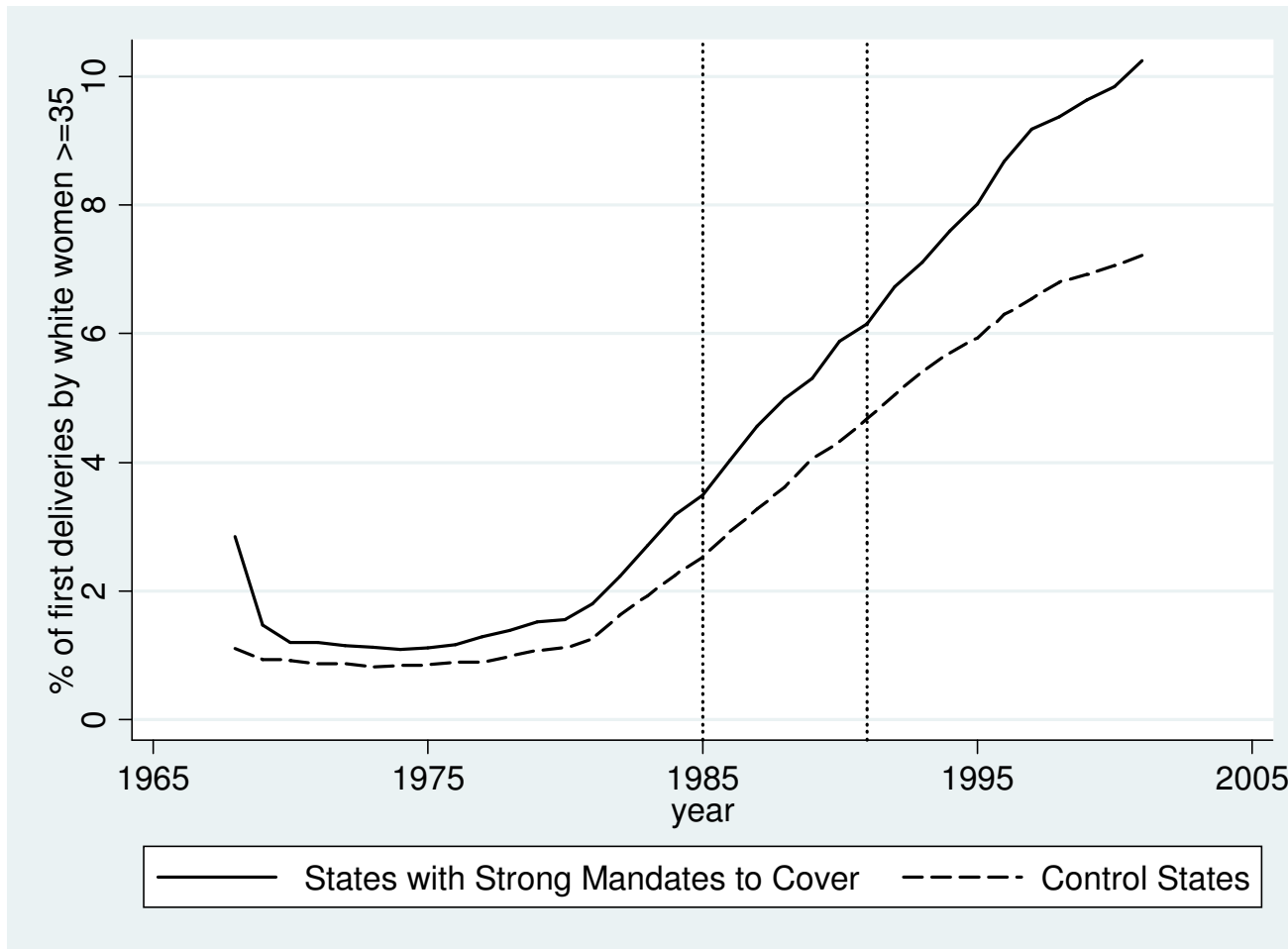
Infertility Treatment Mandates (II)

- Mandates heterogeneity in terms of:
 - Intensity (cover/offer, all plans/limited, IVF/no IVF)
 - Timing
- Moreover, states also differ in important socioeconomic characteristics. Hence, state-specific analyses.

