Estimating the Importance of the Supply Side

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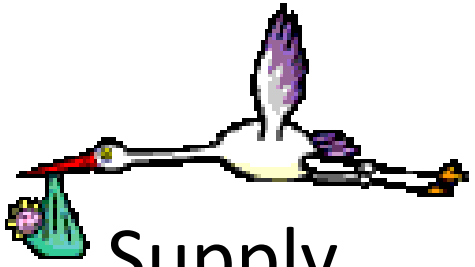
Demand and "Supply"



Demand

Preferences

Prices

Income

Births

Supply

Things that affect the marginal cost of *averting* births

Education

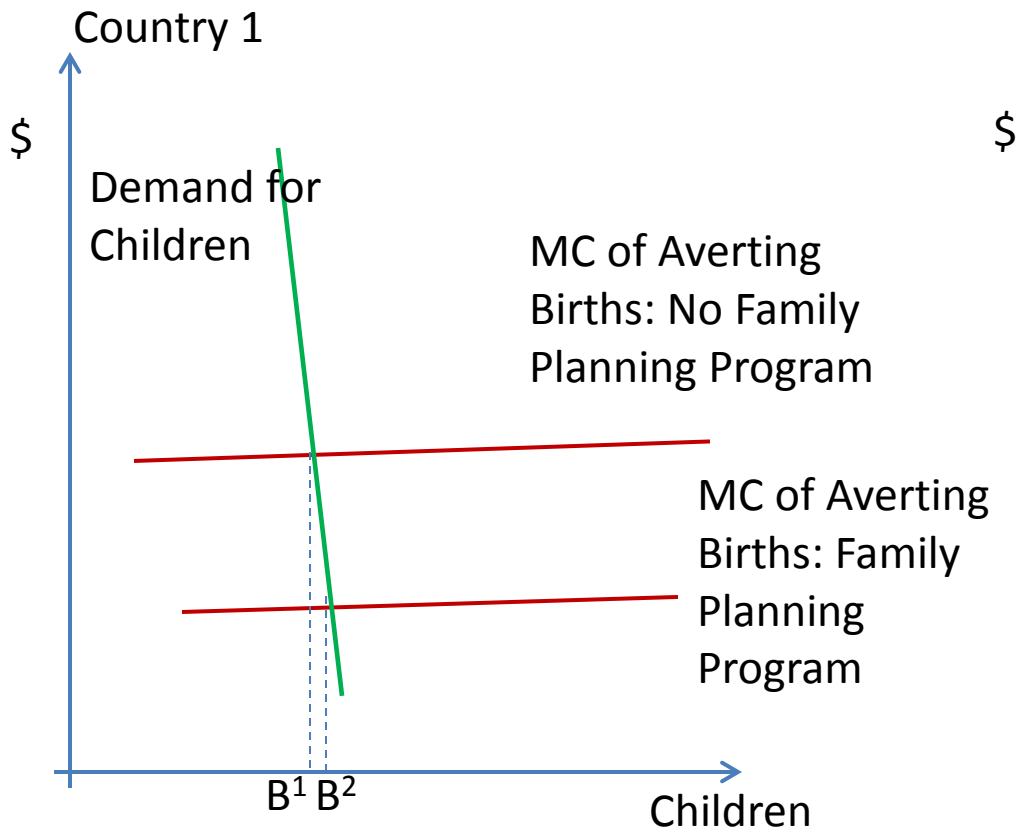
"Development"

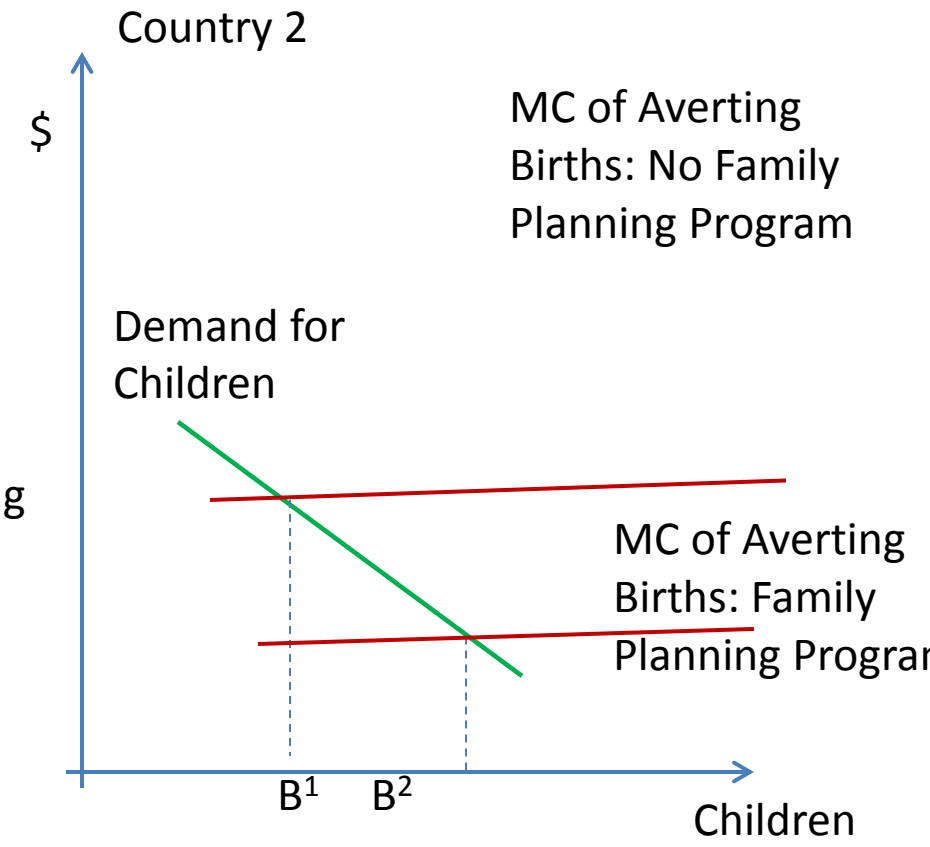
"Culture"

Family Planning Policy

Demand and Supply of Children

- Births averted = Reproductive potential-children
  - Adding uncertainty strengthens these conclusions





Implications

- We don't observe both curves. We only observe price-quantity equilibria
  - Did childbearing change due to supply, demand, or both?

- Supply and demand move together:
  - Demand for children/births averted and family planning programs are closely intertwined

  - Areas with different ideas about children/demand for children tend to use contraception more, build more family planning centers, etc.

Empirical Problems

- Cross-sectional (cross-country, cross-state, cross-county) correlations confound differences in the demand for children with differences in the "supply" of births
  - Locations desiring fewer adopt progressive policies
- Differences-in-differences may confound changes in the demand (leading to a policy change, e.g.) with the effect of the policy change (endogenous policy change)
    - Reverse causality
    - Simultaneity

The Debate over Family Planning

- Supply-side (“family planning gap”)
  - Westoff (1975: 579): "the entire decline in births within marriage across the decade of the 'sixties' can be attributed to the improvement in the control of fertility".
  - Robey, Rutstein, and Morris (1993:62): state that "differences in contraceptive prevalence explain about 90 percent of the variation in fertility rates" and "fertility levels have dropped most sharply where family planning has increased most dramatically"

- Demand-side (“desired children view”)
  - Becker (1981:143): “The ‘contraceptive revolution’ … ushered in by the pill has probably not been a major cause of the sharp drop in fertility in recent decades”
  - Pritchett (1994:3): “the challenge of reducing people’s fertility is the challenge of reducing people’s fertility desires”

Theoretical Conceptualization

Quality-Quantity Model 1

- Household maximization problem is given by

  $U(n,q,s)$ s.t. $\pi_c qn+\pi_s s=I$

- n is the number of children
- q is the "quality" of children,
- c=qn is the quality units of children
- s is parents' standard of living
- π full price for each commodity
- I is total household lifetime income

Quality-Quantity Model 2

- Under standard assumptions, that optimality implies,

$$U_n / U_q = q/n$$

- Marginal rate of substitution between the number of children and child quality depends on the optimal choice of q and n (shadow price of child quality is dependent on n)
- Posit that the income elasticity of quality>income elasticity of child quantity

Adding the Supply Side 1

- Household maximization problem is given by

$$U(n,q,s) \text{ s.t. } \pi_c qn + \pi_A (N-n) + \pi_s s = I$$

- where n=N-A: N is natural fertility (childbearing in the absence of any contraception or effort to reduce childbearing and is fixed by nature) and A is the number of births averted.
- Averting births has a non-zero, constant marginal cost for averting a birth, π_A
- Note: $\pi_A = 0$ simplifies to the standard model

