What Accounts for the Racial Gap in Time Allocation and Intergenerational Transmission of Human Capital?

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Racial Gaps

- Focus on "pre-market skill" as a source of racial gaps
- AFQT test scores gaps are large and develop early
- Skill formation are affected by families environment and structure
- However, that does not rule out discrimination in the labor market
- The "pre-market" skill gaps can also be important for intergenerational transmission of skills
- Family structure and "initial conditions" are important to understand formation of these skills
- There is an interplay between markets and other factors and the goal is to analyze on the mechanisms, and quantify the impact of different elements

Broad question

What is the role of Marriage and Labor markets in racial skill gaps and intergenerational persistence of these gaps? We quantify these effects accounting for the role of markets in parental time investment and skill formation.

Black-White Marriage Market Differences:

- Lower rate of dual parent household for Blacks than Whites
- Lower rate of Assortative matching on educational and earnings for Blacks than Whites.
- Less stable family or higher divorce rates among Blacks than Whites.

Black-White Labor Market Differences:

- Education, and Experience differences
- Wage offer gaps (conditional on experience and education)

This paper

- Develop framework for analyzing life-cycle allocation and marriage decisions in a *non-coorporative dynastic* model with *quasilinear utility* and *frictionless* marriage matching.
- The framework is used to analyze the joint effect of fertility, labor market, and marriage market on the Black-White achievement and intergenerational mobility gaps.
- Model structure closely related to Gayle & Shephard (2019), Shephard (2019), and Gayle et al. (2019): main point of departure is to incorporate a dynastic concerns, endogenous fertility, and child development, as in Gayle et al. (2018a) and Gayle et al. (2018b), in *non-coorporative* model.

Black-White Education Attainment Gap

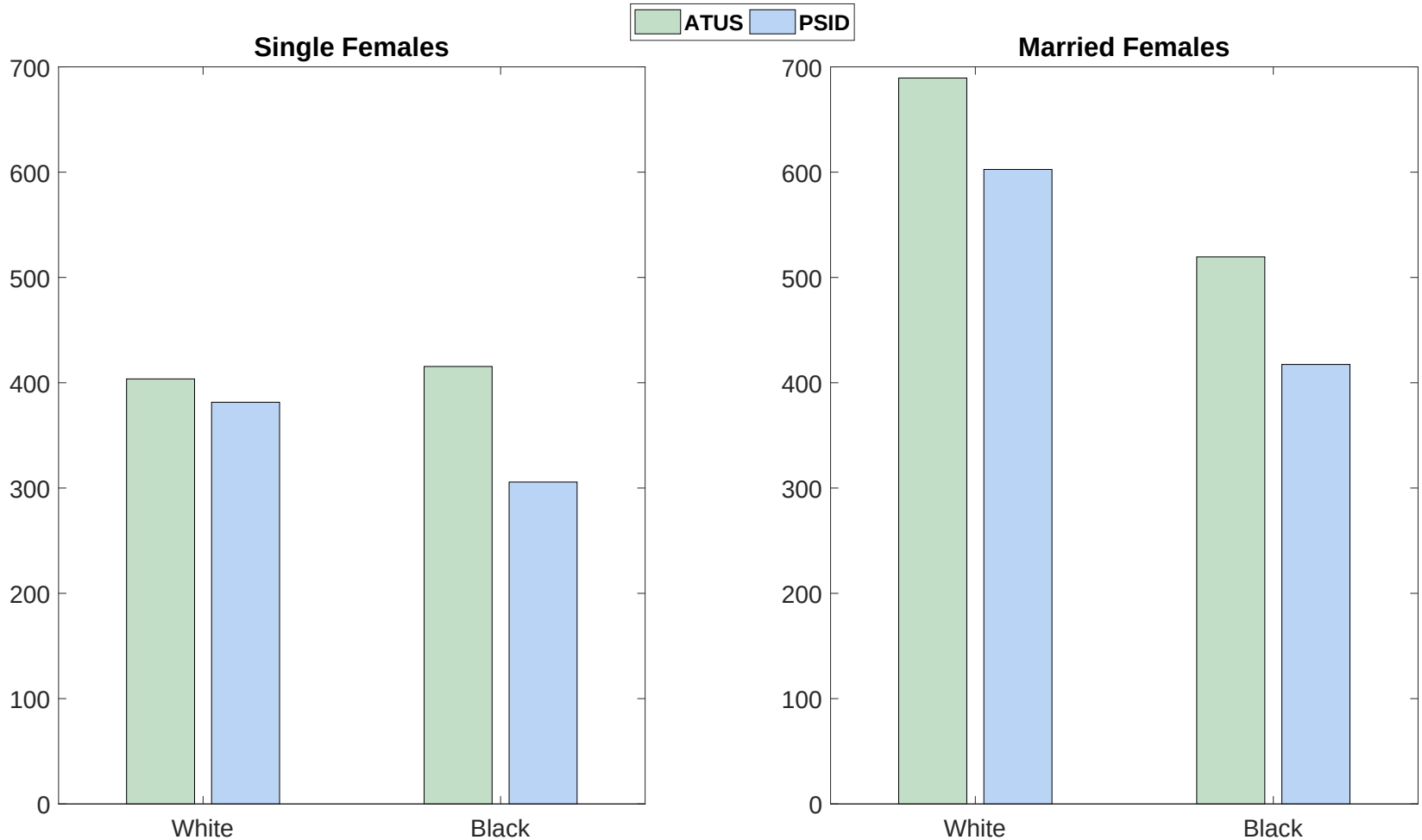
- Well documented that there exists a Black-White Education Attainment gap.
- After controlling for parental characteristics like education, and location the gap persist.
- After controlling for labor income, gap becomes insignificant.
- After controlling Parental Time in Early Childhood the gap reverses and labor income become insignificant.
- Controlling for the presence of father in the household does not change the results. [EDUCTION GAP▷]
- *The question is why?*

It is Married Couples Too!

- Black mothers spend less time with children, one reason is that they are more likely to be a single parent
  - The probability of being a single parent for a child under 6 is 69% for black individuals and 13% for white individuals
- However, married black women spent less time with children

Is It because of Single Motherhood?

Female Home hours with by Marital Status and Race



Source: ATUS, PSID

Possible Causes of Racial Differences in Division of Labor.

- Labor market: *Racial Wage Gaps*
- Marriage Market(I): *Racial gaps in the stability of the family.* [DOVORCE▷]
- Marriage Market (II): *Racial gaps in assortative mating-Lack of high educated black men.* [Assortative Mating▷]

WHICH IS MORE IMPORTANT?

What is it about married couples? *Division of Labor!*

Summary Statistics by Race and Gender for Assortatively Matched Couples

	College Graduates				High School		
	Female		Male		Female		M
Variable	White	Black	White	Black	White	Black	White
Annual time with children	*492*	*466*	*142*	*118*	446	267	98
	(514)	(463)	(239)	(277)	(507)	(388)	(231)
Number of children	1.87	1.89	1.80	1.93	1.72	1.80	1.67
	(0.77)	(0.63)	(.74)	(0.65)	(0.74)	(0.86)	(0.69)
Housework	*1057*	*1039*	*408*	*382*	1,262	1,047	339
	(563)	(503)	(310)	(330)	(611)	(527)	(334)
Age	35.2	35.2	36.7	36.9	29.4	29.2	32.4
	(5.77)	(5.27)	(5.78)	(5.39)	(6.36)	(6.31)	(6.33)
Education	16.5	16.6	16.5	16.7	12	12	12
	(0.50)	(0.50)	(0.50)	(0.46)	(0)	(0)	(0)
Labor income	*26,668*	*42,650*	*74,912*	*66,607*	12,687	14,721	39,288
	(28,229)	(21,132)	(46,027)	(22,819)	(13,038)	(12,566)	(20,561)
Wage rate	19.1	24.2	35.5	31.5	8.4	9.1	18.2
	(17.9)	(10.6)	(26.0)	(10.9)	(8.8)	(8.7)	(11.4)
Annual work hours	*1,100*	*1,709*	*2,287*	*2168*	1,105	1,309	2,188
	(867)	(560)	(561)	(549)	(910)	(860)	(648)
Observations	2,826	221	2,265	170	3,144	1,190	1,868

Some Literature (incomplete!)

- Large literature on the racial gaps in education.
  - See for example: Cameron & Heckman (2001), Aucejo & James (2019), among others
- A smaller literature on the effect of family structure and time investment in children outcomes.
  - Cunha & Heckman (2007), Bernal & Keane (2011), Del Boca et al. (2013) and Agostinelli (2018).
- Recent empirical literature on Dynastic models of transmission of human capital.
  - Lee & Seshadri (2019), Abbott et al. (2013), Gayle et al. (2018a), Gayle et al. (2018b), Bolt et al. (2021)
- Dynamic models of Equilibrium Marriage market. Dynamic equilibrium marriage models with search:
  - Search model: Aiyagari et al. (2000), Greenwood et al. (2003), Seitz (2009), Greenwood et al. (2016), Díaz-Giménez & Giolito (2013), Ríos-Rull et al. (2016), Goussé et al. (2017), Ciscato (2019), and Shephard (2019).
  - Frictionless: Choo (2015) and Gayle et al. (2019)
- Closest papers: Caucutt et al. (2018) , Beauchamp et al. (2018)

Model

Overview

- Life-Cycle is embedded in a dynastic model (preference ala Barro-Becker)
- Life-cycle discrete choices: Altruistic individuals choose birth (i.e. $b_t \in \{0, 1\}$), labor supply (i.e. $\mathbf{h}_t = [h_t^i, h_t^j]$), parental time (i.e. $\mathbf{d}_t = [d_t^i, d_t^j]$), whether to marry and divorce every period (i.e M_t).
  - family structure, labor market experience, children education and skill, fertility are endogenous
  - Transfers within marriage clear the market every period and determine matches distribution and proportion of singles.
  - Competitive labor markets, skills and experience are endogenous
- Exogenous: (ii) Initial distribution of education by gender and race, (ii) Given education and experience: gender and race wage gaps, and (iii) nonpecuniary cost of divorce.