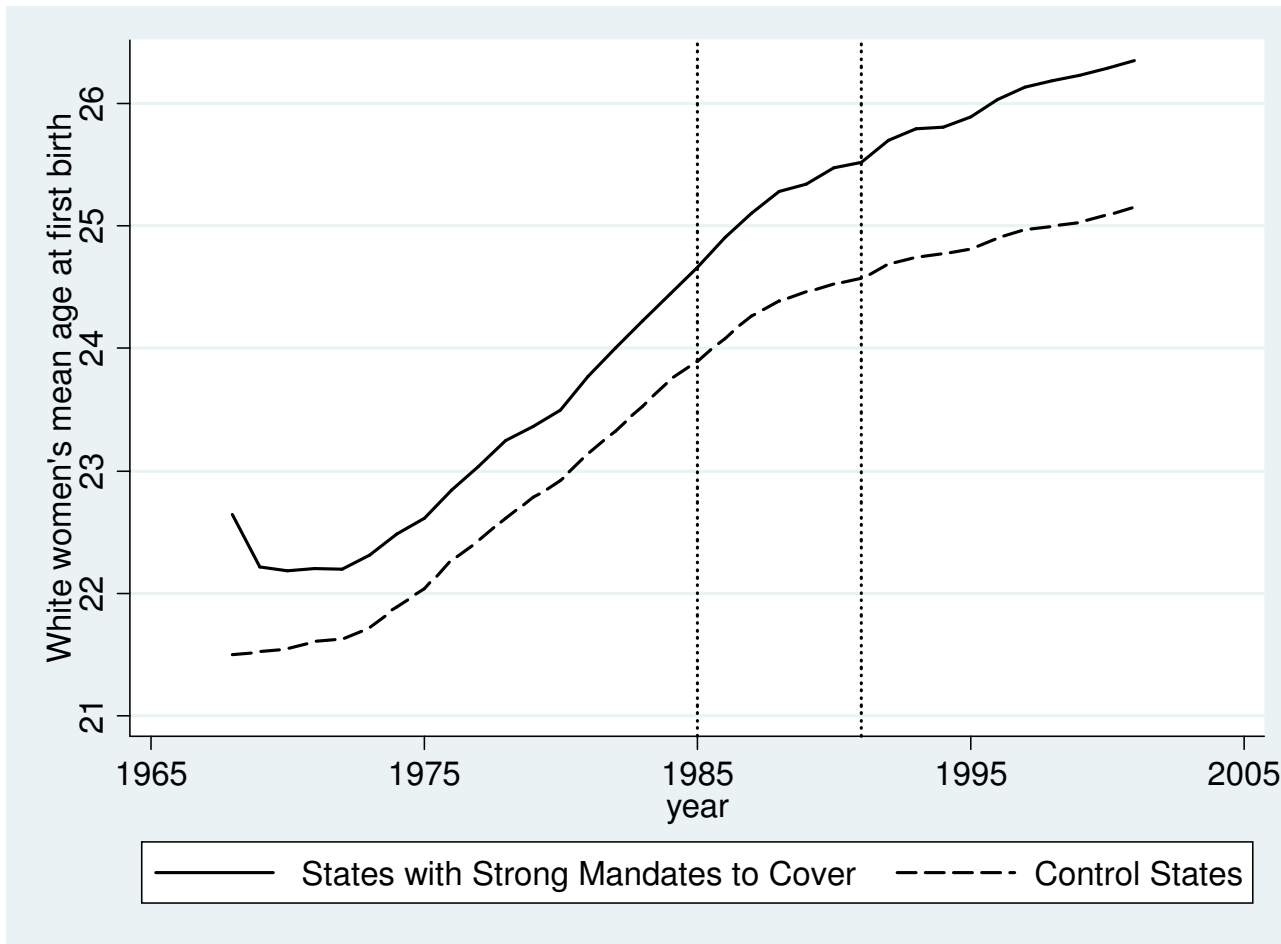
Data

- Birth certificates from the National Vital Statistics (1968-2001)
- CPS March extracts (1968-2001) - states separately identified from 1977 onwards.
Predictors:
