Is the Market Pronatalist? Inequality, Differential Fertility, and Growth Revisited

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Introduction

- Historically: negative relationship between income and fertility.
  - Prominent mechanism: Opportunity cost of raising children.

- In recent decades, the relationship flattened substantially.

- At the same time, large increase in income inequality.

- Question: can changes in marketization (outsouring) explain trend?

Fertility by Income Decile 1980 & 2010
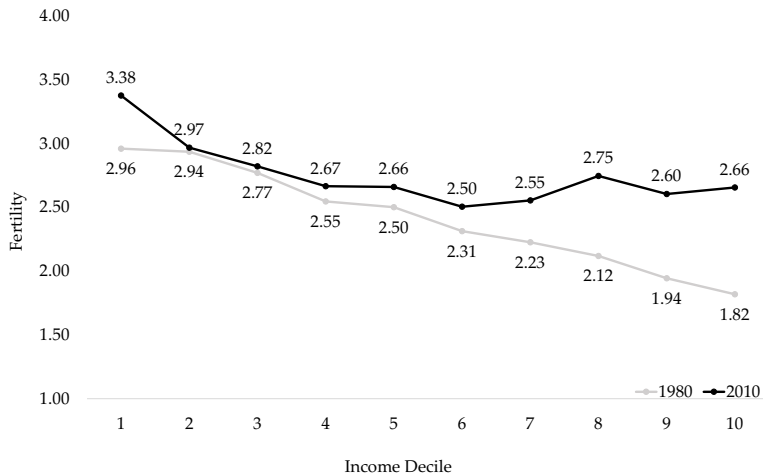
High Income Fertility & Relative Cost

coefficient=1.064 p-value=0.000
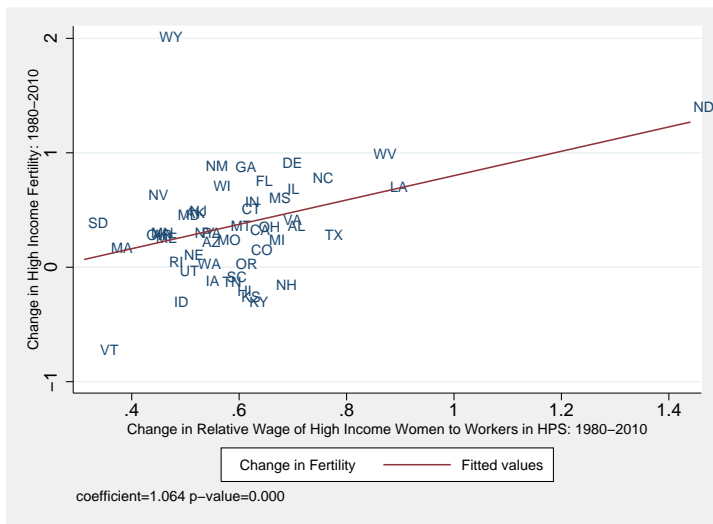
What we do

1. Build a model that highlights role of marketization for fertility.

2. Result: ↑ inequality & ↓ price of market good substitutes quantitatively accounts for changing fertility patterns.

3. Implication 1: ↑ inequality → ↑ HC of next generation.
   - Through differential fertility.
   - Opposite of standard literature (de la Croix & Doepke 2003; Moav 2005).

4. Implication 2: ↑ Minimum wage → ↓ fertility and labor supply of *high* income women.
   - Show quantitatively in model.
   - Estimate empirically in cross-state data (OLS + IV).

5. Further implications for childlessness and marital sorting.

Literature

- Inequality & differential fertility: de la Croix & Doepke (2003), Moav (2005), Hazan & Zoabi (2015), Jones, Schoonbroodt, & Tertilt (2010), Vogl (2016)

- Marketization: Cortes & Tessada (2011), Furtado (2016), Mazzolari & Ragusa (2013), Greenwood et al. (2016, others)

- Minimum wage: Baskaya & Rubinstein (2012)

- Childlessness: Baudin, de la Croix & Gobbi (2015)

Model – Outline

$$u = \ln{(c)} + \alpha \ln{(n)} + \beta \pi(e)$$

$$c + p_n n + p_e en = w_f + w_m$$

$$\pi(e) = \ln\left(b(e + \eta)^\theta\right)$$

Model – Marketization

$$TC(n) = \min_{t_f, m} t_f \cdot w_f + m \cdot p_m$$

s.t.