Results Preview: Sources of the Racial Gap in Parental Time Input and Outcomes

Counterfactual simulations

1. Labor market: Earnings gap
2. Marriage market: Equalized the Initial education distribution across race for men, give black men white men's initial education distribution.
3. Marriage Market: A marriage bonus to mimic the Marriage probability of whites.
4. Marriage market: Increase divorce cost to match the divorce probability of whites.

- Effect on Children educational outcomes and earnings
  - Effect on choices: labor supply, parental time and fertility
  - Effect on parental time investment per-child, accounts for quantity-quality trade-off

Results Preview: Educational Outcomes - Summary

- Closing the **marriage probability** actually increased educational achievement gap!
  - The large reduction in fathers' time dominates the large increase in maternal time
- Closing the **earnings gap** improve the educational attainments of blacks (19.6% some college and more; 2.25% college), income effect reduces fertility
- At the same time changing the**initial education distribution of black men** had the largest positive impact on achievement (college gap reduced by 31.5%)
  - It modestly increased mothers' time but increased fathers' time the most
- Decrease in the **divorce probability** had the second largest positive effect (college gap declined by 20.2%), it improves stability of the family and improved achievement while reducing fertility significantly
- Qualitatively, the patterns are similar for boys and girls, however, girls achievements are always greater

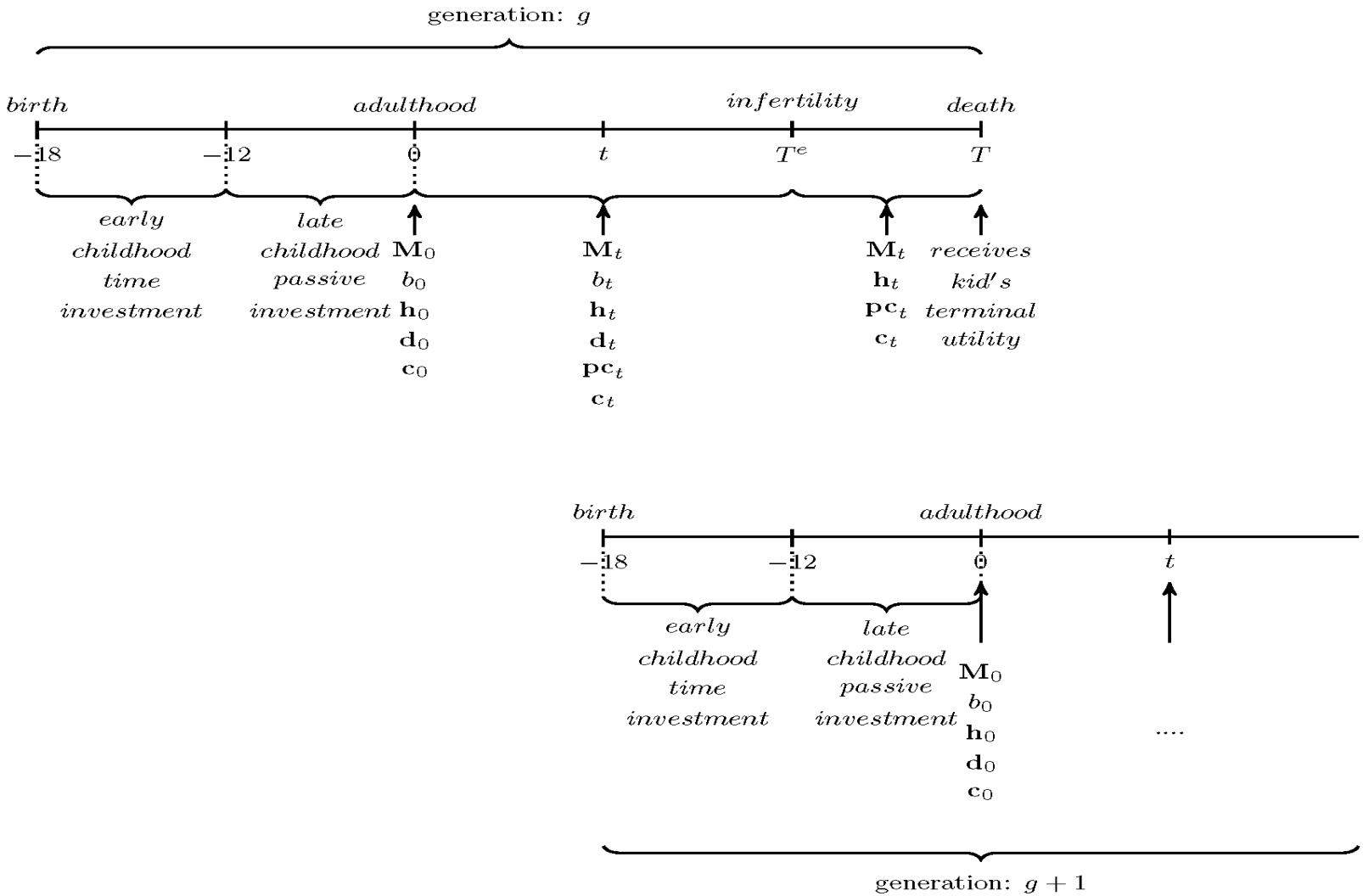
Model

Environment

- Individuals lives in generations, $g \in \{0, ...\infty\}$
- At birth an individual is a child for two stages, an early childhood and a late childhood period.
- Children do not make any choices.
- In the early childhood stage both parents make time investment
- In the late childhood parents can only make passive monetary investment

Dynastic framework

Lifecycle and Dynastic Timeline



Marriage Environment and timing

Timing:

- Start of period: Individuals update state vectors given previous actions and age one period. (No change in marital state.)
- Middle of period: After updating state variables, marriage market shocks is realized and marriage matching, renegotiation, and divorce decisions are made
- End of period: After marriage matching, renegotiation, and divorce have taken place. More uncertainty is realized and household decisions are made.

Marriage matching and market clearing

Marriage matching and Market clearing:

- Frictionless matching every period: new marriages formed (within cohort) based on economic value and preference shocks.
- When married, household decisions are made in *non-cooporative* game, taking transfers as given.
- We consider a model with one-period **limited-commitment** and unilateral divorce.
- Divorced couples can immediately reenter the marriage market.

Household allocation problem:

- Following matching and renegotiation, more idiosyncratic uncertainty realized and household allocation decisions made.

Model

Household budget constraint

- The budget constraint for a married couple is

$$\mathcal{W}^k(\mathbf{z}_t(k), h^w(k)) + \mathcal{W}^{k'}(\mathbf{z}_t(k'), h^w(k')) \geq c_t^q(z_t, h_t^w, b_t) + c_{k,t} + c_{k',t} \quad (1)$$

- where $c_t^q(z_t, h_t^w, b_t)$ is public consumption (expenditures on children) and $c_{k',t}$ and $c_{k,t}$ are private consumption
  Let τ_k and τ_k' denote net transfers. Thus spouses k private consumption is given by

$$\mathcal{W}^k(\mathbf{z}_t^k, h_t^k) + \tau_k(\mathbf{z}_t^k, \mathbf{z}_t^{k'}) \geq c_{k,t} + \alpha_k(\mathbf{z}_t^k, \mathbf{z}_t^{k'}) \times (\sum_{s=1}^{t} b_{t-s}) \times [\mathcal{W}^k(\mathbf{z}_t^k, h_t^k) + \mathcal{W}^{k'}(\mathbf{z}_t^{k'}, h_t^{k'})] \quad (2)$$

Model

Household budget constraint

- The conditional sharing rule of spouse k's private consumption is given by

$$\frac{c_{k,t}}{c_{k,t}+c_{k',t}} = \frac{\mathcal{W}^k(\mathbf{z}_t(k), h^w(k)) + \tau_k(\mathbf{z}_t^k, \mathbf{z}_t^{k'})}{\mathcal{W}^k(\mathbf{z}_t(k), h^w(k)) + \mathcal{W}^{k'}(\mathbf{z}_t(k'), h^w(k')) - c_t^q(\mathbf{z}_t, h_t^w, b_t)} \tag{3}$$

- We assume that single or divorced parents' expenditures share on children are a function of only the individual state variable, $\alpha_k(\mathbf{z}_t^k)$.
- All children lives with their mother and their fathers pay a court mandated child support as a function of their state variables. This is not identified normalized to zero.