Adding the Supply Side 2

- Under standard assumptions, optimality implies,

$$U_n / U_q = (\pi_c q - \pi_A) / \pi_c n$$

- Almost the same as previous optimality condition except that $\underline{\pi_A}$ <u>acts to reduce the price of child quantity</u>

- Intuition: nature's *subsidy* to childbearing
  - Family planning reduces the relative price of child quality, e.g. investing in children

Empirical Importance of Supply

Research Design

- Randomly assign stork deliveries?
- Randomly assign preferences, prices income?
- Technology shock to supply side?
  - Pill: appears at the peak of the baby boom ☹
  - Abortion: more promising, but appears after Vietnam fertility notch
- "DIS-couragement design"=price increase
  - Indirect effect of policies
  - Obsolete, 90 year old policies activated by technology shock

Identifying the Effect of "Supply"

- #1: Unmarried, late adolescents:
  - Goldin and Katz (JPE, 2002), Bailey (QJE, 2006), etc.
  - "Early Legal Access to the Pill": legal consent between 18 and 21 for birth cohorts of 1939-1956
- #2: Married women: Bailey(AER, 2010)
  - 1957: Idiosyncratic language in Comstock laws passed in the 1800s "activated" by technology shock
  - *1965: Griswold v. Connecticut* "invalidates" statutes
- #3: Poorer women: Bailey (AEJ-AE, 2012)
  - County-level, federal funding "shocks" between 1965 and ~1974

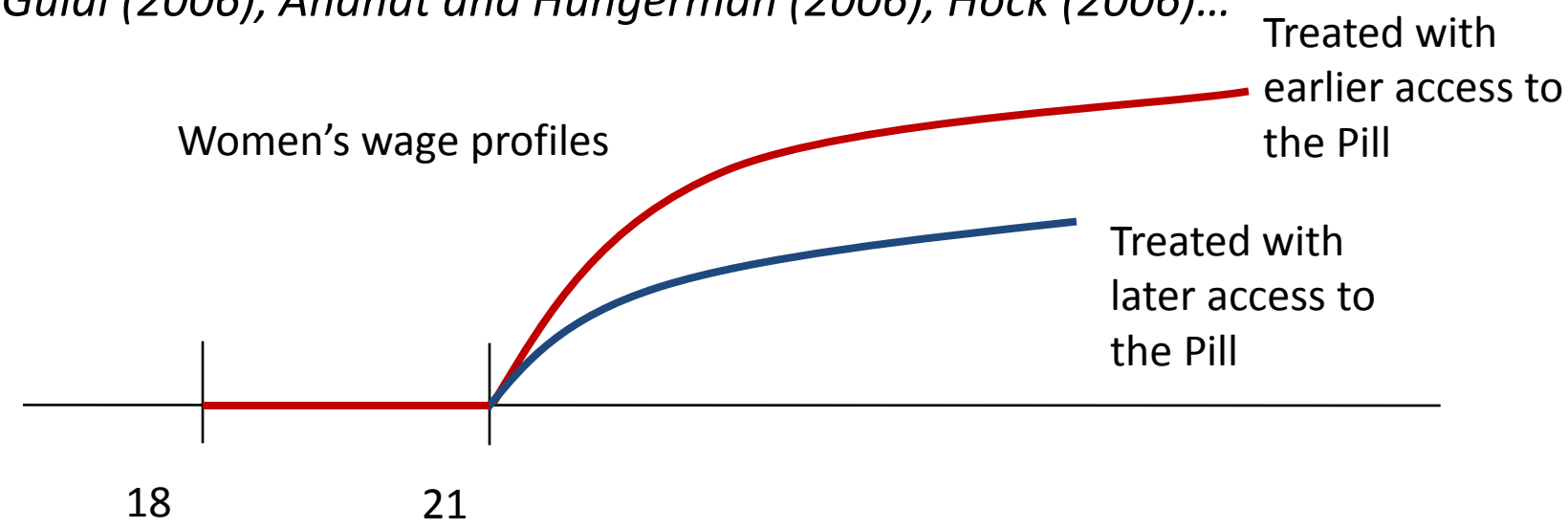
Identification Strategy #1: ELA to Pill varies by state and birth cohort

- Goldin and Katz (2002), Bailey (2006)
  - History: “Early legal access” to the Pill=Legal consent (without parents) before age 21
  - Economics: reduction in the price of averting births during a critical period for human capital investment/marriage; move to a less constrained equilibrium

In a Picture

Goldin and Katz (2002) & Bailey (2006)

Guldi (2006), Ananat and Hungerman (2006), Hock (2006)…



To be "TREATED" with early legal access,

women are unmarried, born 1940-1956

Identification Strategy #1: ELA to Pill varies by state and birth cohort

$$P(AFB_{sc}<=a)=F(\mathbf{X'_{sc}}\boldsymbol{\beta}+\tau ELA_{sc}+f_s+g_c)$$

Threats to identification: unobservable that

-varies within cohort (c) across states (s)

-varies within state (s) across cohort (c)

$$Y_{asc}=\mathbf{X'_{asc}}\boldsymbol{\beta}+\Sigma_k\delta^k ELA_{sc}1(a=k)+f_s+g_c+h_{c+a}+\{f_{as}+g_{ac}\}+\varepsilon_{asc}$$

Threats to identification with bracketed term: unobservable that varies within state-cohort (sc) across ages or varies within cohort-age (ca) across states

Threats to identification without bracketed term:

- varies by cohort (ca)
- varies by age-state (sa)

Identification Strategy #1

Dependent variable	Mean dependent variable[a]	1 = In the labor force				
		March *CPS*				June *CPS*
		(1)	(2)	(3)	(4)	(5)
ELA to pill × 21–25	0.605	0.003	0.005	−0.003	0.009	−0.048
		[0.006]	[0.006]	[0.008]	[0.009]	[0.059]
ELA to pill × 26–30	0.580	0.039	0.042	0.040	0.028	0.005
		[0.007]	[0.006]	[0.009]	[0.010]	[0.022]
ELA to pill × 31–35	0.640	0.016	0.019	0.022	0.019	0.004
		[0.006]	[0.006]	[0.009]	[0.010]	[0.021]
ELA to pill × 36–40	0.711	−0.002	0.002	0.004	0.007	0.001
		[0.007]	[0.006]	[0.010]	[0.008]	[0.023]
ELA to pill × 41–44	0.752	−0.006	−0.003	−0.007	−0.007	0.091
		[0.008]	[0.008]	[0.012]	[0.008]	[0.042]
Fixed effects		R, Y, C[b]	R, Y, C, RxYear[c]	R, Y, C, RxYear[c]	R, Y, C, RxYear[c]	S, Y, C, SxYear[d]
Age of majority states				X		
Abortion controls[e]					X	X
First birth before 22[f]						Yes
Observations		733419	733419	245943	733419	103972
Log likelihood		−454635	−454359	−150263	−454341	−59671

What happened to married women, women with children?

Identification Strategy #2: Comstock laws + technology shock

- Bailey (2010)
- History:
  - 1957: Idiosyncratic language in Comstock laws passed in the 1800s "activated" by technology shock
  - *1965: Griswold v. Connecticut* "invalidates" statutes
- Economics:
  - Reduction in the price of averting births concentrated among married women in states without sales bans

