ART vs Abortion:
Explaining Trends in Child Adoption

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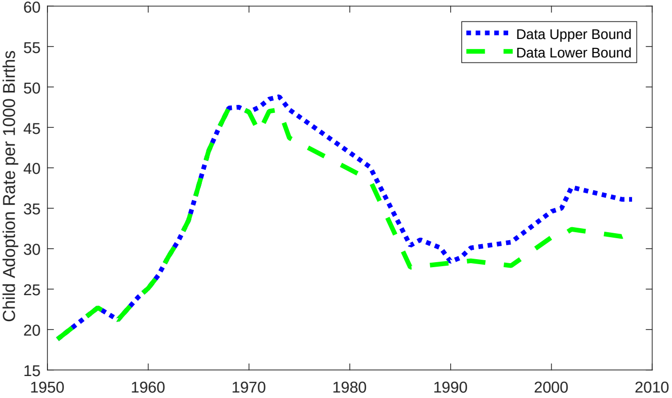
Motivation

Figure: Child Adoption Rate per 1000 Births



Source: Moriguchi (2012)

Summary

Child Adoption Rate in the US

1. Exponentially increases until 1970
2. Falls until 1990 and partially recovers after that

This Paper:

1. Study changes in **demand** and supply side in the adoption market
2. Build a stylized model where adoption is an alternative to childbearing
3. Use this model to simulate the historical US adoption rates

Who are Adoptive Parents?

"[Unrelated] adoption is rare among all couples in the US, but in some subgroups it is an important means of acquiring children. ... Having adopted a child is most common among women who had never borne a child, those [with fecundity impairment], currently married and those age 30 or older. Nearly half of the women who possess all of these characteristics had adopted a child."

C. Bachrach *(National Center for Health Statistics)*

General Idea

Supply side: (Conventional Explanation)

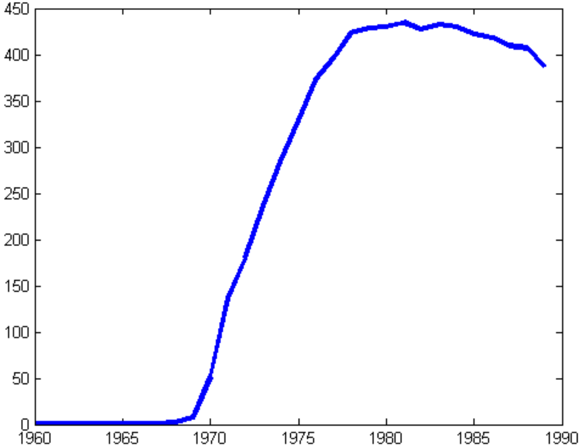
1. Early 1970s legalization of abortion decreased supply of orphans for adoption.

Demand side:

2. Increasing returns to work experience motivates women to delay fertility, ceteris paribus, increasing demand for adoption.
3. Early 1970s various methods of Assisted Reproductive Technologies (ART) became widespread, allowing more women of older ages to have biological children, decreasing demand for adoption.

Conventional Explanation: Abortion Legalization

Figure: Abortion Rate per 1000 Births in the U.S. 1960-1990



Why Abortion is Not Enough?

- Abortion legalization can explain only 1970s drop but not 1960s rise in adoption.
- Adoptions are not limited by the local market, but there is no kink in the international adoptions.
- No decrease in the age at first birth among college-educated/ 25+ women following abortion legalization.

Supply Side: Assisted Reproductive Technologies

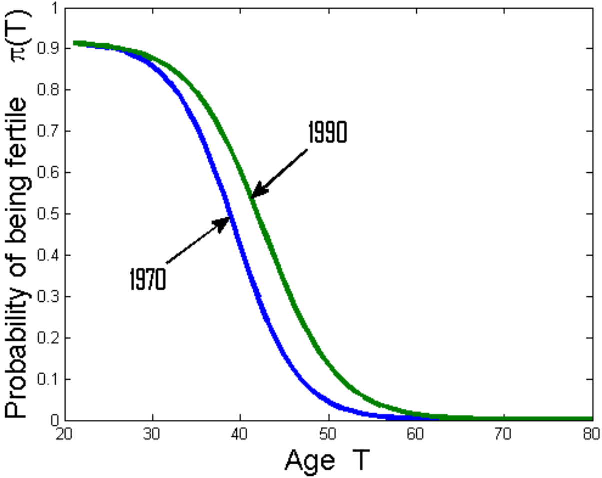
Dr. Jerome K. Sherman - founder of the first in the world sperm bank in University of Iowa Hospital in 1964.

Supply Side: Assisted Reproductive Technologies

Assisted Reproductive Technology (ART) is a group of methods used to cure infertility and achieve pregnancy.