Intergenerational Transition

- e' : child's education .
- η': child's innate ability.
- $x \equiv (e, \eta)$: parents' characteristics

$$
\begin{aligned}
e'_{I(j)} &= \Gamma_{I(j)}[x, d^{(0)}, ..., d^{(5)}, w^{(0)}, ..., w^{(5)}, S_{-5})] + \omega'_{I(j)} && \text{(4a)} \\
\eta'_{I(j)} &= \Gamma_{I(j)\eta}(e'_{I(j)}) + \widetilde{\eta}'_{i(j)} && \text{(4b)} \\
\Pr(\widetilde{\eta}' &= \widetilde{\eta}_\ell) = F_{i(j)}(e_f, e_m, \eta_f, \eta_m), && \text{(4c)}
\end{aligned}
$$

- $d^{(k)} = (d_f^{(k)}, d_m^{(k)})$:parental time investment at age k of the child.
- $w^{(k)}$: household earnings at age k of the child
- S_{-5}: gender-adjusted number of young siblings present in the household during early childhood
- $\omega'_{I(j)}$: luck

Model

Dynastic Component: Barro and Becker (1989) Extension

$$\mathcal{U}^j(\mathbf{x}) = \mathcal{V}^j(\mathbf{x}) + \beta^T \lambda E_0 \left[\left(\sum_{s=1}^{T} b_{T-s} \right)^{-\nu} \left(\sum_{n=1}^{\mathcal{N}_{i'}} \mathcal{U}^i(\mathbf{x}'_n) + \sum_{n=1}^{\mathcal{N}_{j'}} \mathcal{U}^j(\mathbf{x}'_n) \right) | \mathbf{x} \right]$$

$$\mathcal{U}^i(\mathbf{x}) = \mathcal{V}^i(\mathbf{x}) + \beta^T \lambda E_0 \left[\left(\sum_{s=1}^{T} b_{T-s} \right)^{-\nu} \left(\sum_{n=1}^{\mathcal{N}_{i'}} \mathcal{U}^i(\mathbf{x}'_n) + \sum_{n=1}^{\mathcal{N}_{j'}} \mathcal{U}^j(\mathbf{x}'_n) \right) | \mathbf{x} \right].$$

- $\mathcal{N}_{i'}$ and $\mathcal{N}_{j'}$: total number of male and female children at the end of life-cycle.
- $\mathcal{V}^i(\mathbf{x})$ and $\mathcal{V}^j(\mathbf{x})$: Life-cycle discounted utility for men and women.
- β: life-cycle discount factor.
- $\lambda(\sum_{s=1}^{T} b_{T-s})^{-\nu}$: The dynastic discount factor.
- $0 < \lambda < 1$: relative weight of child vs self.
- $0 < \nu < 1$: discount factor for an additional child.
- $\mathcal{U}^i(\mathbf{x})$ and $\mathcal{U}^j(\mathbf{x})$: weighted sum of his/her own life-cycle utility and average expected utility of his/her children.

Equilibrium

- Households decisions are modeled as a noncooperative game, in which spouses choose actions simultaneously each period.
- Conditional on the spouse strategies, the optimization problem is similar to that of a single agent dynamic problem.
- We solve the model for a stationary Markov Perfect Equilibrium (MPE) in pure strategies.
- We show that an equilibrium exists for some parameters of the model.
- In addition, there is a possibility of multiple equilibria, but we show that they can be Pareto ranked, and assume the highest equilibrium is being played.
- We start by characterizing the within generation solution by looking at the final stage in the life-cycle and then work backward.

Equilibrium-Life-Cycle

- The best response conditional choice probabilities of the couple are denoted by: $\{\mathcal{P}_t^j(a_t^{j*}|a_t(i), \mathbf{z}_t, 1), \mathcal{P}_t^i(a_t^{i*}|a_t(j), \mathbf{z}_t, 1)\}$
- An equilibrium to the household game exist if there exist, for each pair of actions: $a_t = (a_t(j), a_t(i))$ a pair of probabilities such that $\forall(a_t(j), a_t(i))$ and for all t:

$$\begin{aligned} \mathcal{P}_t^j(a_t|\mathbf{z}_t, 1) &= \mathcal{P}_t^j(a_t|\mathcal{P}_t^i(a_t(i), \mathbf{z}_t, 1), \mathbf{z}_t, 1) \\ \mathcal{P}_t^i(a_t|\mathbf{z}_t, 1) &= \mathcal{P}_t^i(a_t|\mathcal{P}_t^j(a_t(j)|\mathbf{z}_t, 1), \mathbf{z}_t, 1). \end{aligned} \tag{5}$$

- As this is a complete information game there is not guarantee that a pure strategy equilibrium exists. We provide conditions under which a pure strategy equilibrium exist

Equilibrium

Age $t < T$: Marriage market

- Married couples draw preferences for marriage, $\zeta^k_{\mathbf{z}_t}$ for $k \in \{i, j\}$ and all $\mathbf{z}^k_t$ in its support and $\zeta^k_{0,\mathbf{z}_t}$ the preference for being single.
- The marriage preferences, $(\zeta^k_{\mathbf{z}_t}, \zeta^k_{0,\mathbf{z}_t})$, are drawn from a extreme value type I distribution.

Equilibrium

Age $t < T$: Marriage Market - Marriage decision

- The marriage of a $\mathbf{z}'_t$ who chooses to marry on the $\overline{\mathbf{Z}}^j_t$ women in stage t versus staying single is:

$$\max_j \{\overline{\mathcal{U}}^i_{\mathbf{z}'_t,0} + \zeta^i_{\mathbf{z}'_t,0}, \overline{\mathcal{U}}^i_{1,\mathbf{z}'_t,\mathbf{z}^1_t}(\tau_1(\mathbf{z}'_t,\mathbf{z}^1_t)) + \zeta^i_{\mathbf{z}'_t,\mathbf{z}^1_t}, ..., \overline{\mathcal{U}}^i_{1,\mathbf{z}'_t,\mathbf{z}^J_t}(\tau_J(\mathbf{z}'_t,\mathbf{z}^J_t)) + \zeta^i_{\mathbf{z}'_t,\mathbf{z}^J_t}\} \quad (6)$$

- In this case choosing $j = 0$ corresponds to choosing to be single in stage t. Therefore, the fraction of single man of type $\mathbf{z}^i_t$ getting married to a women of type $\mathbf{z}^j_t$ is

$$\mathcal{P}^i_{\mathbf{z}^i_t,\mathbf{z}^j_t}(M_t = 1|\tau(\mathbf{z}^i_t)) = \frac{\exp\left[\overline{\mathcal{U}}^i_{1,\mathbf{z}^i_t,\mathbf{z}^j_t}(\tau_j(\mathbf{z}^i_t,\mathbf{z}^j_t))\right]}{\exp\left[\overline{\mathcal{U}}^i_{\mathbf{z}^i_t,0}\right] + \sum_{h=1}^J \exp\left[\overline{\mathcal{U}}^i_{1,\mathbf{z}^i_t,\mathbf{z}^h_t}(\tau_j(\mathbf{z}^i_t,\mathbf{z}^h_t))\right]} = \frac{\mu^d_{\mathbf{z}^i_t,\mathbf{z}^j_t}\left(\tau(\mathbf{z}^i_t)\right)}{\kappa_{\mathbf{z}^i_t}} \quad (7)$$

  where $\tau(\mathbf{z}^i_t) = [\tau_j(\mathbf{z}^i_t,\mathbf{z}^1_t)), ..., \tau_j(\mathbf{z}^i_t,\mathbf{z}^{J_t}_t))]^\intercal$ is a $J_t \times 1$ vector of transfer rule associated with different partner options for a type-$\mathbf{z}^i_t$ man.

- The measure of type-$\mathbf{z}^i_t$ single in stage t is denoted by $\kappa_{\mathbf{z}^i_t}$ and $\mu^d_{\mathbf{z}^i_t,\mathbf{z}^j_t}\left(\tau(\mathbf{z}^i_t)\right)$ is the measure of type-$\mathbf{z}^i_t$ single men that "demand" type-$\mathbf{z}^j_t$ women.

Equilibrium

Age $t < T$: Marriage Market - Marriage decision

- For women, the fraction of single women of type-$\mathbf{z}_t^j$ in stage t of their lifecycle who would like to marry a type-$\mathbf{z}_t^i$ man is given by

$$\mathcal{P}^j_{\mathbf{z}_t^i,\mathbf{z}_t^j}(M_t = 1|\tau(\mathbf{z}_t^j)) = \frac{\exp\left[\overline{\mathcal{U}}^j_{1,\mathbf{z}_t^i,\mathbf{z}_t^j}(\tau_j(\mathbf{z}_t^i,\mathbf{z}_t^j))\right]}{\exp\left[\overline{\mathcal{U}}^j_{\mathbf{z}_t^j,0}\right] + \sum_{g=1}^{I_t}\exp\left[\overline{\mathcal{U}}^i_{1,\mathbf{z}_t^i,\mathbf{z}_t^h}(\tau_j(\mathbf{z}_t^g,\mathbf{z}_t^j))\right]} = \frac{\mu^s_{\mathbf{z}_t^i,\mathbf{z}_t^j}\left(\tau(\mathbf{z}_t^j)\right)}{\kappa_{\mathbf{z}_t^j}} \tag{8}$$

where $\tau(\mathbf{z}_t^j) = [\tau_j(\mathbf{z}_t^1,\mathbf{z}_t^j)),...,\tau_j(\mathbf{z}_t^{I_t},\mathbf{z}_t^j))]^\intercal$ is a $I_t \times 1$ vector of transfer rule associated with different partner options for a type-$\mathbf{z}_t^j$ woman. The measure of type-$\mathbf{z}_t^j$ single women in stage t is denoted by $\kappa_{\mathbf{z}_t^j}$ and $\mu^s_{\mathbf{z}_t^i,\mathbf{z}_t^j}\left(\tau(\mathbf{z}_t^j)\right)$ is the measure of type-$\mathbf{z}_t^j$ single women who is "supply" type-$\mathbf{z}_t^i$ men.