$$n = A \left(\phi t_f^\rho + (1 - \phi) m^\rho \right)^{\frac{1}{\rho}}.$$

$\Rightarrow$

$$TC\left(n, w_f, p_m\right) = \frac{1}{A} \left[\phi^{\frac{1}{1-\rho}} w_f^{\frac{\rho}{\rho-1}} + (1 - \phi)^{\frac{1}{1-\rho}} p_m^{\frac{\rho}{\rho-1}} \right]^{\frac{\rho-1}{\rho}} n \equiv p_n n.$$
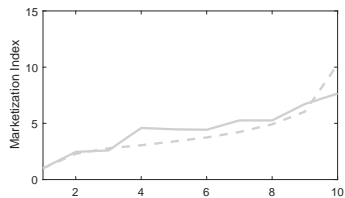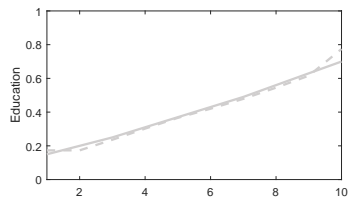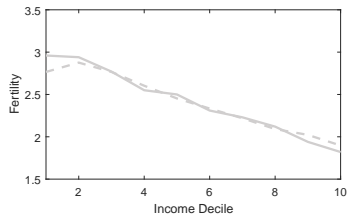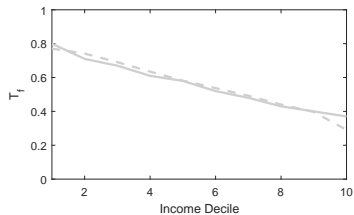
Model – Men

- Traditional Gender Roles: Men pay no time cost of children.
  - Increase in male inequality $\rightarrow$ flattening of fertility-income profile due to income effect.
- Modern Gender Roles: Men pay time cost of children.
  - Increase in male inequality: only generates flattening fertility-income profile with marketization.
- Conservative assumption: traditional gender roles. Gives other mechanisms related to inequality best chance of explaining flattening of fertility-income profile.

Quantitative Strategy

- Calibration:
    1. Wages from data.
    2. Remaining 8 parameters calibrated to match 1980 profiles (by decile):
        1. Fertility.
        2. Mother's time at home.
        3. College attainment of children.
        4. Index of marketization.

- Exercise: input 2010 wages + $p_{m,2010}$.
    1. Model prediction vs data (untargeted).
    2. Decomposition of mechanisms.

Model – Fit

Model, 1980 — Data, 1980

Model – 2010 Prediction
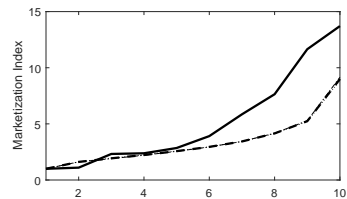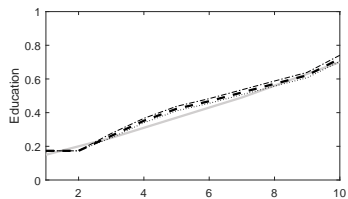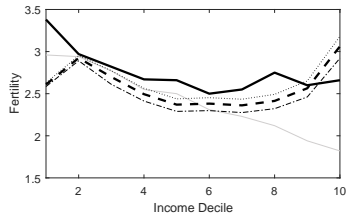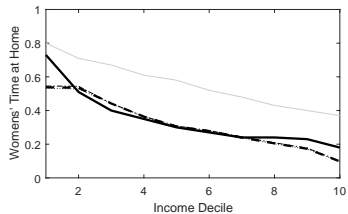
Model – Marketization Strength

- The average fraction of household income spent on market substitutes is 4.7%.

- Mazzolari & Ragusa (2012) find that a 1 p.p. ↑ top decile wage bill → 2-4% ↑ employment in HPS section.

    - Our model: 3%

Results

	Data	Model	No Δ Marketization	No Δw_m
%Δ High Income Fert	40.0%	43.5%	-34.0%	30.0%
%Δ MDF	38.5%	41.0%	-14.0%	24.0%
%Δ MDF Top/Bottom	18.6%	24.4%	-11.1%	15.1%
Δ Fraction College (pp)	1.70	2.40	-1.23	1.60

Minimum Wage

- Minimum wage affects the price of home production substitutes. Increases in the minimum wage:
    - ↓ labor supply, especially when fertility cannot adjust.
    - ↓ fertility.
- Effects are differential across the income distribution.