 - sex, age structure of the population, race, marital status, nr. of own kids
 - education
 - labour market variables, employment provided health insurance, firm size
- Census population estimates

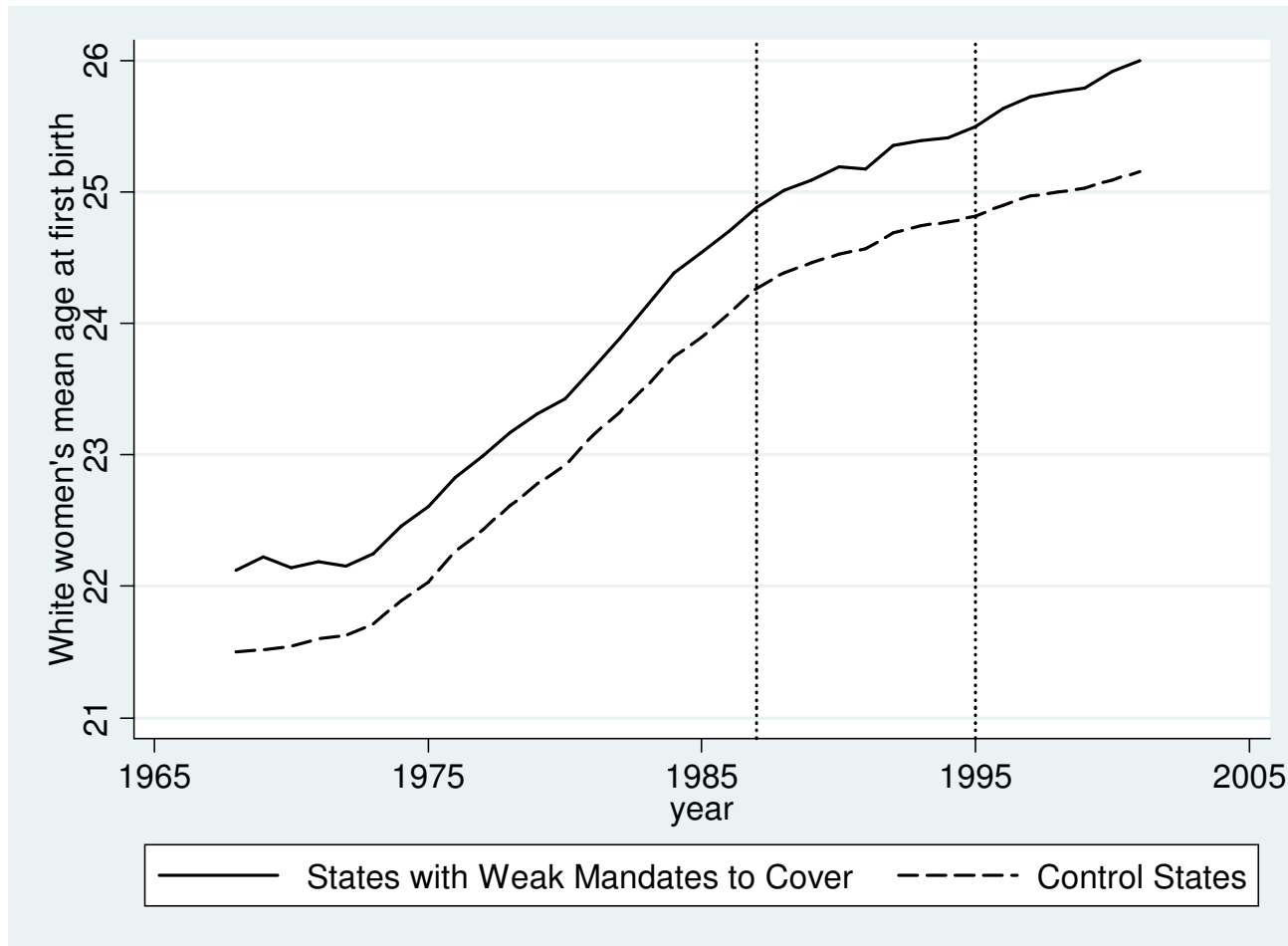
Raw Evidence on Delay (I)