Equilibrium

Stage $t < T$: Marriage market equilibrium

- An equilibrium of the marriage market is characterized by a $I_t \times J_t$ matrix of transfers $\tau_{\mathbf{t}} = [\tau(\mathbf{z}_t^1), ..., \tau(\mathbf{z}_t^{J_t})]^\intercal$ such that the measure of type-$\mathbf{z}_t^j$ women demanded by type-$\mathbf{z}_t^i$ men is equal to the measure of type-$\mathbf{z}_t^j$ women supplied

$$\mu_{\mathbf{z}_t^i,\mathbf{z}_t^j}(\tau_{\mathbf{t}}) = \mu^d_{\mathbf{z}_t^i,\mathbf{z}_t^j}(\tau(\mathbf{z}_t^i)) = \mu^s_{\mathbf{z}_t^i,\mathbf{z}_t^j}(\tau(\mathbf{z}_t^j)) \quad \forall i = 1, ..., I_t, j = 1, ..., J_t. \tag{9}$$

- The equilibrium has to satisfy the following accounting constraints

$$\mu_{\mathbf{z}_t^i,0} + \sum_{h=1}^{J_t} \mu_{\mathbf{z}_t^i,\mathbf{z}_t^h}(\tau(\mathbf{z}_t^i)) = \kappa_{\mathbf{z}_t^i} \quad \forall i = 1, ..., I_t \tag{10}$$

$$\mu_{0,\mathbf{z}_t^j} + \sum_{g=1}^{I_t} \mu_{\mathbf{z}_t^g,\mathbf{z}_t^j}(\tau(\mathbf{z}_t^j)) = \kappa_{\mathbf{z}_t^j} \quad \forall j = 1, ..., J_t \tag{11}$$

Equilibrium

Stage $t < T$: Divorce

- Individuals in a marriage are paid their outside option in the anonymous spot marriage market.

The probability of divorce for a couple of type-$(\mathbf{z}_t^i, \mathbf{z}_t^j)$ in t is

$$\mathbf{P}_{t,0,1}(i,j) = 1 - \mathbf{P}^I_{t,1,1}(i,j) \times \mathbf{P}^j_{t,1,1}(i,j). \tag{12}$$

Where

$$\mathbf{P}^i_{t,1,1}(i,j) = \int I\{\overline{\mathcal{U}}^i_{1,i,j}(\tau_{t,i,j}) + \psi^i_{t,i,j} + \zeta^i_{t,i,j} > \overline{\mathcal{U}}^i_{i,0} + \zeta^i_{t,i,0}\} f(\zeta^i) d\zeta^i,$$

and

$$\mathbf{P}^j_{t,1,1}(i,j) = \int I\{\overline{\mathcal{U}}^j_{1,i,j}(\tau_{t,i,j}) + \psi^j_{t,i,j} + \zeta^j_{i,j} > \overline{\mathcal{U}}^j_{i,0} + \zeta^i_{0,j}\} f(\zeta^j) d\zeta^j.$$

Definition of Equilibrium

Definition

(Equilibrium) A stationary equilibrium of the model consists for all $t = 0, ..., T$ (i) time/resources allocation and birth choice probabilities for single women,$\mathcal{P}_t^j(a_t|\mathbf{z}_t^j, 0)$, and for single men, $\mathcal{P}_t^j(a_t|\mathbf{z}_t^j, 0)$; (ii) time/resource allocation and birth MPE choice probabilities for married women, (iii) sequences of $I_t \times J_t$ transfer matrix,$\tau_\mathbf{t}$; (iv) sequence of pair of vectors available singles at the beginning of age t, (κ_t^j, κ_t^i) and (v) a pair of initial intergenerational value function , $(\mathcal{U}^j(\mathbf{x_0}), \mathcal{U}^i(\mathbf{x_0}))$. Such that

1. The single individual time/resources allocation and birth choice probabilities are optimal. 2. Married couples time/resources allocation and birth choice probabilities,$\mathcal{P}_t^{j*}(a_t|\mathbf{z}_t, 1)$, and $\mathcal{P}_t^{i*}(a_t|\mathbf{z}_t, 1)$, have a fixed point. 3. The transfer matrix $\tau_\mathbf{t}$ and the vector of available singles (κ_t^j, κ_t^i) clears the marriage market. 4. The initial valuation function is a fixed point of the dynastic problem.

Empirical implication of the theory

- Hold up problem with parental investment of fathers, so even if no comparative advantage at home/wage gap in labor market mothers would spend more time with children.
- Single mothers have an incentive from the marriage to invest in the children. Quality children are valued in the marriage market.
- The short side of the marriage markets enjoys rent: Educated black men.
- Standard Quality-Quantity trade off.
- Multiple income and substitution effects.

Identification

Identification proceeds in three steps:

- Conditional on the sharing rule, the time allocation and fertility equilibrium conditions, semi-parametrically identify the utility and discount factor parameters
- The marriage market equilibrium conditions to identify the sharing rule.
- Use equilibrium Divorce conditions to identify the divorce cost.

Identification: Production Stage

- The reduced-form conditional choice probabilities of time allocation and fertility decisions are non-parametrically identified.
- The reduced-form marriage and divorce probabilities are nonparametrically identified.
- Transition probabilities of state variables are identified.

Single men have 8 orthogonality conditions (9 choices) at age t where $\xi^i_{0,t}$ is a 8x1 vector of moment conditions defined as:

$$\begin{aligned}\xi^i_{0,t}(\theta) =&[\mathcal{U}^i_0(1,\mathbf{z}^i_t) - \mathcal{U}^i_0(0,\mathbf{z}^i_t) - \ln\left(\frac{p_1(\mathbf{z}^i_t)}{p_0(\mathbf{z}^i_t)}\right) \\ &,...,\mathcal{U}^i_0(8,\mathbf{z}^i_t) - \mathcal{U}^i_0(0,\mathbf{z}^i_t) - \ln\left(\frac{p_8(\mathbf{z}^i_t)}{p_0(\mathbf{z}^i_t)}\right)]'. \qquad (13)\end{aligned}$$

- Which is orthogonal to all to $\mathbf{z}^i_{t-1}$ and a^i_{t-1} by rational expectation.
- A similar condition holds for single and married couples.

Identification: Marriage Market Stage(I)

- A men is single in period $t-1$ with the state $\mathbf{z}_{t-1}^i$ and chooses action a_{t-1}^i, the time t state becomes $\mathbf{z}_t^i = F(\mathbf{z}_{t-1}^i, a_{t-1}^i)$.
- This man gets married using the function $F_0^i(M_t = 1 \mid M_{t-1} = 0, \mathbf{z}_t^i) \equiv F_0^i(\mathbf{z}_t^i)$.
- If he gets married he matches a spouse using the function $F^i(\mathbf{z}_t^j \mid \mathbf{z}_t^i, M_t = 1)$.

We then define his marriage probability as:

$$F_0^i(\mathbf{z}_t^j \mid \mathbf{z}_t^i) = \begin{cases} F^i(\mathbf{z}_t^j \mid \mathbf{z}_t^i, M_t = 1) \times F_0^i(\mathbf{z}_t^i) & \text{if married type } \mathbf{z}_t^j \\ 1 - F_0^i(\mathbf{z}_t^i) & \text{if he remains single} \end{cases} \tag{14}$$

Identification: Marriage Market Stage(II)

- These functions in equation(14) are determined endogenously in the marriage market and are characterized by marriage equilibrium equation.

A single man entering the market market stage of period t with a state variable $\mathbf{z}_t^i$ has the following 72 marriage orthogonality conditions:

$$\begin{aligned}\xi_{M,t}^i(\theta) =&[\overline{\mathcal{U}}^i_{1,\mathbf{z}_t^i,\mathbf{z}_t^j(1)} - \overline{\mathcal{U}}^i_{\mathbf{z}_t^i,0} - \ln\left(\frac{F_0^i(\mathbf{z}_t^j(1)|\mathbf{z}_t^i)}{F_0^i(\mathbf{0}|\mathbf{z}_t^i)}\right), \ldots, \\ &\overline{\mathcal{U}}^i_{1,\mathbf{z}_t^i,\mathbf{z}_t^j(72)} - \overline{\mathcal{U}}^i_{\mathbf{z}_t^i,0} - \ln\left(\frac{F_0^i(\mathbf{z}_t^j(72)|\mathbf{z}_t^i)}{F_0^i(\mathbf{0}|\mathbf{z}_t^i)}\right)]'. \qquad (15)\end{aligned}$$

- Which is orthogonal to all variables in the past.
- A similar condition holds for women and divorce.

Estimation Overview

Step 1

- Estimate earnings equation and fixed effects
- Estimate CCP's and best responses for the production stage, marriage and divorce
- Estimate intergenerational transition function

Step 2-representation

- Conditional valuation function for the dynastic model can be expressed as a function of the primitives (Hotz and Miller)
- See Gayle, Golan and Soytas 2018

Step 3-Parameters from the "production stage"

- Using techniques from Hotz, Miller, Sanders, and Smith (1994), we form moment conditions from the best response functions and estimate structural parameters, *discount factors and per-period utility parameters*, using GMM.