Timeline

Estelle Griswold

Executive Director of Planned Parenthood League of Connecticut

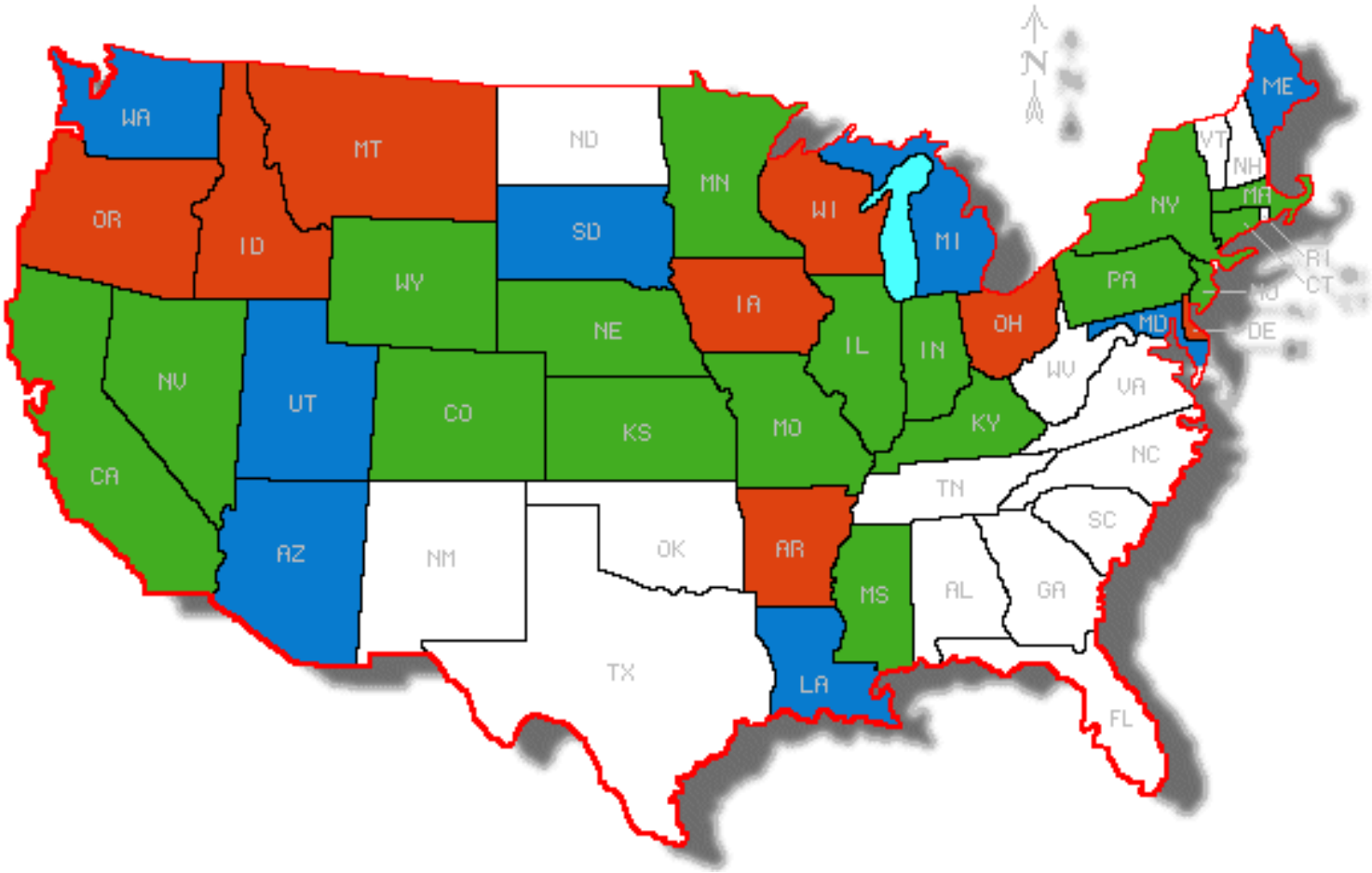
1879: Connecticut passed very restrictive state Comstock law

1965: Connecticut statute enjoined by *Griswold*

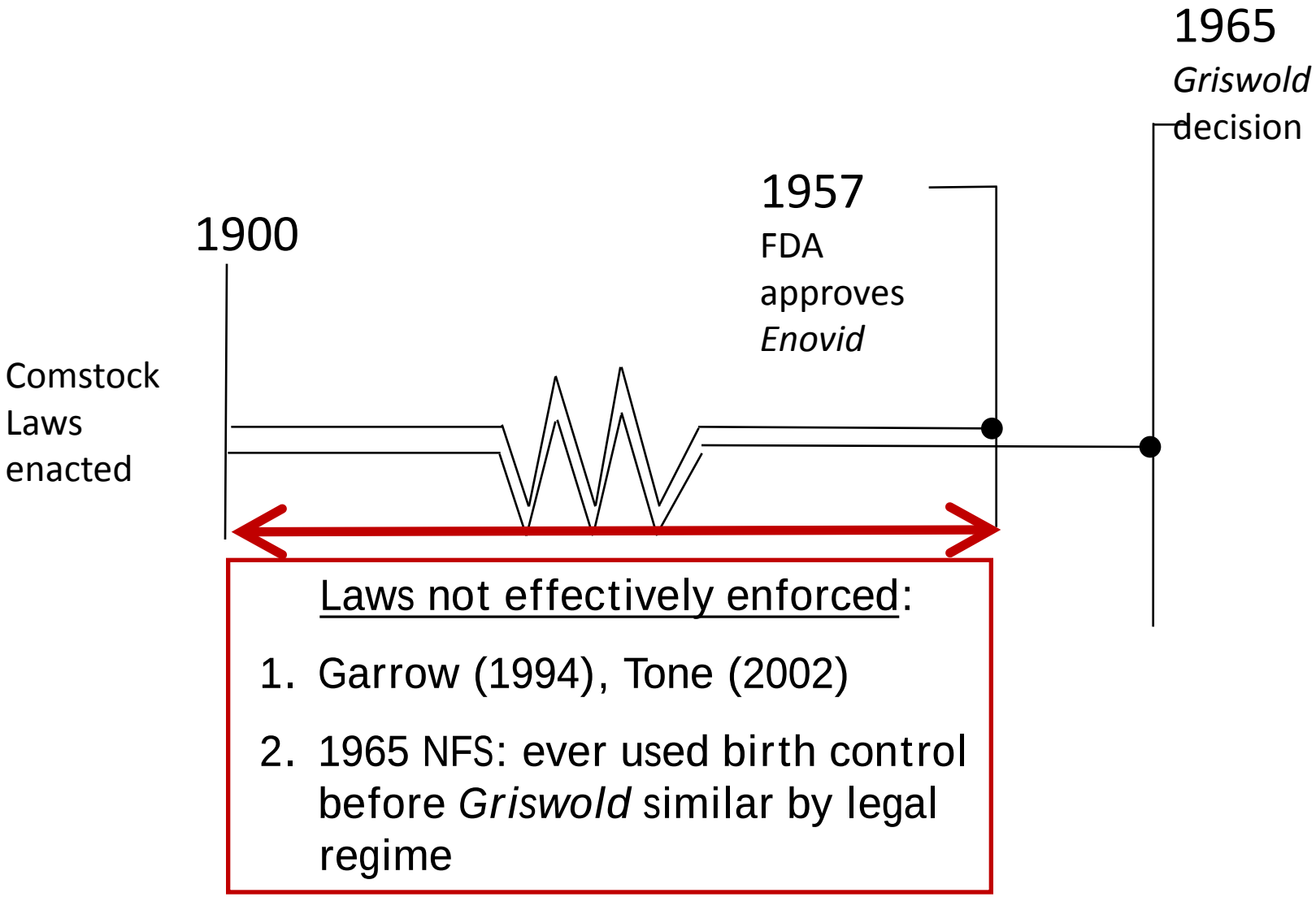
1960: 33 states had Comstock laws surviving; 24 sales bans

1965-1971: 21 revise sales bans; more than ½ initiate state funded family planning programs

Comstock Laws c. 1960 (Table I)



Empirical Strategy



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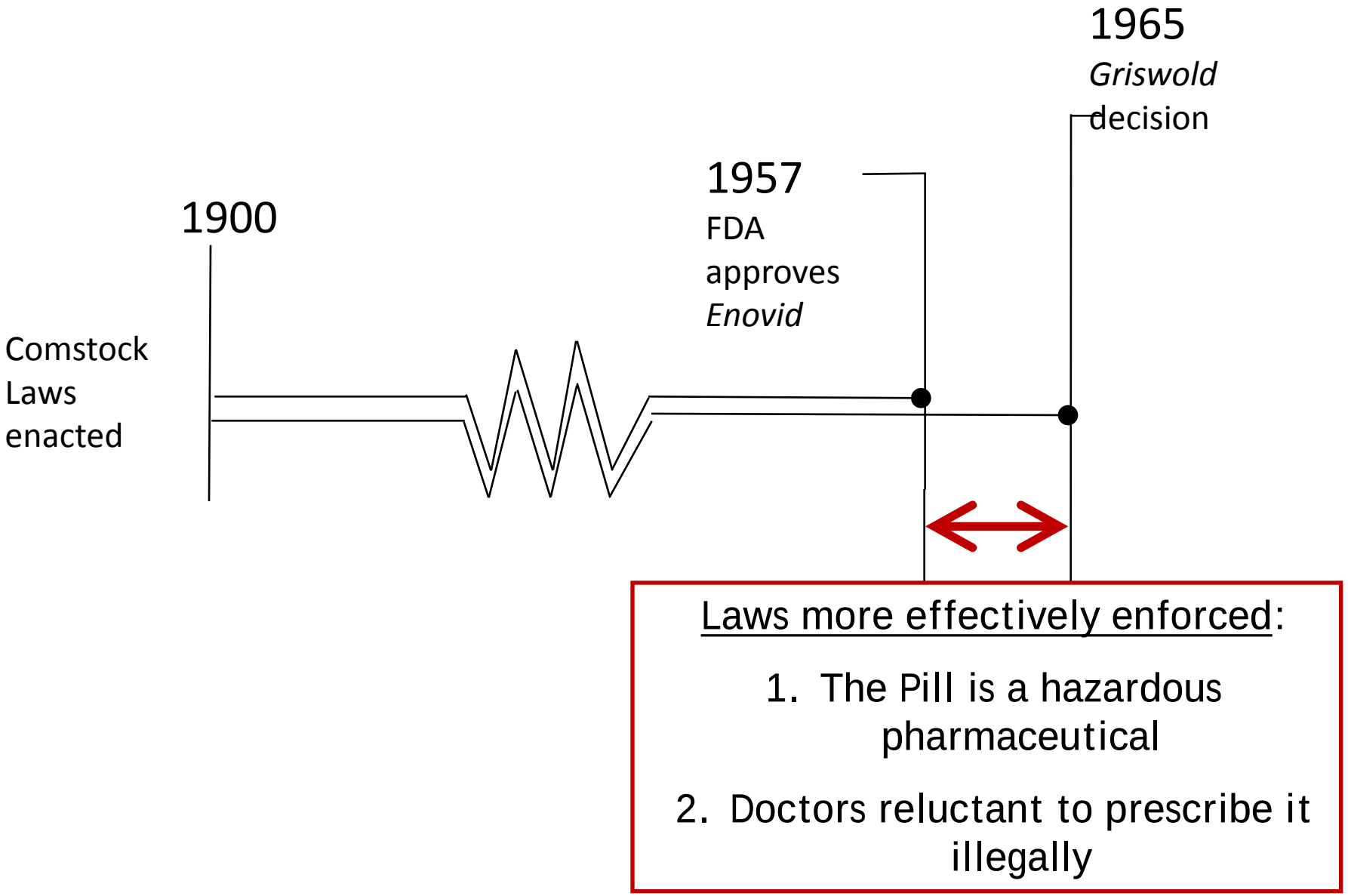