Raw Evidence on Delay (II)



Raw Evidence on Delay (III)



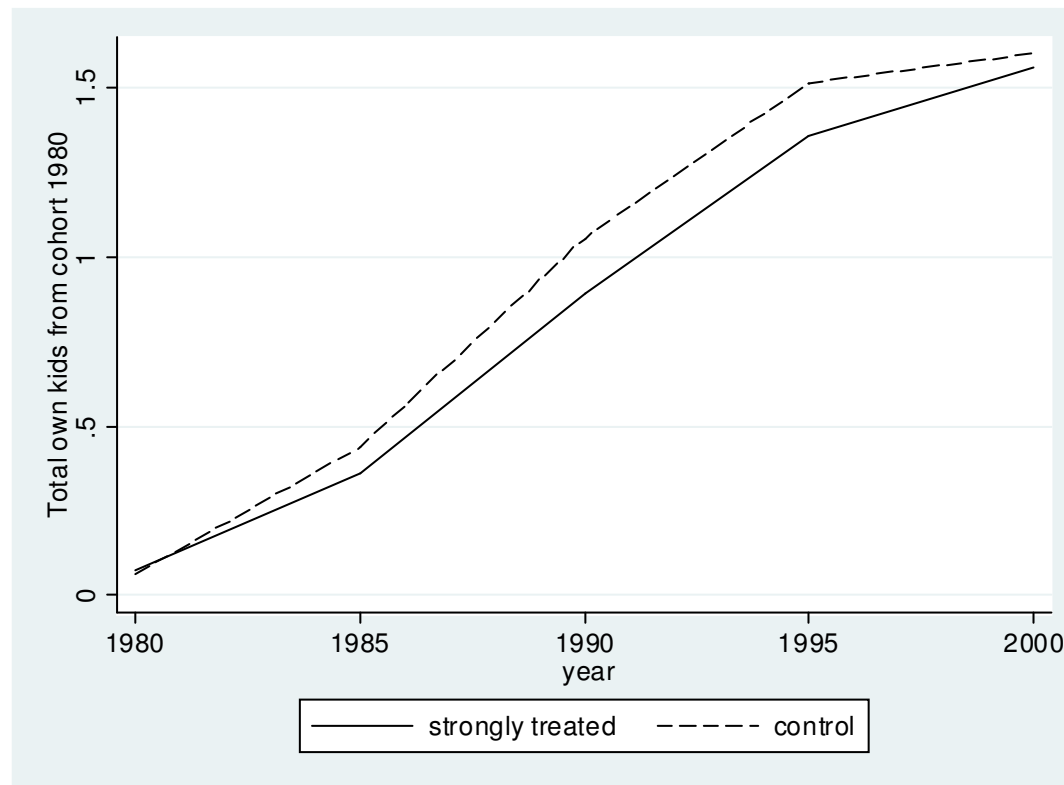
Raw Evidence on Delay (IV)

Raw diffs in diffs estimates. Whites. Mean age at first birth

	1	2	3	4
	postpre_diff_treated	postpre_diff_control	dd=1-2	perc_dd=(3/1)*100
Arkansas	0.725	0.889	-0.164	-22.678
Hawaii	1.221	0.889	0.332	27.199
Illinois	0.592	0.586	0.006	1.080
Maryland	1.993	1.261	0.731	36.698
Massachusetts	2.205	0.889	1.316	59.692
Rhode_Island	1.223	0.693	0.530	43.321

Raw Evidence on Catch up effect

- Cohort comparison: we follow the same cohort in treated and control states and compare their # of children as they grow old.