- 1953. The first successful pregnancy from artificial insemination of frozen sperm is reported.
- **1970. Idant Laboratories — the first commercial sperm bank in the US**
- 1978. Louise Brown — the first IVF child.
- **By 1987, US doctors were performing artificial insemination on about 172,000 women per year, resulting in some 65,000 births.**

Progress in ART



Model

- Agent lives from time 0 — beginning of her career to time R — retirement
- Agent maximizes her expected lifetime utility by choosing T — time of child acquisition and $\overline{K}$ — number of attempts to get a child
- All biological (k_b) and adopted children (k_a) are assumed to appear simultaneously in the agent's life
- Note that $\overline{K}$ is the maximum number of children $K = k_b + k_a$ that the agent will have if all of her conception and/or adoption attempts are successful
- Given the assumptions, agent solves:

$$\max_{T,\overline{K}} \quad \mathbb{E}_K V(T,K) + \mathbb{E}_{k_b,k_a} U(k_b, k_a, T) \tag{1}$$

Family Formation

- $\pi_b(T)$ — probability an agent is fertile in period T $(\frac{\partial \pi_b(T)}{\partial (T)} < 0)$
- If she fails to conceive, π_a — probability she adopts
- Example: $\overline{K} = 1$
  - Agent ends up with a biological child with $p_{1,0}(1) = \pi_b(T)$
  - with adopted child: $p_{0,1}(1) = (1 - \pi_b(T))\pi_a$
  - child free: $p_{0,0}(1) = (1 - \pi_b(T))(1 - \pi_a)$
- So by choosing $T, \overline{K}$ agent picks probability distribution over composition and number of children

Then the expected utility agent derives from parenting is:

$$\mathbb{E}_{k_b,k_a} U(k_b, k_a, T) = \sum_{\{k_b,k_a\}:\ k_b+k_a \leq \overline{K}} p_{k_b,k_a}(T, \overline{K}) U(k_b, k_a, T) \quad (2)$$

where
$$U(k_b, k_a, T) = \lambda u(k_b, R - T) + u(k_a, R - T) \quad (3)$$

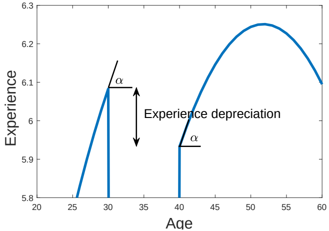
Life-Time Earnings

- Following Olivetti (2006), the agent accumulates experience through a learning-by-doing process (i.e., current stock of experience depends on its past value and the number of hours worked in the previous period)
- While the agent is childless, she devotes all her time to work
- Time cost: fraction of time τ per child
- Agent's earnings therefore are $\Theta \equiv \Theta(t, 0)$ before the agent attempts to become a mother and $\Theta \equiv \Theta(t, T, K)$ once she starts to take care of K children.

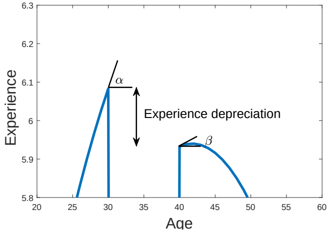
Present value of life-time earnings:

$$\mathbb{E}_K V(T, K) = \sum_{t=1}^{T} \beta^t v\left(\Theta(t, 0)\right) + \sum_{K=0}^{\overline{K}} P_K(T, \overline{K}) \left[\sum_{t=T+1}^{R} \beta^t v\left(\Theta(t, T, K)\right) \right] \tag{4}$$