Step 4-Marriage Stage

- Estimate sharing rule using equilibrium conditions
- This can be used to update the utility parameters estimated in Step 3

Estimation: More Details on Steps 3 and 4

1. Consider a model in which marriage and divorce are transition functions (based on endogenous state variables) and not choices
2. We can approximate the sharing rule with a polynomial (enters the per-period utility)
3. We can identify the utility parameters, including the sharing rule following multistep estimation described below
4. The identification of the sharing rule comes from variation in the continuation values
5. There is no guarantee that it is consistent with the equilibrium and the measures of available single men and women next period (κ_t^j, κ_t^i)
6. This is especially important for counterfactual analysis

Estimation-Marriage Market

- We now need to identify the sharing using the market clearing conditions
- Quasi-Demand
- Quasi-Supply
- Equating the supply of men type j to the demand.
- Given the measure of single men and women from each type, equate quasi-demand and supply
- The sharing rule clear clear the market
- Given the sharing rule we "update" the CCP's in the production stage and divorce probabilities

Estimation-Marriage Market

- The following are the quasi-demand and supply for a type of men(women)

$$\ln\left[\mu^{d}_{\mathbf{z}^i_t,\mathbf{z}^j_t}(\mathbf{Z}_\tau\tau)\right] - \ln\left[\mu^{d}_{\mathbf{z}^i_t,0}(\mathbf{Z}_\tau\tau)\right] = \overline{\mathcal{U}}^{i}_{1,\mathbf{z}^i_t,\mathbf{z}^j_t}(\tau_j(\mathbf{Z}_\tau\tau) - \overline{\mathcal{U}}^{i}_{\mathbf{z}^i_t,0}. \quad (16)$$

$$\ln\left[\mu^{s}_{\mathbf{z}^i_t,\mathbf{z}^j_t}(\mathbf{Z}_\tau\tau)\right] - \ln\left[\mu^{s}_{0,\mathbf{z}^j_t}(\mathbf{Z}_\tau\tau)\right] = \overline{\mathcal{U}}^{j}_{1,\mathbf{z}^i_t,\mathbf{z}^j_t}(\mathbf{Z}_\tau\tau) - \overline{\mathcal{U}}^{j}_{0,\mathbf{z}^j_t}. \quad (17)$$

- Sharing rule for all types τ solved the difference between 16 17, imposing
- $\mu^{d}_{\mathbf{z}^i_t,\mathbf{z}^j_t}(\mathbf{Z}_\tau\tau) = \mu^{s}_{\mathbf{z}^i_t,\mathbf{z}^j_t}(\mathbf{Z}_\tau\tau)$

Estimation-Marriage Market

- Given the marriage probability and initial distributions of single and married types, we update the measures of married couples types
- And measure of single women (and single men) are defined recursively below:

$$\kappa_{\mathbf{z}^i_{t+1},\mathbf{z}^j_{t+1}} = \sum_{k=1}^{K}\sum_{s=1}^{I_t}\sum_{r=1}^{J_t}\left\{\kappa_{\mathbf{z}^s_t,\mathbf{z}^r_t}\left(1-\mathbf{P}_t(0|1,\mathbf{z}^s_t,\mathbf{z}^r_t)\right)+\mu_{\mathbf{z}^s_t,\mathbf{z}^s_t}\left(\mathbf{Z}_\tau\tau\right)\right\}\mathbf{F}^k_t(\mathbf{z}^i_{t+1},\mathbf{z}^j_{t+1} \tag{18}$$

$$\kappa^j_{\mathbf{z}^j_{t+1}} = \sum_{k}^{K}\sum_{r=1}^{J_t}\mathbf{F}^{k,j}_t\left(\mathbf{z}^j_{t+1}|\mathbf{z}^r_t\right)\kappa^j_{\mathbf{z}^j_t}\mathcal{P}^j_{\mathbf{z}^r_t,0} + \sum_{s=1}^{I_{t+1}}\kappa_{\mathbf{z}^s_{t+1},\mathbf{z}^j_{t+1}}\mathbf{P}_{t+1}(0|1,\mathbf{z}^s_{t+1},\mathbf{z}^j_{t+1}) \tag{19}$$

- $\mathbf{F}^{k,j}_t(\mathbf{z}^j_{t+1}|\mathbf{z}^r_t)$ is the transition function the production stage for single women.
- Similarly defined for single men

Estimation-Marriage Market

- Given the marriage probability and initial distributions of single and married types, we update the measures of married couples types
- And measure of single women (and single men) are defined recursively below:

$$\kappa_{\mathbf{z}^i_{t+1},\mathbf{z}^j_{t+1}} = \sum_{k=1}^{K}\sum_{s=1}^{I_t}\sum_{r=1}^{J_t}\left\{\kappa_{\mathbf{z}^s_t,\mathbf{z}^r_t}\left(1-\mathbf{P}_t(0|1,\mathbf{z}^s_t,\mathbf{z}^r_t)\right)+\mu_{\mathbf{z}^s_t,\mathbf{z}^s_t}\left(\mathbf{Z}_\tau\tau\right)\right\}\mathbf{F}^k_t(\mathbf{z}^i_{t+1},\mathbf{z}^j_{t+1} \tag{20}$$

$$\kappa^j_{\mathbf{z}^j_{t+1}} = \sum_{k}^{K}\sum_{r=1}^{J_t}\mathbf{F}^{k,j}_t\left(\mathbf{z}^j_{t+1}|\mathbf{z}^r_t\right)\kappa^j_{\mathbf{z}^j_t}\mathcal{P}^j_{\mathbf{z}^r_t,0} + \sum_{s=1}^{I_{t+1}}\kappa_{\mathbf{z}^s_{t+1},\mathbf{z}^j_{t+1}}\mathbf{P}_{t+1}(0|1,\mathbf{z}^s_{t+1},\mathbf{z}^j_{t+1}) \tag{21}$$

- $\mathbf{F}^{k,j}_t(\mathbf{z}^j_{t+1}|\mathbf{z}^r_t)$ is the transition function the production stage for single women.
- Similarly defined for single men

Estimation-Marriage Market

- With the above updated measures, $\kappa_{\mathbf{z}^i_{t+1},\mathbf{z}^j_{t+1}}$ we recompute the supply the measures of married by types and singles

$$\mu^d_{\mathbf{z}^i_t,0} = \kappa^i_{\mathbf{z}^i_t} - \sum_{h=1}^{J_t} \mu^d_{\mathbf{z}^i_t,\mathbf{z}^h_t}\left(\mathbf{Z}_\tau \tau\right)$$
$$\mu^s_{0,\mathbf{z}^j_t} = \kappa^j_{\mathbf{z}^j_t} - \sum_{g=1}^{I_t} \mu^s_{\mathbf{z}^g_t,\mathbf{z}^j_t}\left(\mathbf{Z}_\tau \tau\right) \tag{22}$$

$$\mu^d_{\mathbf{z}^i_t,\mathbf{z}^j_t}\left(\mathbf{Z}_\tau \tau\right) = \mathcal{P}^i_{\mathbf{z}^i_s,\mathbf{z}^j_s} \times \kappa^i_{\mathbf{z}^i_t}$$
$$\mu^s_{\mathbf{z}^i_t,\mathbf{z}^j_t}\left(\mathbf{Z}_\tau \tau\right) = \mathcal{P}^j_{\mathbf{z}^i_s,\mathbf{z}^j_s} \times \kappa^j_{\mathbf{z}^i_t}. \tag{23}$$

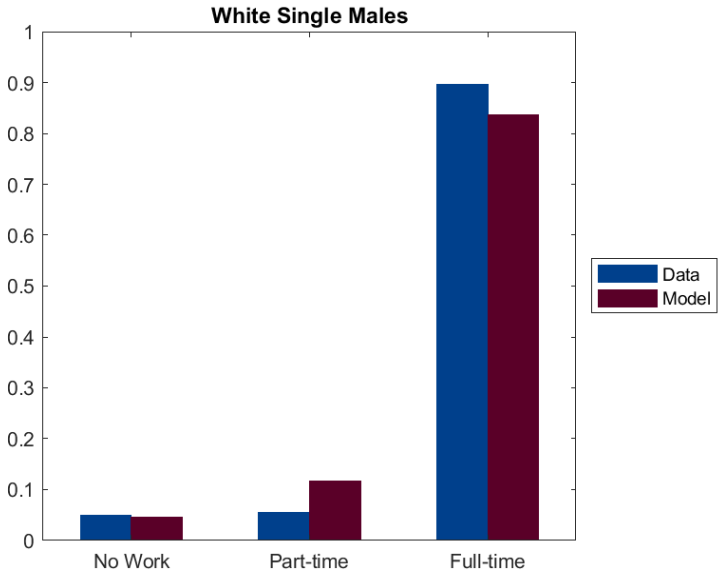
- This algorithm is similar to Gayle & Shephard (2019),
- However, we next use the above inner algorithm to update the CCP's in the production stage
- The moments are as described above

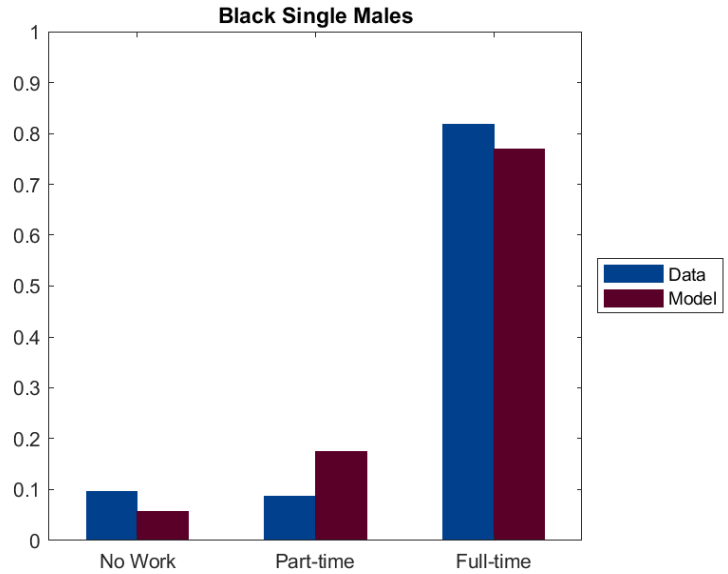
Labor Market Earnings - Results

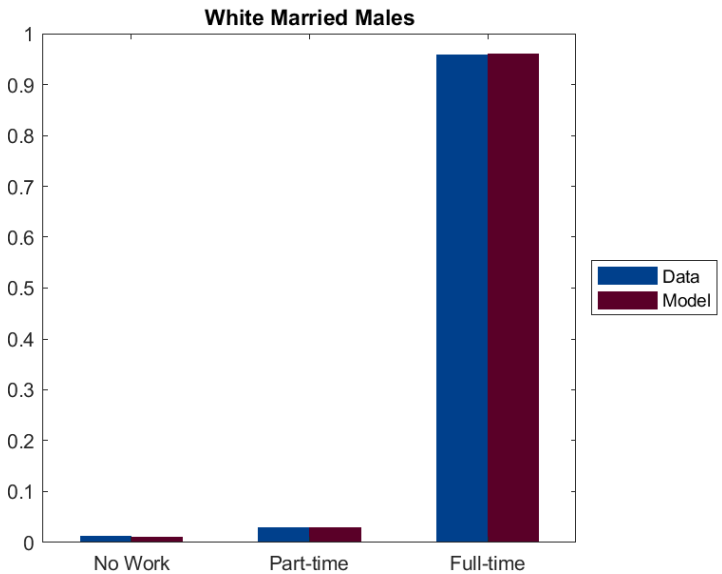
- Parental input affect earnings through education
- Regress log earnings on age*education, part time and full time work, previous 4 years experience (by gender)
- Slope of age-log(earnings) profile of college graduate is 3 times larger than that of less than high school, almost double that of some college
- Labor market "tax" for female and black (in the fixed effect estimates)