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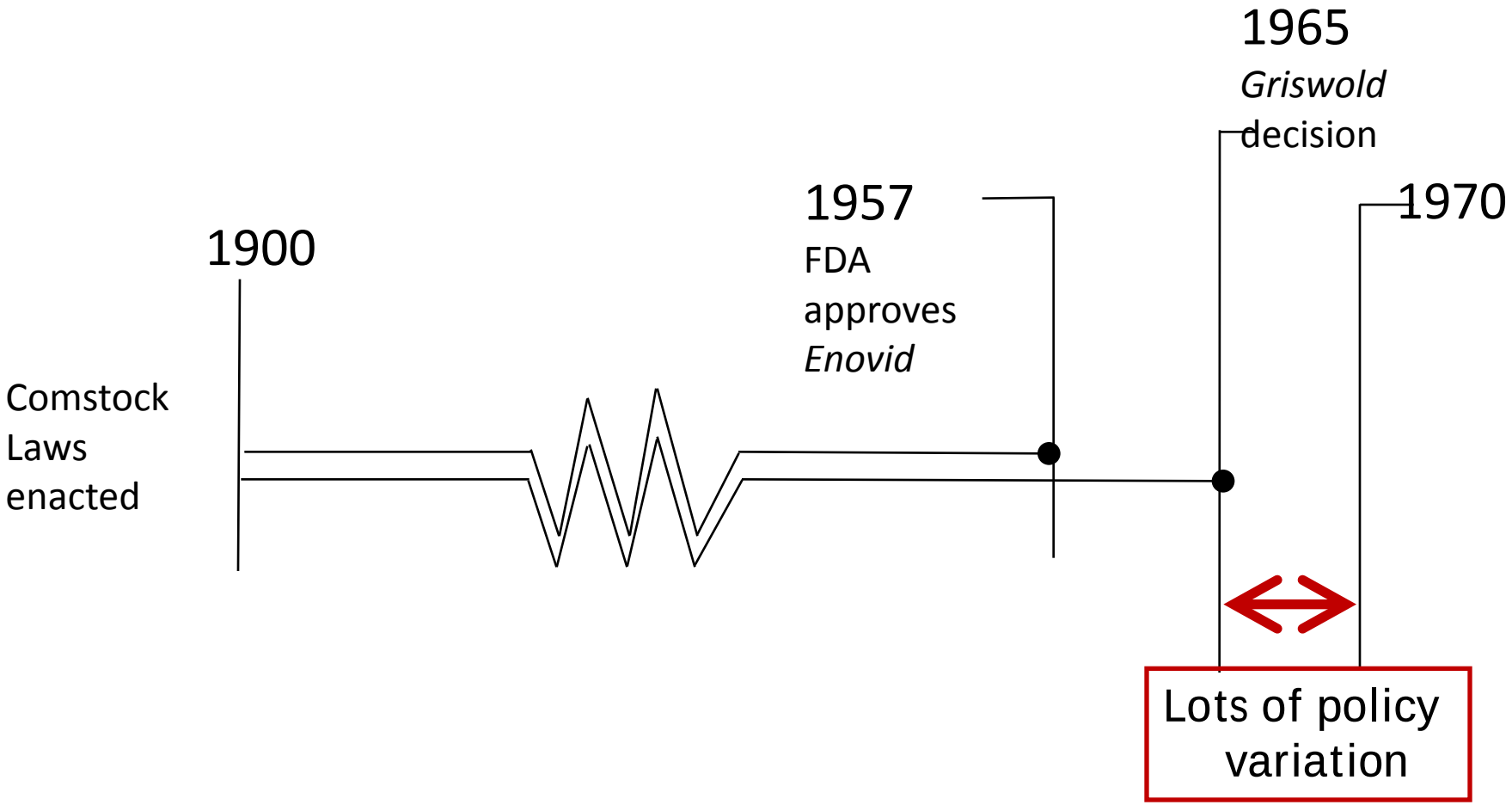


Identification Strategy #2: Comstock laws + technology shock

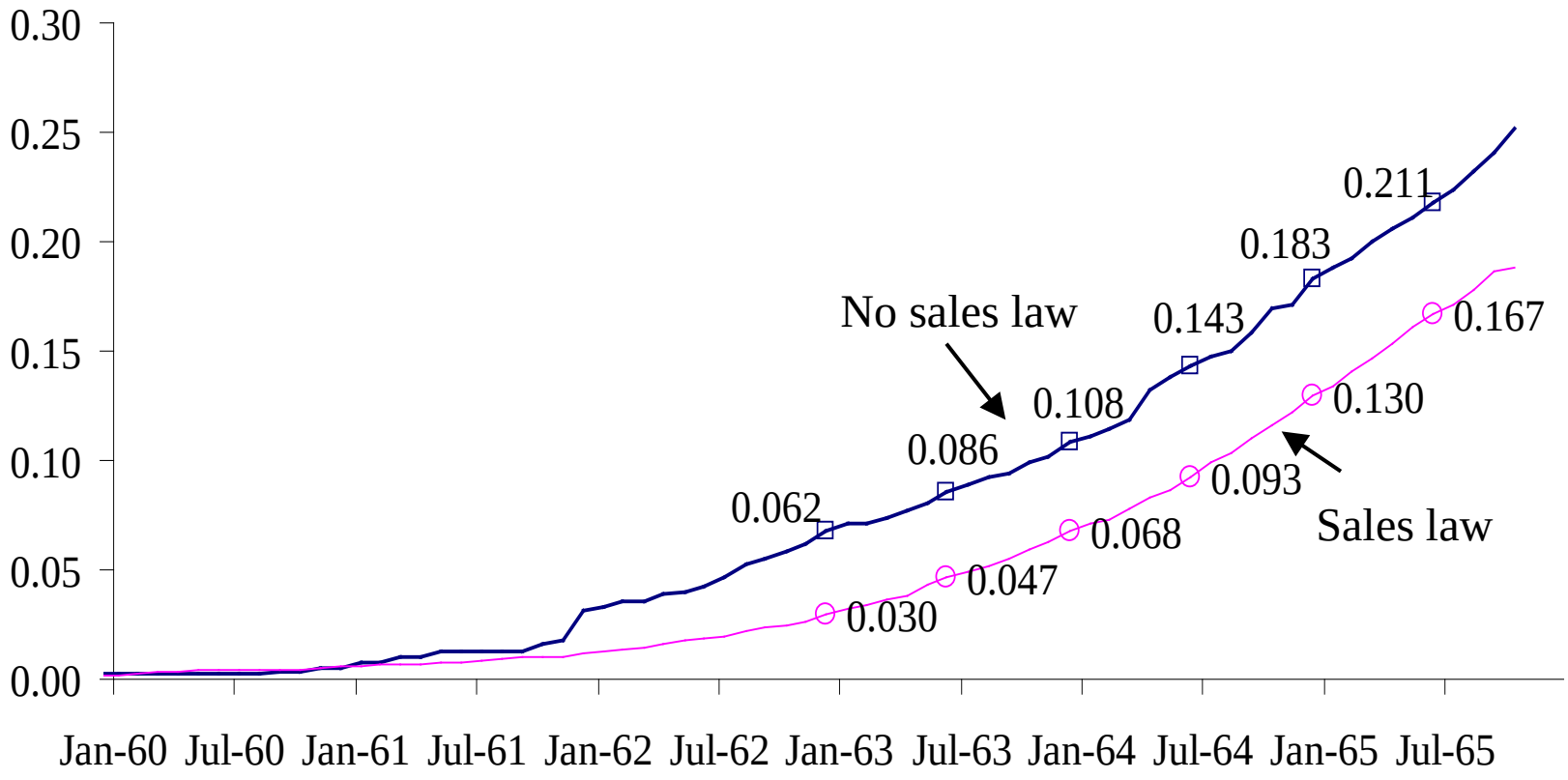
$$GFR_{st} = Sales_s \mathbf{f}_t' \tilde{\boldsymbol{\tau}}_1 + Exception_s \mathbf{f}_t' \tilde{\boldsymbol{\tau}}_2 + Advertising_s \mathbf{f}_t' \tilde{\boldsymbol{\tau}}_3 + g_{rt} + \mathbf{X}_{st}' \boldsymbol{\delta} + \varepsilon_{st}$$