Benefit of Fertility Delay

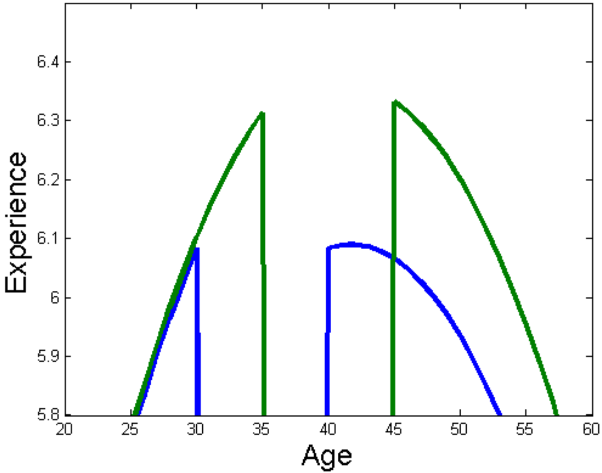


(a) Tenure-Specific Process à la Mincer



(b) Age-Specific Process à la Olivetti

Benefit of Fertility Delay



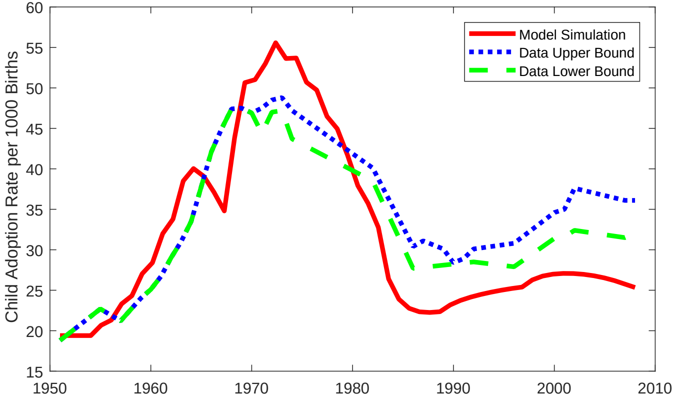
Simulation of Historical Trends

- I simulate behavior of successive generations of representative agents. Each generation has specific Θ, π_a and $\pi_b(g)$ functions
- Θ Human capital accumulation process: linear extrapolation of coefficients from Olivetti (2006)
- π_b Probability of being fertile: Van Noord-Zaadstra et al. (1991) for benchmark case, and update it with ART success rates
- π_a Availability of adoption

$$\pi_a = 1 - N_I - N_L + N_{IA} \tag{5}$$

where N_I and N_L are illegal and legal abortions per thousand live births respectively, and N_{IA} is the number of intercountry adoptions per thousand live births.

Simulation Result



Counterfactual 1

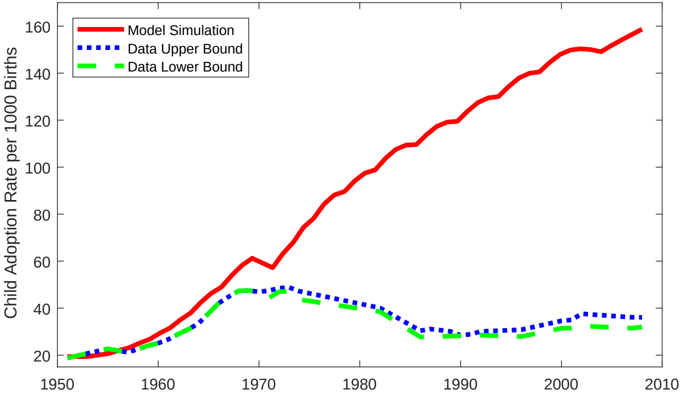
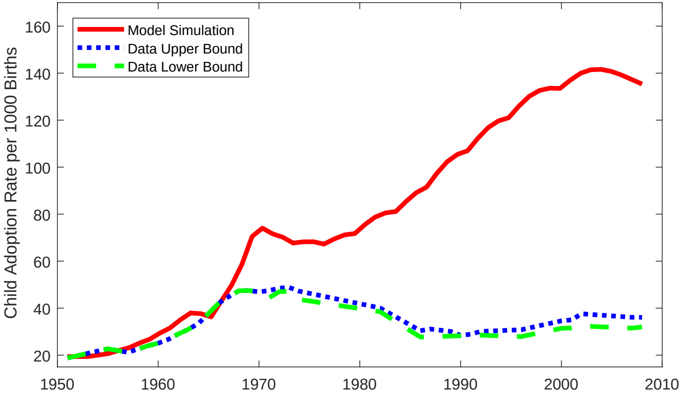


Figure: Only Returns to Experience Change

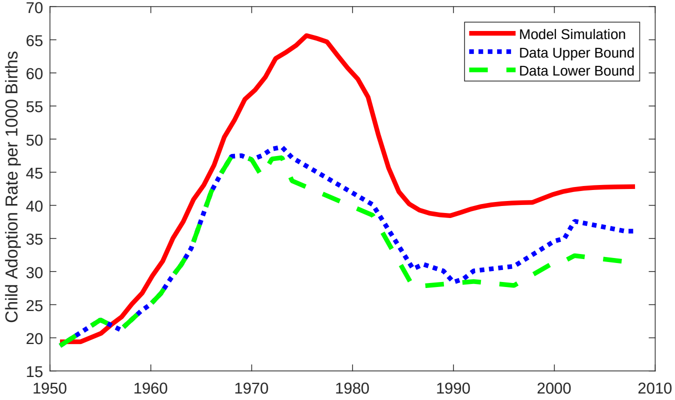
Counterfactual 2

Figure: Returns to Experience and Abortion Rate Changes



Counterfactual 3

Figure: Returns to Experience and ART Changes



Conclusion

- It is unlikely that the child adoption trend was driven mainly by the supply side
- In the model increasing returns to female experience produce pre-1970 rise in adoption rate and innovations in ART together with increase in abortions produce post-1970 decline