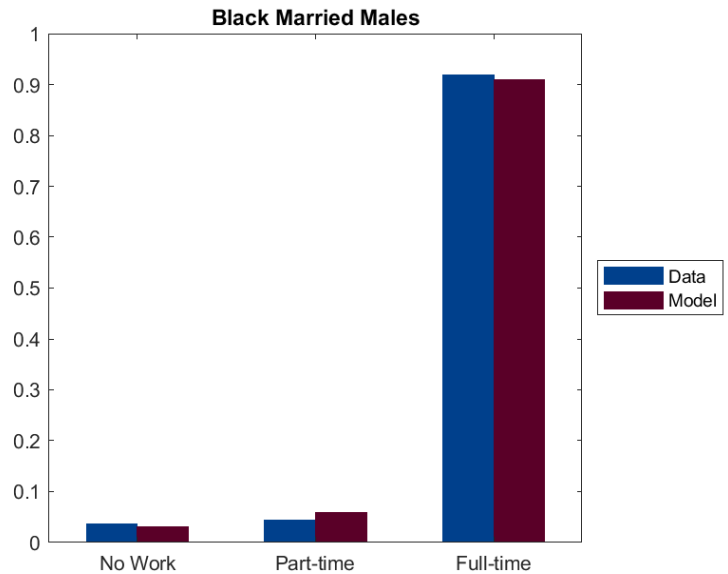
  1. Small relative to the education-age compensation
  2. Black "tax" is smaller than the female "tax"

