An Economic History of Fertility in the U.S.: 1826 - 1960

Authors: Larry Jones and Michele Tertilt
Presenter: Diego Daruich

Frontiers of Family Economics
Prepared for Sargent’s Reading Group (NYU)

September 16, 2014
Summary

- **Motivation:** Modeling fertility decisions is challenging. Try to identify facts that will be useful for future modeling.

- **Data:** U.S. Census data for 1900-1990, to build 5-year cohorts between 1826 and 1960.
  - Focus on married women, who have completed fertility.
  - Data on their age and Children Ever Born (CEB), and husbands’ occupation/education.

- **Questions:** What is the relationship between fertility and income? How much of fertility drop comes from negative time invariant relationship with income?

- **Findings:**
  - Strong negative relationship. Overall income elasticity of -0.38.
  - Shifted income distribution can explain a big share (up to 90%) of reduction in fertility.
  - But observe deviations from time invariant, isoelastic relation.
  - Reduction in elasticity over time.
Outline

Findings
- CEB by Birth Cohort
- Compositional Arguments
- Negative Income Elasticity + Increasing Income
- Using Education
- Elasticities by Groups

Conclusion
Total Fertility

Figure 1: CEB by Birth Cohort.
Total Fertility

- Fertility was **roughly constant** at 5.5 until 1850 (1870).
- **Steep decline** around 1870 (1900).
- **Baby bust** around 1910 (1930), followed by **baby boom** of 1930 (1950).

**Common Hypotheses:**

1. Fertility was **delayed**: NO. Data here is by cohort.
2. **Reduction in marriage**: NO. Data here is on married women.

- **Total Fertility Rate** (TFR) is another measure of fertility, based on given year (not cohort).
  - It **mixes** fertility decisions of all birth cohorts alive at the time.
  - With declining fertility, it overestimates (underestimates) fertility of young (old).
  - So decline in CEB is faster than in TFR.
Figure A2: Number of Children.

Similarly, observed reduction in standard deviation of CEB.
One common hypothesis is that:

- There are groups with different constant fertilities.
- Relative sizes of groups have changed.

Some of the proposed groups are: urban vs. rural, region, race, immigrant. But main features of US fertility history are common across them.
Compositional Arguments

Figure 3: CEB by Sub-Groups.

- Differences are quite stable, and narrowing.
- Fertility decline is not from movement between groups.
Differences were substantial earlier, but also narrowing.

But proportion of women living in “low fertility region” is shrinking. Does not explain fertility decline.
Negative Income Elasticity + Increasing Income

So far we have seen that delayed fertility and reduced marriage do not seem to explain shifts. Similarly, observable compositional arguments fail.

Another popular hypothesis is that:
- There is a negative relationship between fertility and income. (Ex: Time Intensive Children/Opportunity cost model)
- GDPpc growth pushes people into low fertility range.

So main questions are:
- Is it a move along a time independent relationship?
- Or was there a shift of the relationship instead?

To proxy income in Census data, use
- Occupation of husband.
- Occupational Income Score (OIS) → misses temporary shocks. Focus on lifetime earnings instead.
Negative relationship when women did not work: problem for opportunity cost model.

- Relationship looks surprisingly **time invariant**.
- But there are systematic **deviations**.
Figure 7: CEB by Top and Bottom Half of the Income Distribution.

- Rich reduce fertility first (gradually), increasing gap.
- Then fertility has become compressed.
Reduction of Elasticity

Figure 8: CV of Fertility and Income Elasticity.

- Implies that fertility compression, was not just from compression in income.
- Moreover, with updated CPS data, elasticity closer to 0.
What if we use education?

Basically, the pattern is **very similar**:

- Substantial **negative relationship**.
- Considerable **increase in education** over the 100 years.
- Relationship is quite **stable**, but there is a **downward shift** as well.

For more recent census, we can combine both **husband and wife educations**.

- **CEB is declining in both**.
- Also add positive assortative mating, and effect is larger.
Elasticities by Groups

We saw:

- Decline was not even across the income distribution.
- Non-monotonicity of income elasticities.

Question: Are elasticities by groups the same?

Finding: Not the same, but quite similar.
Table 4: Income Elasticity of CEB by Groups.

| Group                      | Intercept | Income Elasticity | OI      | CEB   | log(CEB) gap explained by log(income) gap
|---------------------------|-----------|-------------------|---------|-------|------------------------------------------
| All                       | 4.82      | -0.38             | 19,941  | 3.57  |                                          
| By Location               |           |                   |         |       |                                          
| Urban                     | 4.66      | -0.37             | 21,751  | 3.21  | B                                        
| Rural                     | 4.64      | -0.35             | 18,294  | 3.95  | 53%                                      
| Farm                      | 4.46      | -0.33             | 14,108  | 4.28  | 69%                                      
| Non-Farm                  | 4.65      | -0.36             | 21,109  | 3.30  | B                                        
| By Race                   |           |                   |         |       |                                          
| Black                     | 5.29      | -0.42             | 15,944  | 4.52  | 47%                                      
| White                     | 4.71      | -0.37             | 20,252  | 3.49  | B                                        
| By Immigration Status*    |           |                   |         |       |                                          
| Foreign Born*             | 5.78      | -0.48             | 14,287  | 4.06  | none***                                  
| US born, Foreign Parents* | 5.05      | -0.41             | 15,050  | 3.66  | 57%                                      
| US born, US parents*      | 4.88      | -0.39             | 13,882  | 3.84  | B                                        
| By Region                 |           |                   |         |       |                                          
| New England               | 3.43      | -0.24             | 21,105  | 3.05  | B                                        
| East North Central        | 4.26      | -0.32             | 20,146  | 3.42  | 26%                                      
| South Atlantic            | 5.60      | -0.45             | 19,193  | 4.06  | 29%                                      
| West South Central        | 5.39      | -0.43             | 19,006  | 4.25  | 26%                                      

* Immigration status is available only for the cohorts between 1828 and 1928.
** relative to benchmark (B) category.
*** Foreign born Americans have higher incomes and higher fertility than US born, US parents.

- **Urban vs. Rural:** Very similar. CEB difference from income.
- **Region:** Biggest difference. “Regional fixed effects”?
- **Comp. effects?** No. Pattern over time holds within groups.
Outline

Findings

Conclusion
Conclusion

Facts to keep in mind when modeling fertility.

• Fertility has decreased substantially since 1820s.

• Less diversity:
  • Stable 10-20% having 0 or 1 children.
  • Less families having 4+ children.

• Marriage reduction does NOT explain it.

• Compositional arguments (urban vs. rural, region, race, etc) are NOT key. Patterns are similar across groups.

• CEB Income elasticity:
  • Apparently stable negative relationship, but with deviations.
  • Income sensitivity has reduced over time.
  • Compression of fertility is NOT just from income compression. What then?