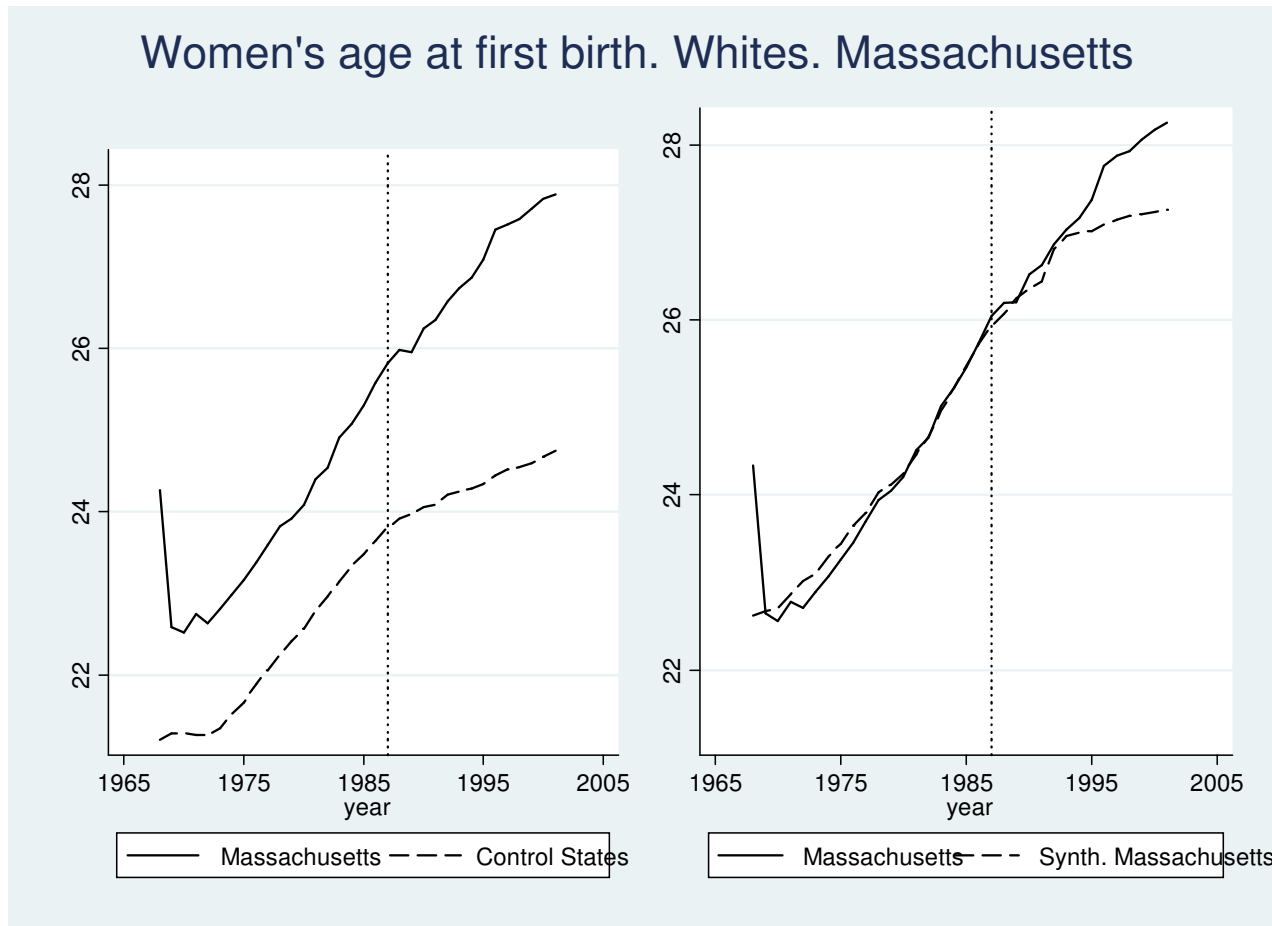
Own kids in hh for 15-19 women in 1980

Results (Preliminary)