Threats to identification: unobservable that varies within region-year that affects states with sales bans (without bans) relative to other states in that region without these bans in the 1957 to 1965 period

Evidence:

1. Laws affected contraceptive sue
2. Back-of-the envelope calculation about how differences in the failure rate may generate differences in outcomes consistent with estimates

Sales Laws and Contraceptive Use



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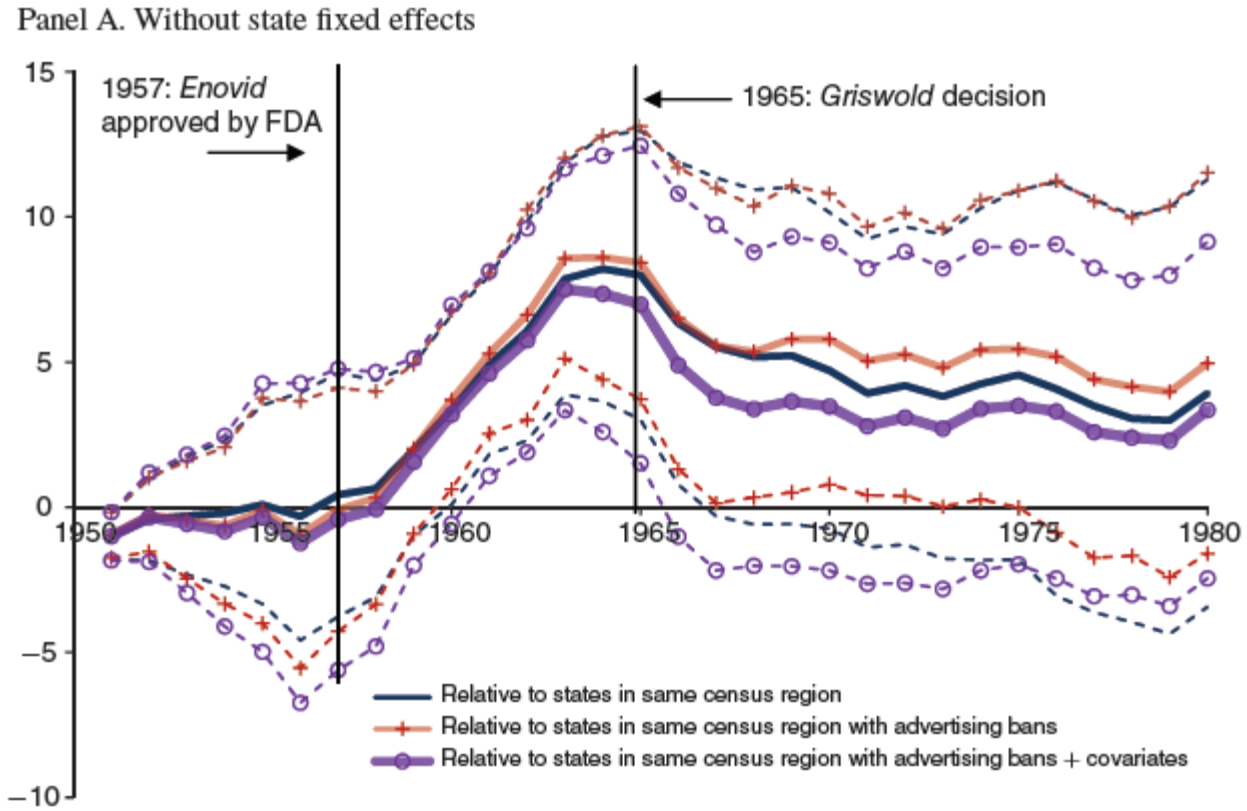

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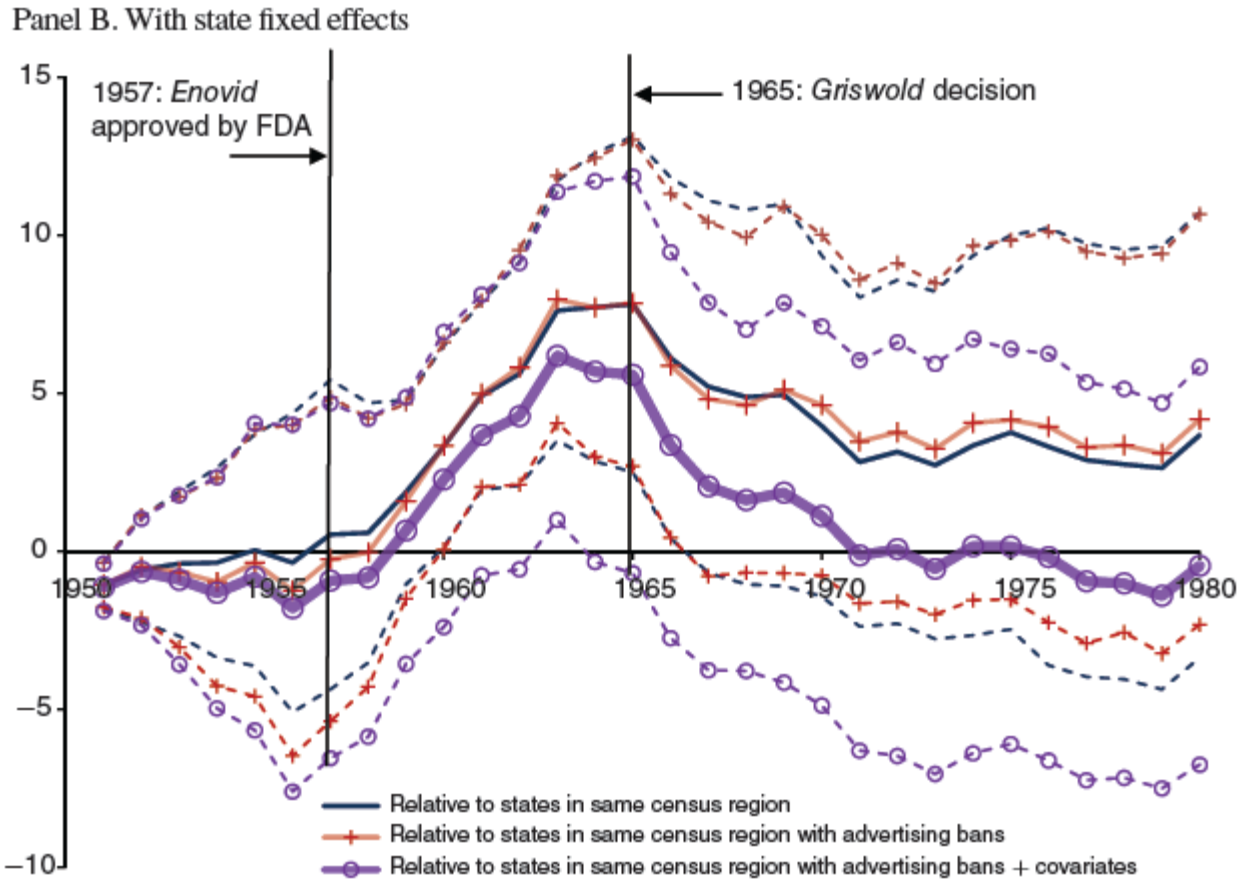


Distributional Implications?

Poor versus more affluent women?