Minimum Wage – Affects HPS Sector Workers
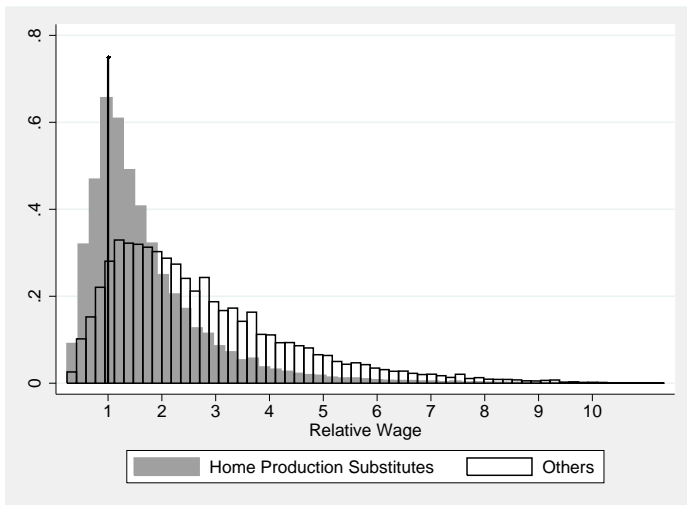
Minimum Wage – Instrument

- Idea: Minimum wage effect on wages HPS sector workers.

- Problem: Minimum wage changes endogenous.

- Instrument (Baskaya & Rubinstein 2012):
    - Changes in federal minimum wage are exogenous to state conditions.
    - Probability Federal binds: state liberalism index (pre-sample).
   - Instrument: Interaction of federal min wage & index of liberalism.

The Effect of the Minimum Wage on Wages in HPS

The Effect of the Minimum Wage on the Wage in Industries Associated with Home Production Substitutes

	Dependent Variable: The Real Wage									
	OLS					2SLS				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Minimum Real Wage	0.764***	0.771***	0.770***	0.665***	0.648***	0.747***	0.645***	0.550**	0.632**	0.582**
	(0.059)	(0.053)	(0.063)	(0.058)	(0.056)	(0.169)	(0.133)	(0.267)	(0.248)	(0.247)
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No
Region × Year FE	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Average State Wages	No	Yes	No	No	Yes	No	Yes	No	No	Yes
Demographic Controls	No	No	No	Yes	Yes	No	No	No	Yes	Yes
1st Stage F-Statistic	–	–	–	–	–	16.47	15.90	26.72	26.93	26.08
Obs.	228,197	228,197	228,197	228,197	228,197	228,197	228,197	228,197	228,197	228,197
R^2	0.258	0.259	0.259	0.372	0.372	0.258	0.258	0.259	0.372	0.372

Notes: Standard errors in parentheses are clustered at the state level.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Sample comprises workers in industries of the economy associated with home production substitutes for the years 1980 to 2010 using CPS data. Demographic controls include age fixed effects, education fixed effects, occupation fixed effects, Hispanic and race fixed effects. The instrument for Columns 6–10 is the interaction between average state liberalism between 1960 and 1980 and the real federal minimum wage.

Minimum Wage – Quantitative Results
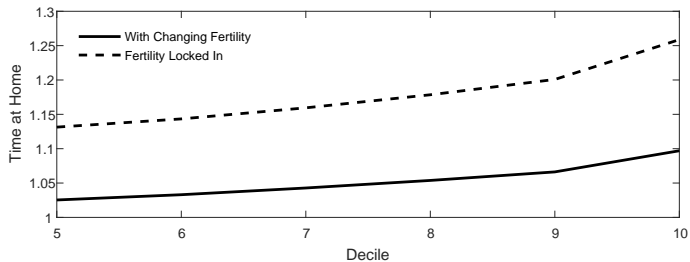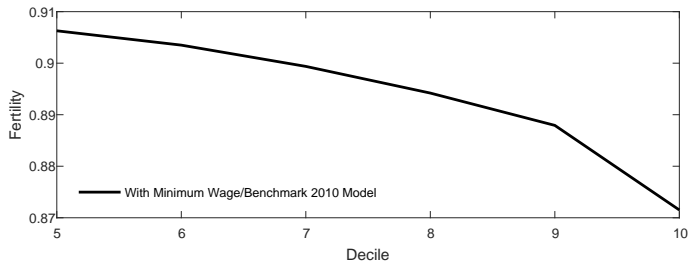
The Effect of the Minimum Wage on Annual Hours of High Income Women

The Effect of the Minimum Wage on the Labor Supply of High Income Women

	OLS						2SLS					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log min. wage	-0.032	-0.008	-0.022	0.038	0.021	0.039	-0.544***	-0.664***	-0.632***	-0.503**	-0.405*	-0.429*
	(0.087)	(0.069)	(0.065)	(0.049)	(0.053)	(0.052)	(0.177)	(0.250)	(0.225)	(0.208)	(0.217)	(0.233)
Year FE	Yes	No	No	No	No	No	Yes	No	No	No	No	No
Region× Year FE	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age FE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Education FE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Industry FE	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
Occupation FE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
1st stage F statistic	–	–	–	–	–	–	15.72	24.13	24.25	24.39	24.46	24.62
Obs.	85,506	85,506	85,506	85,506	85,506	85,506	85,506	85,506	85,506	85,506	85,506	85,506
R^2	0.013	0.015	0.047	0.256	0.291	0.310	0.012	0.014	0.046	0.255	0.291	0.309

| Dependent Variable: Log Yearly Hours |

Notes: Standard errors clustered at the state level are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the log of yearly hours worked. Sample of White non-Hispanic married women aged 25-54, whose real hourly wage is in the 9th and 10th deciles. Women are assigned to hourly wage decile by state, year and 5-year age group.