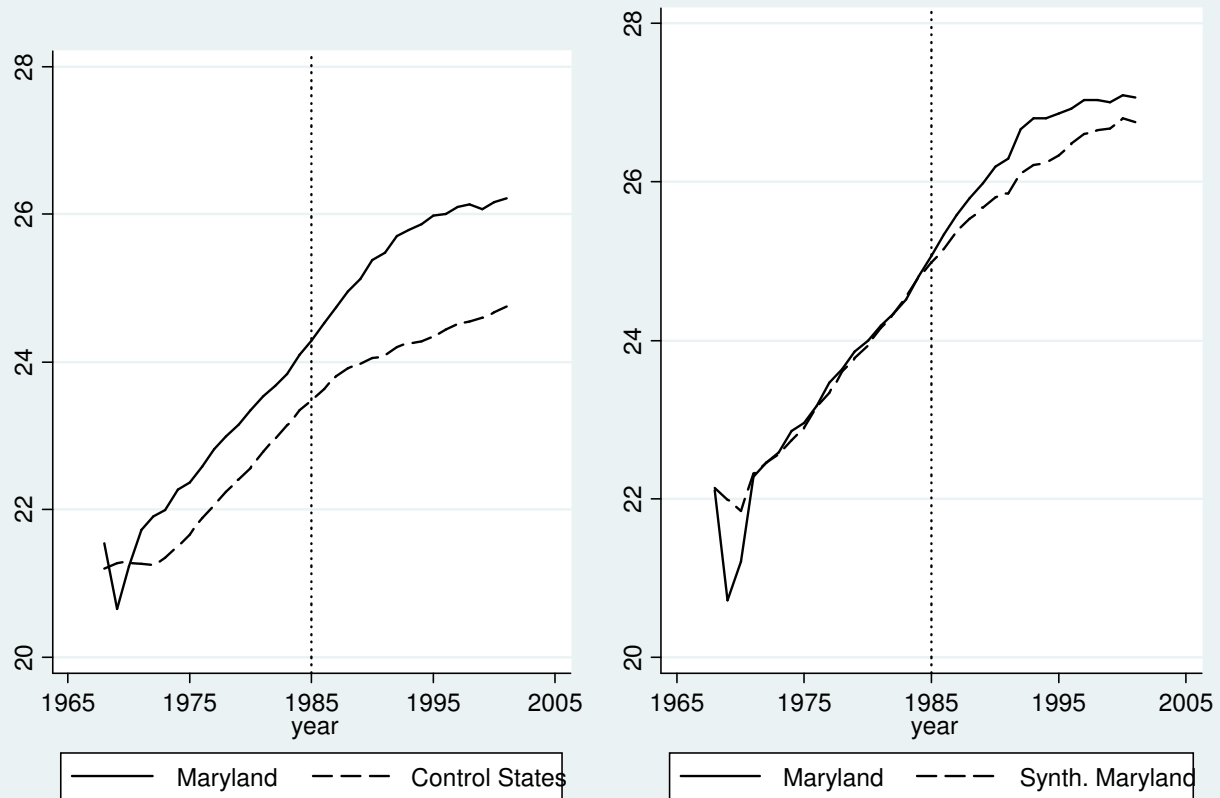
Synthetic control group estimates. Mean age at first birth. Whites