Identification Strategy #3: Funding shocks to family planning

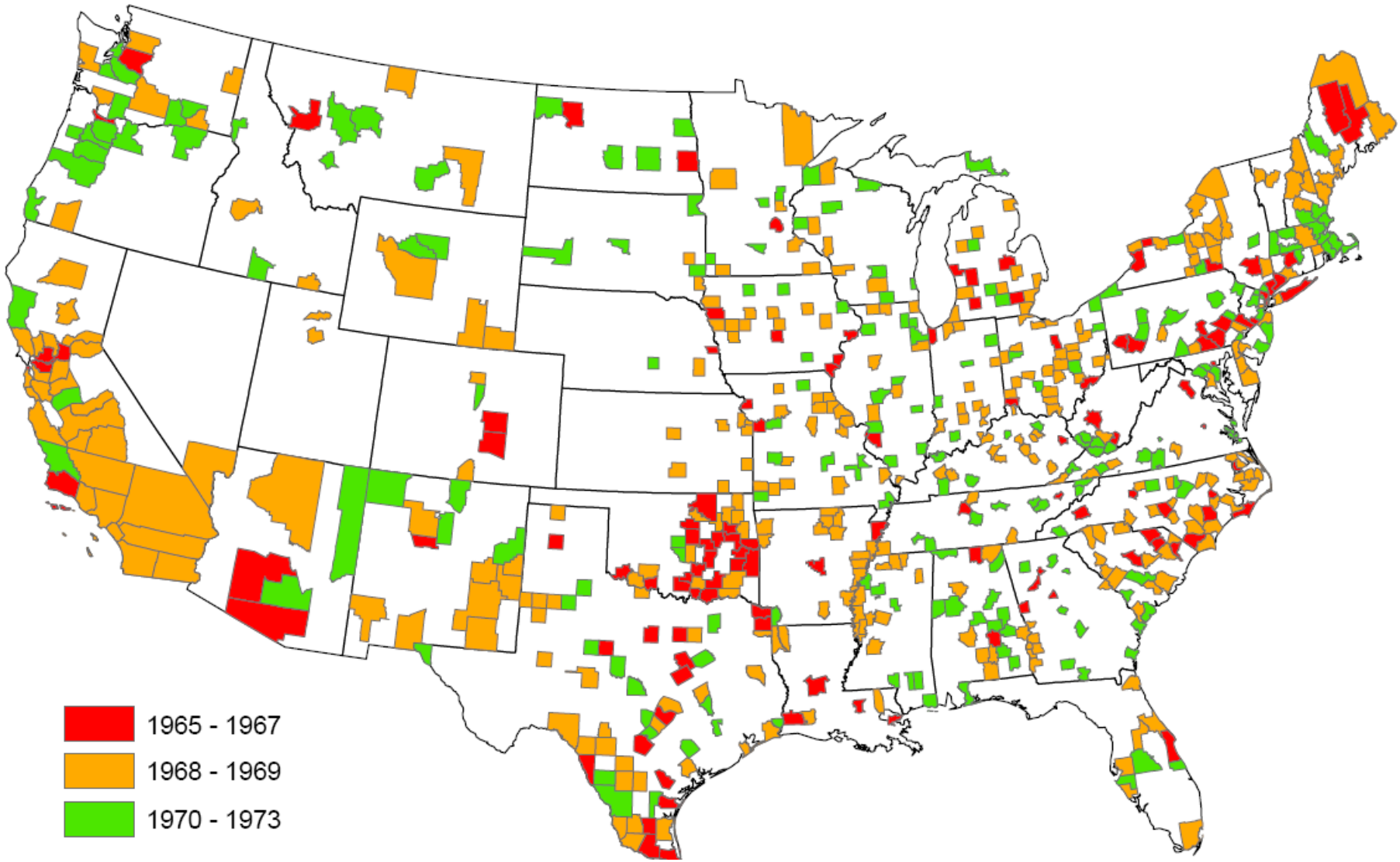
- Bailey (2012)
  - County-level, federal funding "shocks" between 1965 and ~1974
- History:
  - Haphazard *timing* of federal grants
  - Uncorrelated with local demand shocks
- Economics:
  - Reduction in the price of averting births concentrated among poor women in counties receiving grants

Identification Strategy #3: Comstock laws + technology shock

$$Y_{j,t} = \theta_j + \gamma_{s(j),t} + \sum_{y=-8}^{-1} \pi_y D_j 1(t - T_j^* = y) + \sum_{y=1}^{16} \tau_y D_j 1(t - T_j^* = y) + \boldsymbol{X}_{jt}'\boldsymbol{\beta} + \varepsilon_{jt}$$

Threats to identification: unobservable that varies within state-year that affects counties getting grants in the same year they get one

Identification Strategy #3: Comstock laws + technology shock



Research Design and Data

- Exploit variation in when and where federal programs began from 1964 to 1973

- Link this grant information to other data:
  - Vital Statistics on natality (Bailey 2012, public data)
  - Census data on outcomes (Bailey, Malkova and McLaren, RDC)
  - 2000 census, 2005-2011 American Community Survey (Bailey 2013, public data)

Key Assumptions

1. Excludability: Family planning grants do not affect childbearing or children's resources except through the proposed channels

2. Exogeneity: Timing and location of federal family planning grants as good as random after accounting for other model covariates

3. Relevance: Federal family planning programs meaningfully increased the use of family planning services

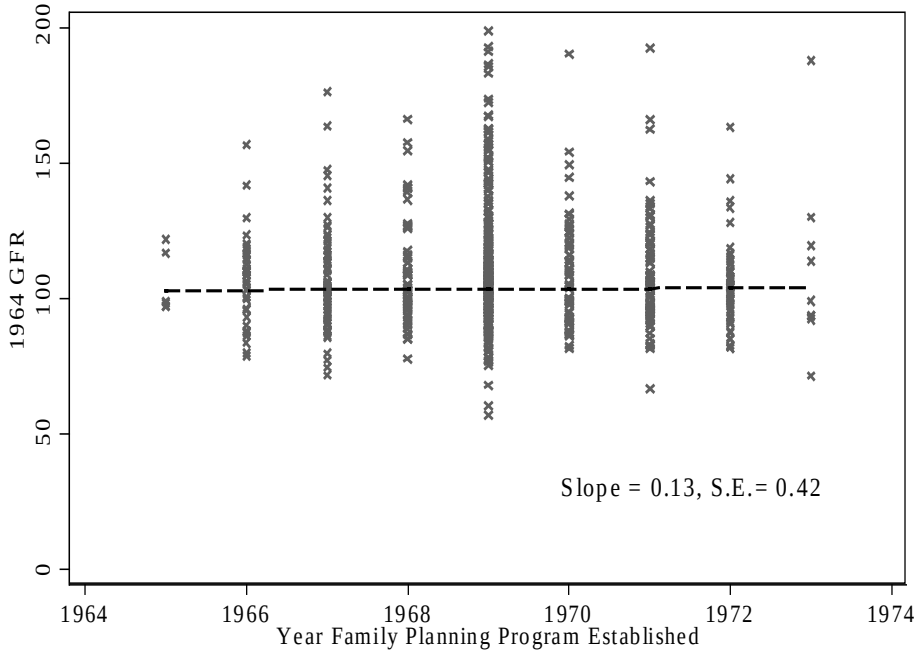
Exogeneity

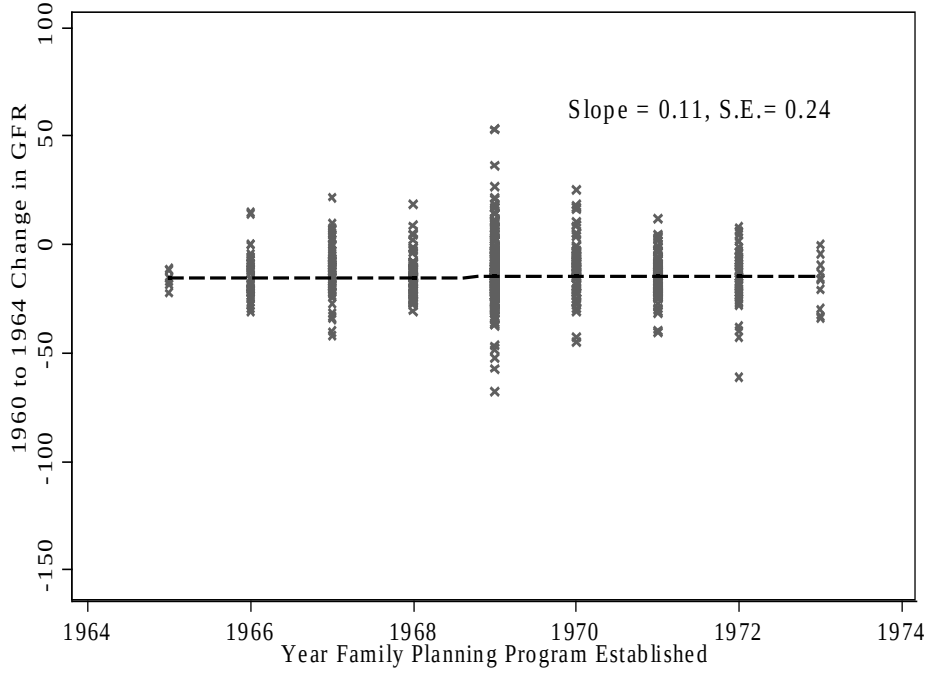
- Historical accounts of the "wild" operation of grant-making or "administrative confusion"