The Effect of the Minimum Wage on Annual Hours of High Income **Men**

The Effect of the Minimum Wage on the Labor Supply of High Income **Men**

	Dependent Variable: Log Yearly Hours											
	OLS						2SLS					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log min. wage	0.043	0.011	0.004	0.002	-0.009	-0.011	-0.118	-0.117	-0.036	0.031	-0.061	-0.032
	(0.034)	(0.031)	(0.028)	(0.026)	(0.027)	(0.027)	(0.115)	(0.149)	(0.123)	(0.122)	(0.122)	(0.119)
Year FE	Yes	No	No	No	No	No	Yes	No	No	No	No	No
Region× Year FE	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age FE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Education FE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Industry FE	No	No	No	Yes	No	Yes	No	No	No	Yes	No	Yes
Occupation FE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
1st stage F statistic	–	–	–	–	–	–	15.27	25.10	25.18	25.42	25.32	25.63
Obs.	100,243	100,243	100,243	100,243	100,243	100,243	100,243	100,243	100,243	100,243	100,243	100,243
R^2	0.013	0.015	0.067	0.160	0.202	0.211	0.013	0.015	0.067	0.160	0.202	0.211

Notes: Standard errors clustered at the state level are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable is the log of yearly hours worked. Sample of White non-Hispanic married **men** aged 25-54, whose real hourly wage is in the 9th and 10th deciles. **Men** are assigned to hourly wage decile by state, year and 5-year age group.

Childlessness
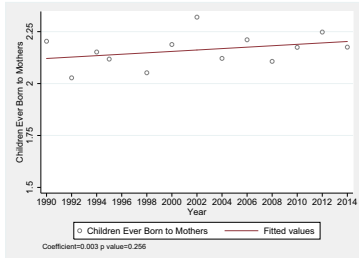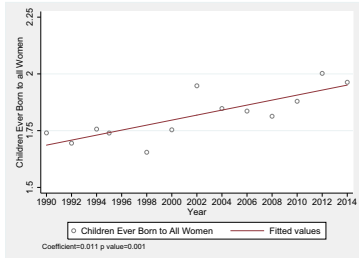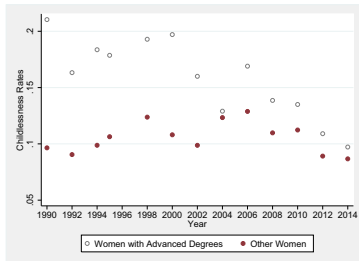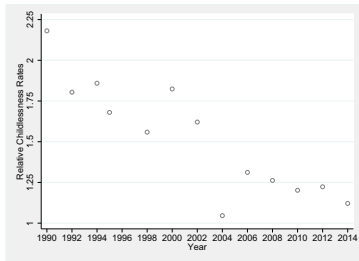
Sorting
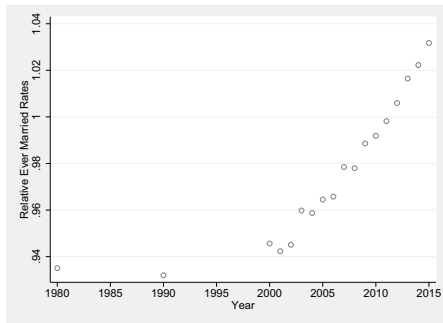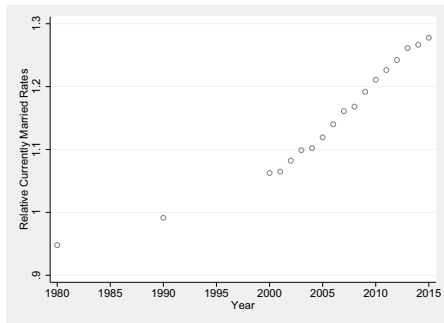
Conclusion

- ↑ Inequality & ↓ HPS good price can explain the flattening of the fertility-income gradient

- ↑ Inequality → increase in aggregate HC.

- ↑ Minimum wage → ↓ labor supply & fertility of high income women.

- ↑ Inequality & ↓ → high income women more attractive in the marriage market.