	1	2	3=(2/1)*100
	postpre_diff_treated	effect	perc_effect
Arkansas	0.725	-0.597	-82.455
Hawaii	1.221	0.065	5.329
Illinois	0.592	0.028	4.695
Maryland	1.993	0.304	15.236
Massachusetts	2.205	0.988	44.817
Rhode_Island	1.223	0.416	34.029

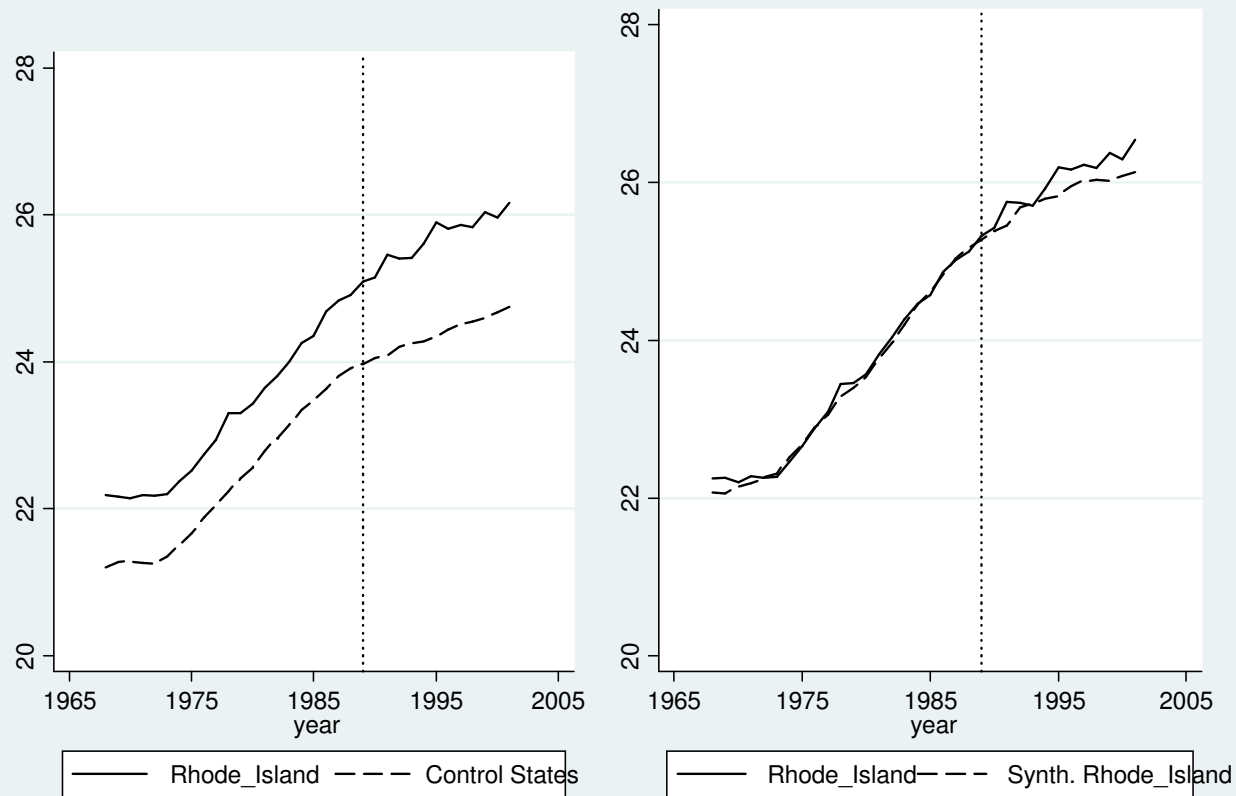
Results (Preliminary)



Women's age at first birth. Whites. Maryland



Women's age at first birth. Whites. Rhode_Island



Further Work

- Are marriage decisions altered?
- Interactions between health insurance and the labour market. Impact of mandates on:
 - rates of coverage (displacement effect?)
 - wages
 - employment