- Empirical evidence that date program began
  - Not predicted by 1960 characteristics or fertility rates
  - Not predicted 1965 *NFS* characteristics (e.g., social mores, sexual behavior, birth control use)

- Timing of program establishment not coincident with other War on Poverty grants

Fertility Rates and the Roll-Out of Family Planning Programs





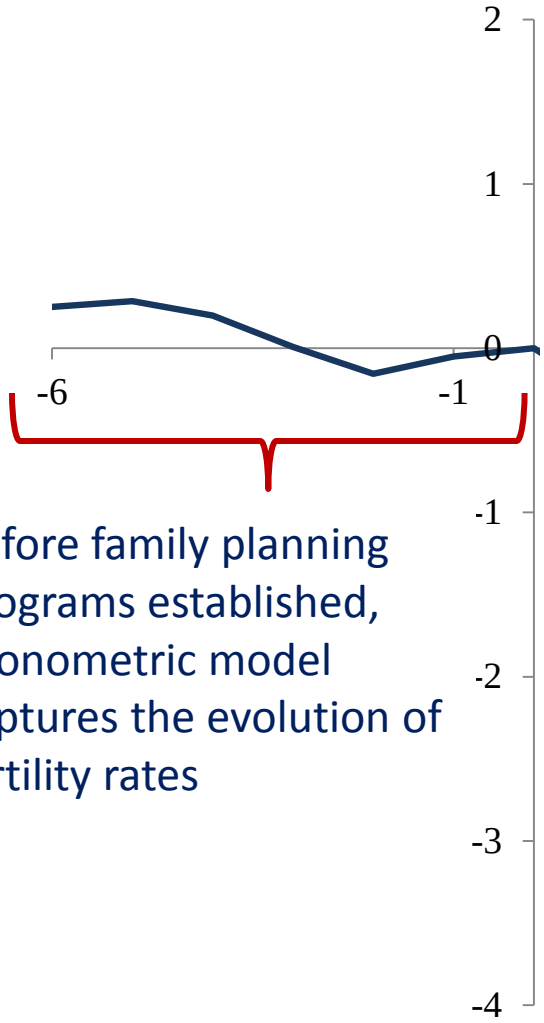
1965 Characteristics and the Roll-Out of Family Planning Programs

	(1) Population Growth a Problem	(2) Ideal Number of Children	(3) Approve of Abortion	(4) Coital Frequency	(5) Ever Used the Pill	(6) When 1st Used Pill | Ever Used	(7) Surgically Sterilized	(8) Children Ever Born to Mother
Mean Dependent Variable	*0.80*	*3.3*	*0.39*	*6.04*	*0.22*	*772*	*0.198*	*5.1*
Year Family Planning	-0.005	0.010	-0.001	0.036	-0.004	0.198	-0.004	-0.054
Program Established	[0.007]	[0.022]	[0.005]	[0.071]	[0.010]	[0.384]	[0.008]	[0.066]
Observations	3,106	3,069	3,106	2,967	3,106	742	3,106	3,101
R-squared	0.021	0.038	0.023	0.136	0.154	0.022	0.095	0.075

	(9) Married Once	(10) Age at 1st Marriage	(11) Age at 1st Pregnancy	(12) Children Ever Born	(13) Husband's Income	(14) Catholic	(15) Highest Grade	(16) 2 Parents at 14
Mean Dependent Variable	*0.87*	*20.8*	*22.3*	*2.7*	*7620*	*0.29*	*11.3*	*0.78*
Year Family Planning	0.006	0.054	0.063	0.017	50.6	0.023	0.036	0.004
Program Established	[0.005]	[0.059]	[0.066]	[0.031]	[157]	[0.016]	[0.104]	[0.006]
Observations	3,106	3,103	2,815	3,106	3,006	3,106	3,105	3,106
R-squared	0.040	0.111	0.160	0.141	0.170	0.061	0.092	0.016

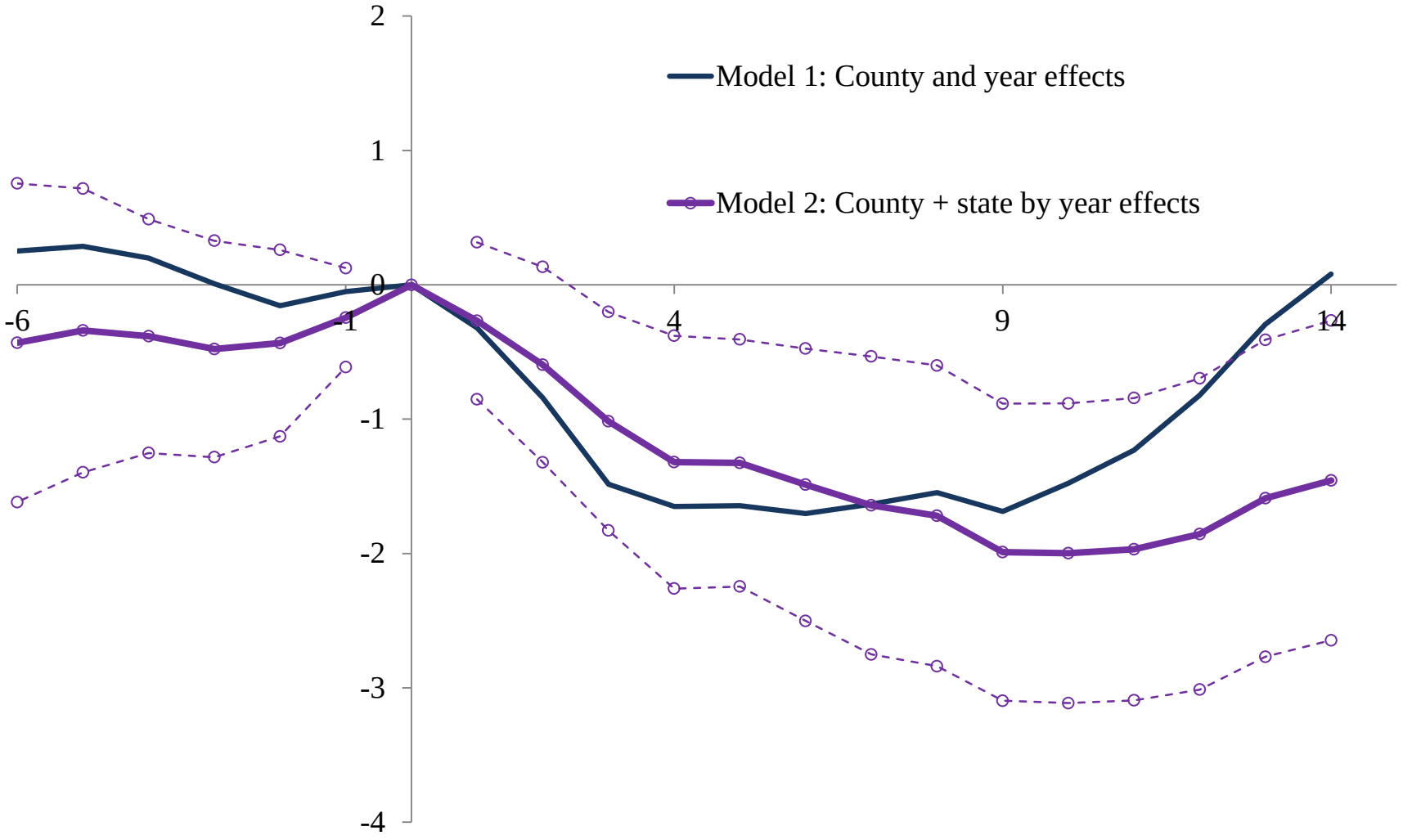
Notes: Dependent variables are coded as follows by column: (1) Do you consider the growth of world population a serious problem? Yes=1, (2) What is the ideal number of children for average American family? (3) Index from three questions about whether the respondent approves of abortion if a woman is not married, for health concerns, or in the case of financial hardship. 1=approve in all three cases; (4) Coital frequency in the last four weeks? (5) Have you ever used the Pill? Yes=1, (6) When did you first use the Pill? (month and year, 772 = March 1964), (7) Have you or your husband had an operation making it impossible to have (another) child? 1=Yes; (8) How many children did your mother have? (9) Is this your first marriage? 1=Yes; (10-11) Age in months constructed from month and year of birth and month and year of first marriage and month and year of first pregnancy end date; (12) How many live births have you had? (13) Husband's income in nominal dollars. (14) Respondent identifies as "Roman Catholic." (15) Highest grade attained by the respondent. (16) Did you live with both parents at age 14? 1=Yes. Estimates are obtained from weighted regressions of the indicated dependent variable on the year the family planning program was established. To account for sampling design, the regressions control for size of sampled PSU, decade of respondent's birth, and race (1=Nonwhite). Source: *1965 National Fertility Study*.

General Fertility Rate



Before family planning programs established, econometric model captures the evolution of fertility rates

General Fertility Rate



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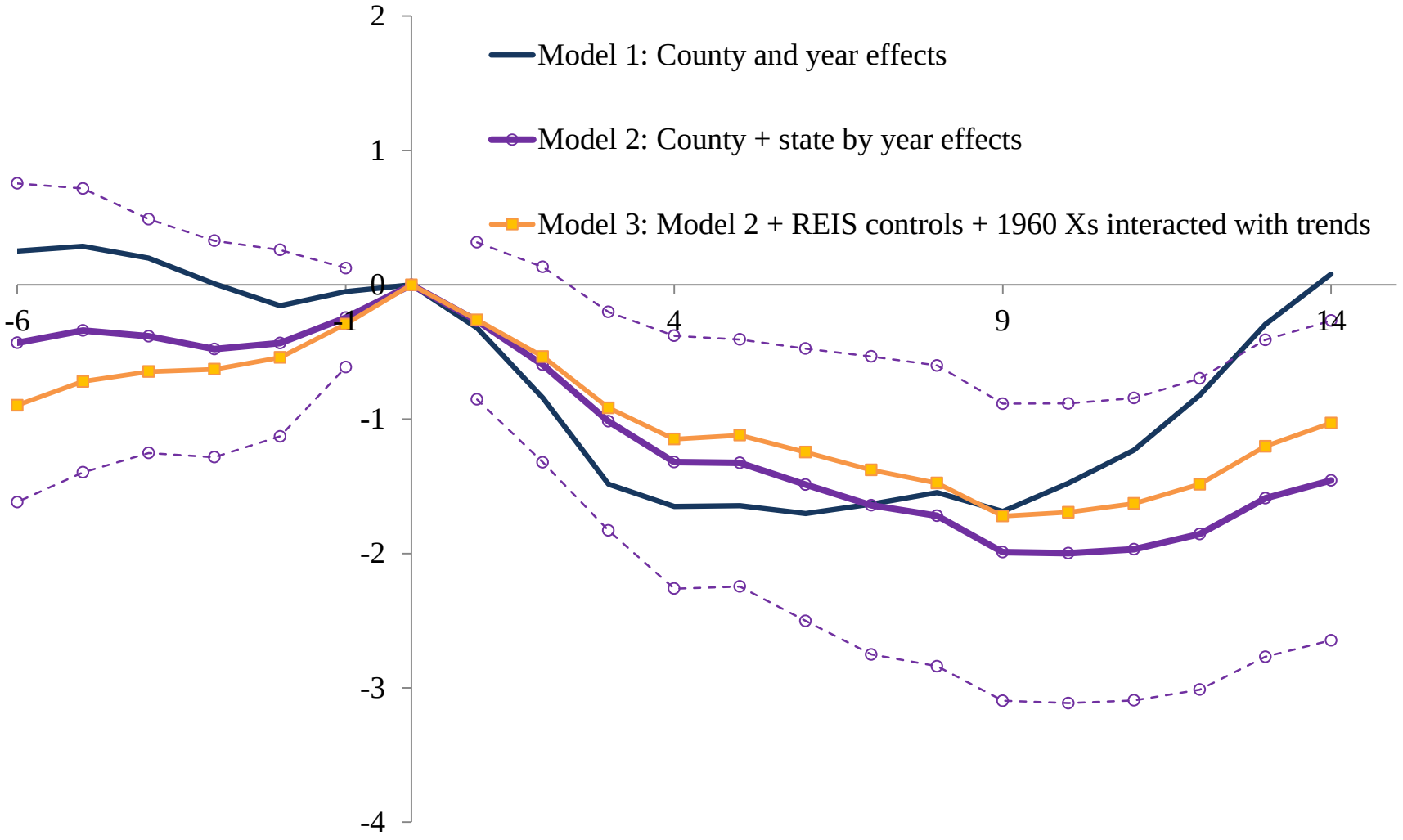
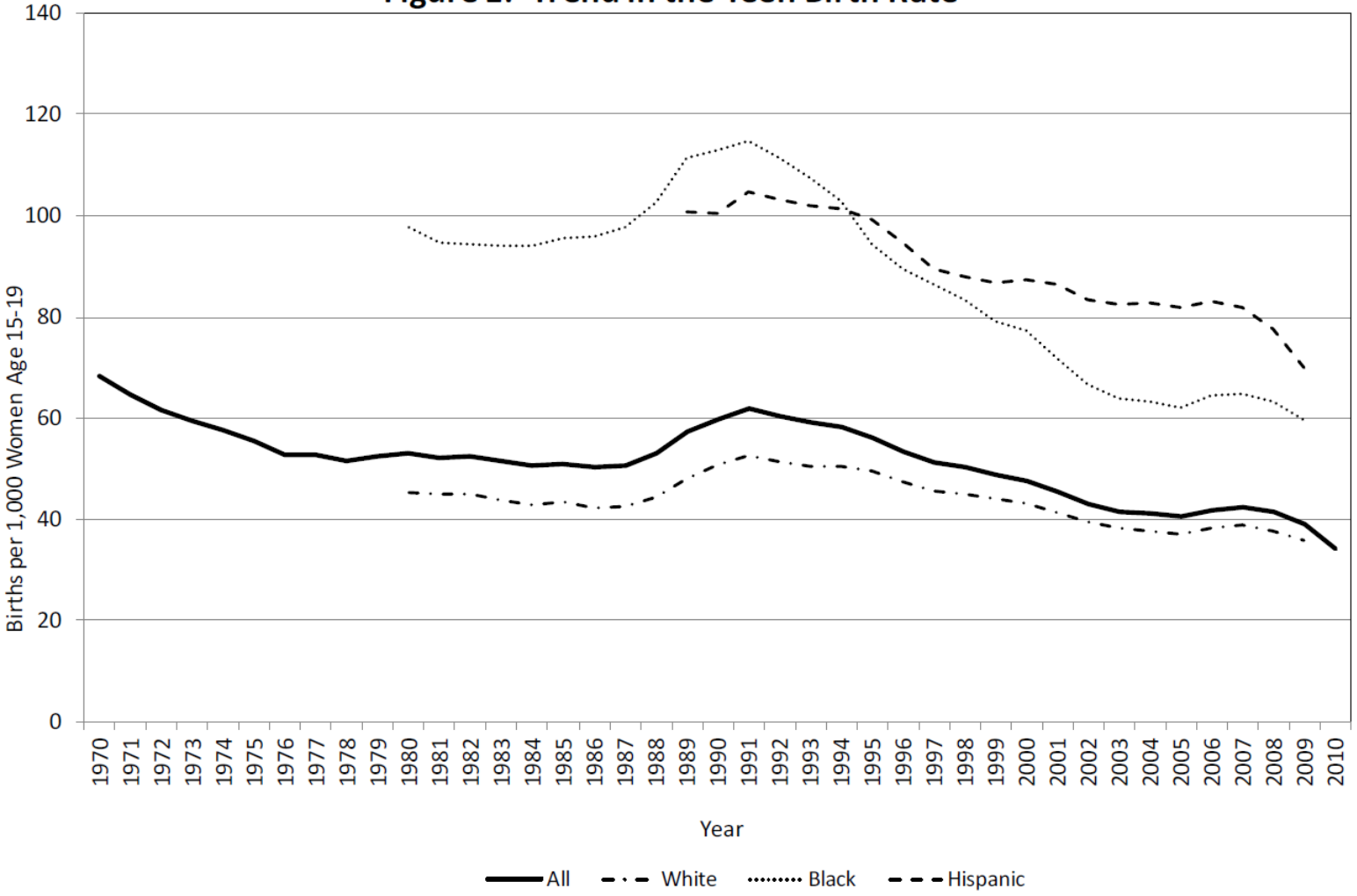


Summary

- Family planning grants reduces fertility rates by 2 percent within 5 years; 1.4 percent lower 15 years later
- 8 percent of the total decline in GFR from 1959 to 1974 (~1.8 million fewer births over 15 years)
- Cost per birth averted is roughly $2700
    - cf. Kearney and Levine 2007 estimate $6800
- Is this small? Not really!
  - Scaling the ITT effects by the beneficiaries implies 30-40 % reduction among women who began using Pill
  - GFR among poor women fell by 20-30 percent over 10 years
  - ¾ of the 1965 gap in childbearing between poor and non-poor women

Buckles and Hungerman

Figure 1: Trend in the Teen Birth Rate



Source: Martin, et al. (2011)