Model Fit: Labor Supply

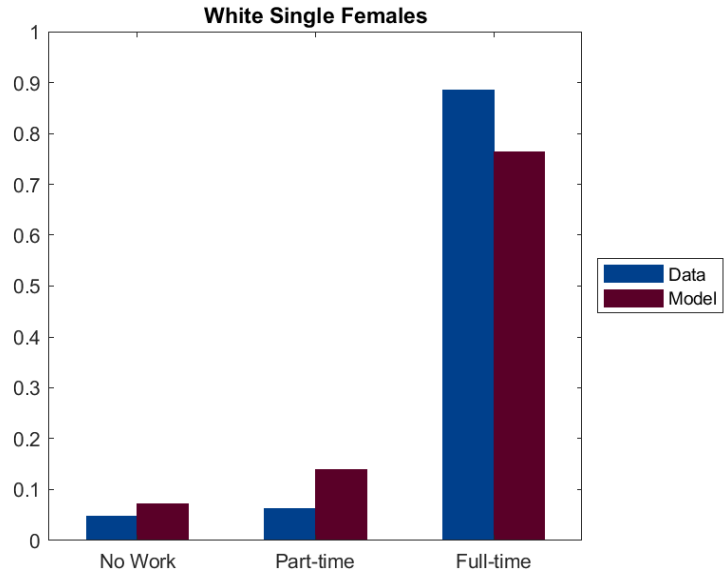


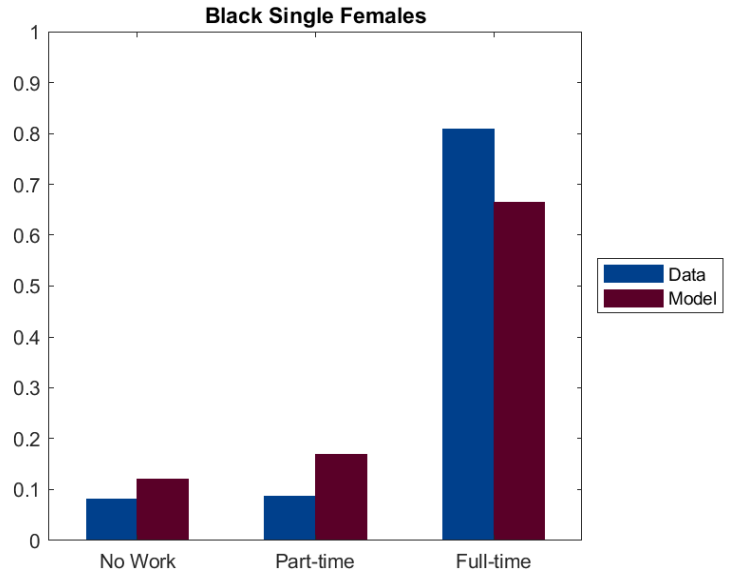


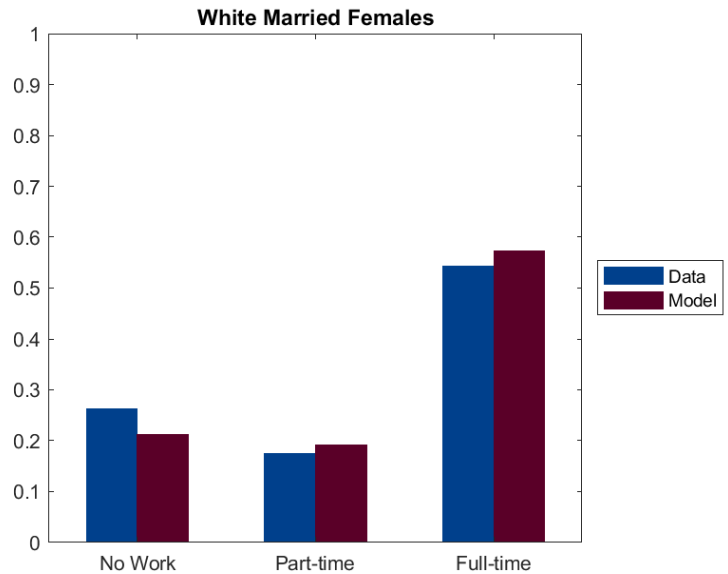


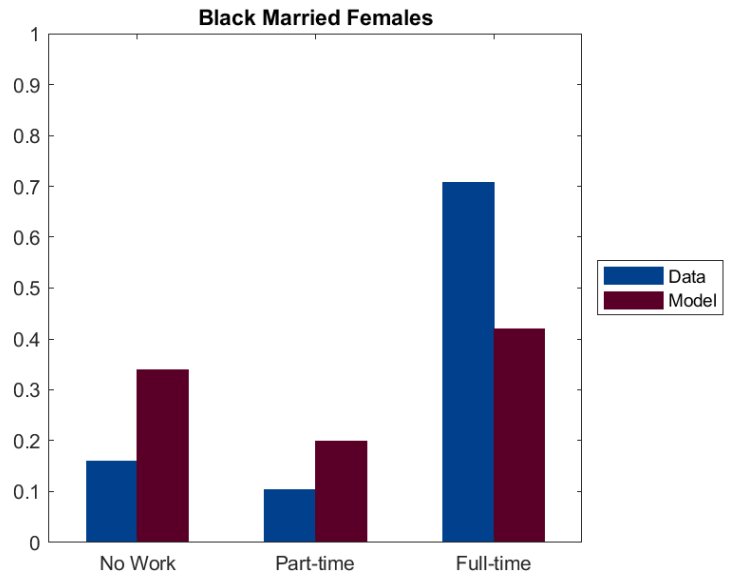


Model Fit: Labor Supply

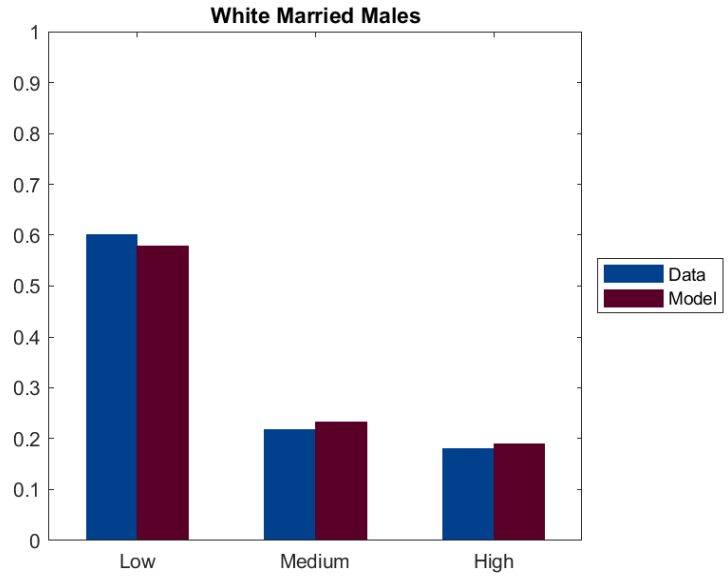


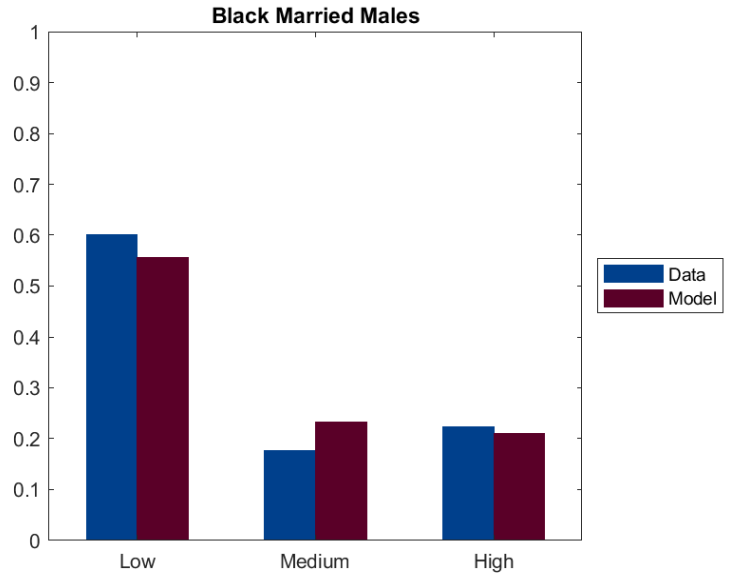


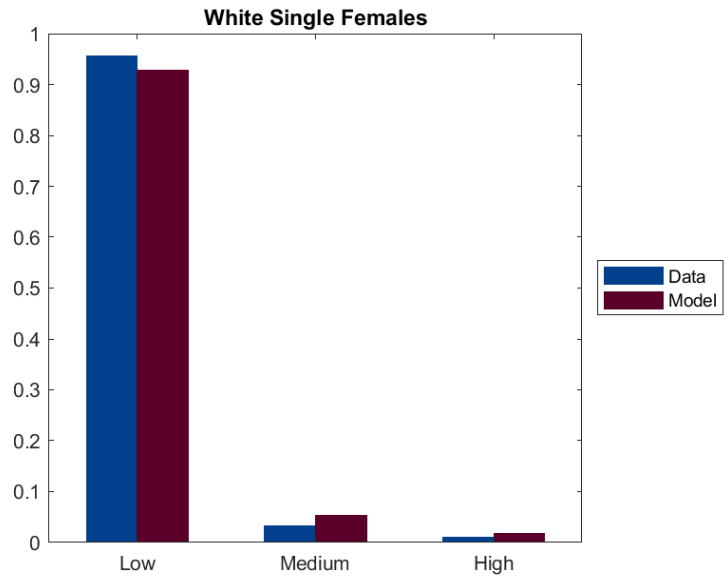


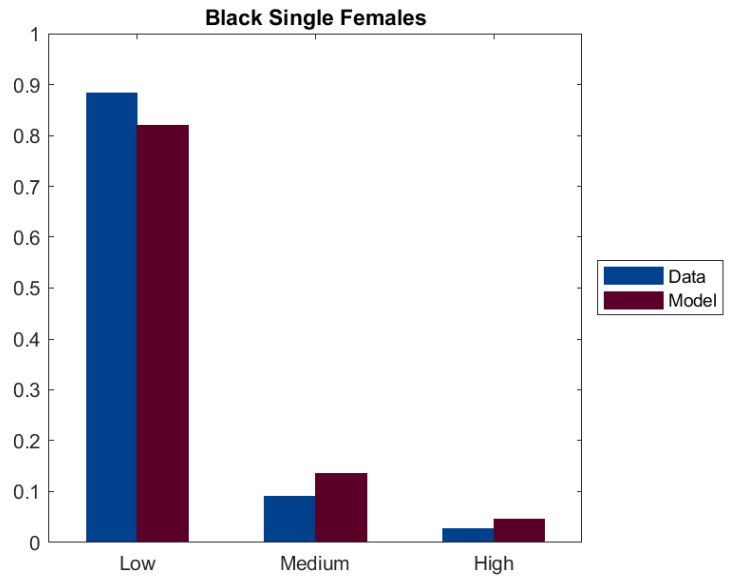


Model Fit: Parental Time

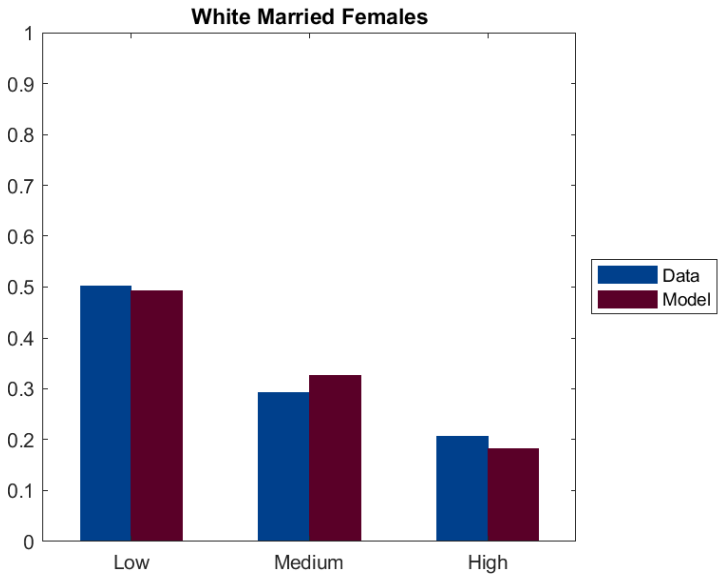


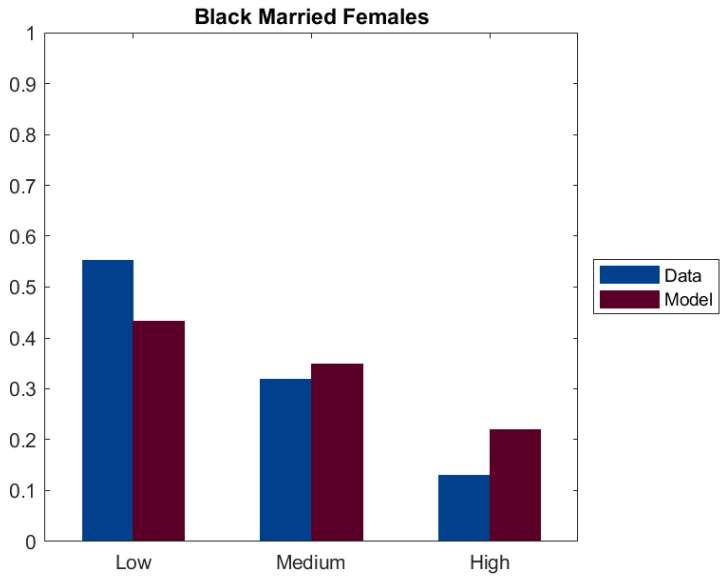




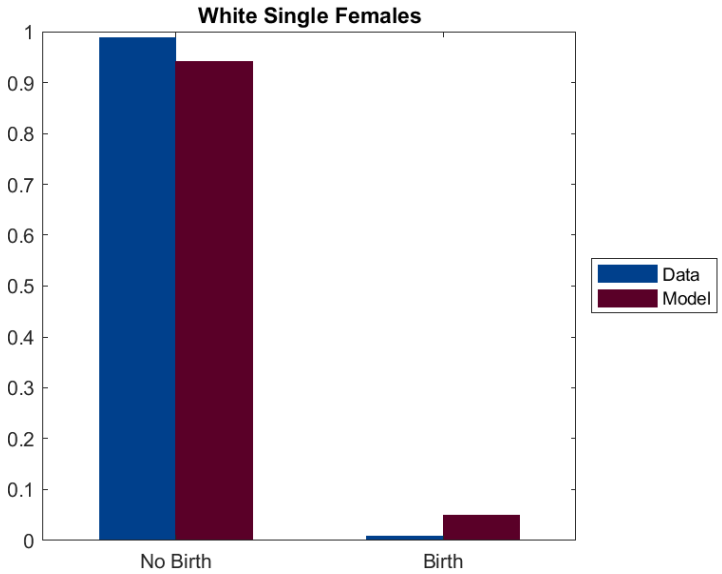


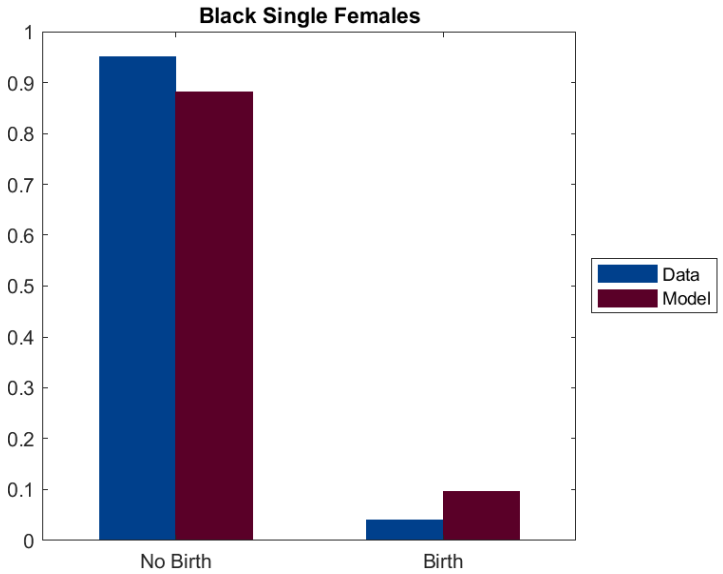
Model Fit: Parental Time

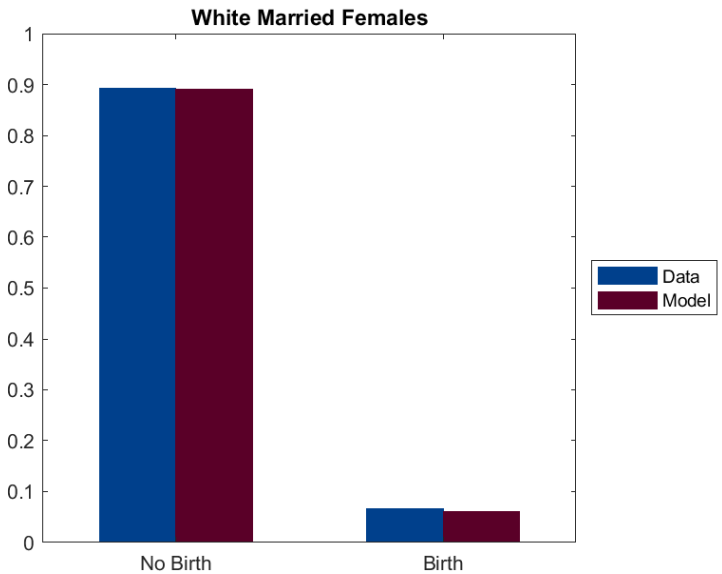


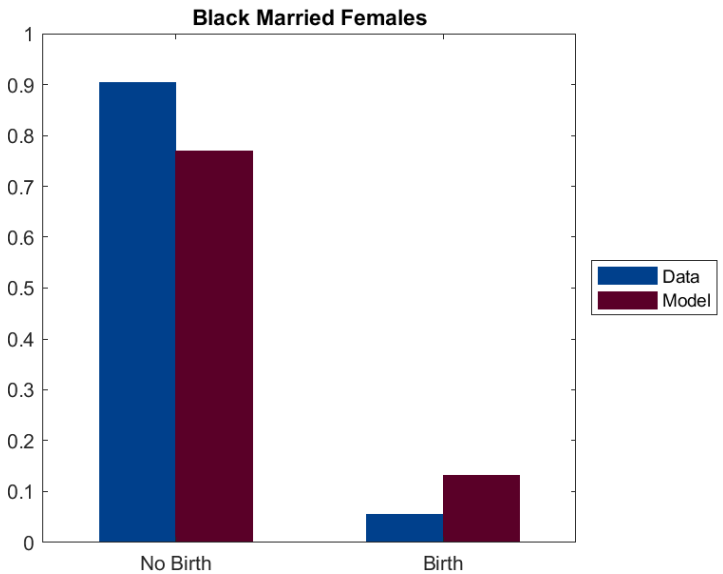


Model Fit: Fertility

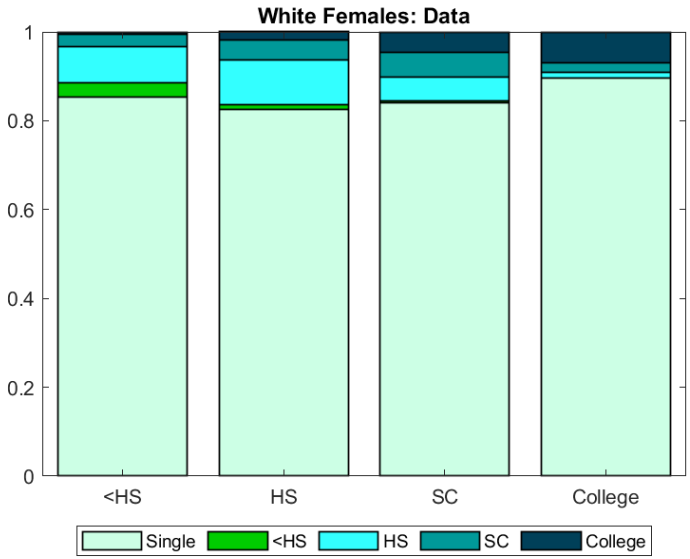


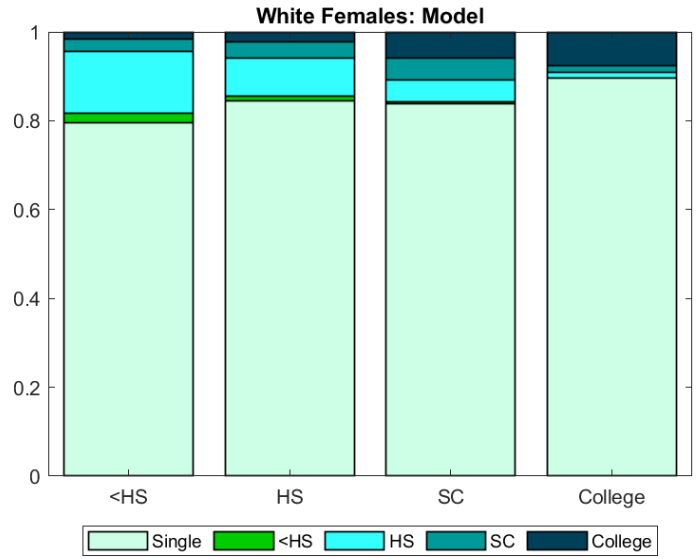


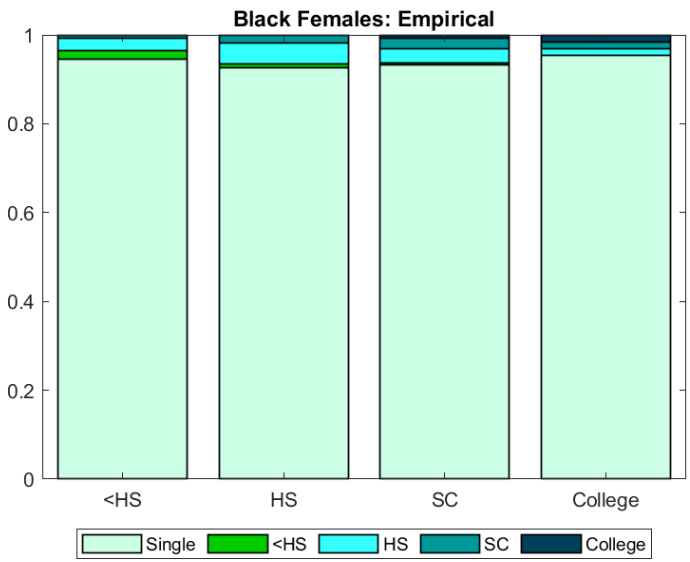


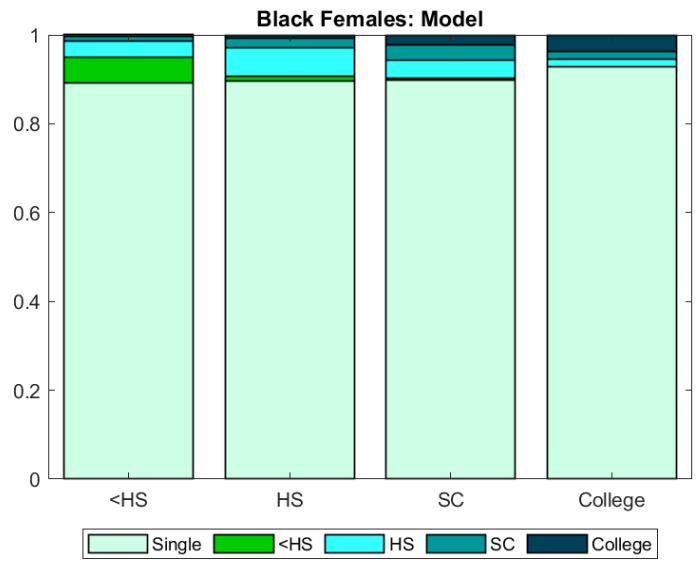


Model Fit: Marriage Transition from single hood









Education Gap - Matching

- Changing the initial education distribution of black men reduced the education outcome gaps the most: college gap reduced by 31.5% (and some college is higher than that of whites)
- For single mothers it reduced full-time work below single white women and increased time with children above level of single white mothers
- Increases specialization in married black households
  - Decreases female full-time work to a level slightly below that of white married females
  - Increases maternal time with children to a level close to that of white married females
  - Married black males increase full time work to a level above that of white married males
  - Fathers' time with children declines to a level substantially below that of white married males
  - Fertility increases, same as white married females
- Income effect is responsible for increase fertility and maternal time with children; but there is still higher probability of divorce and labor market tax

Impact on Choices - Earnings Gap

- Despite the race earnings gap, the returns to parental investment are NOT lower for blacks
- Eliminating the "black tax", however, reduced the education gaps (2.5% college gap; 19.6% some college or more)
- For singles: increased labor supply of black females and decreased it for males
- For married: decreased black females full time work to a level similar to that of white females; increased full time work for males to a higher level than that of white males
- Parental time with kids declines for all!
- But fertility declined substantially so average time per child increased for black males (above that of white males);
- The average time input of females increased but still lower than that of white females

Impact on Choices - Marriage Probability

- Actually increases the education gap!
- **Closing the marriage probability gap** has the largest impact on closing the race gap in maternal time input
- Reduces labor supply of females
- Reduces black fathers time inputs to a level below that of white males
- Increases fertility
- Average time per child of black mothers is above that of white mothers!
- Average time per child of black father is the lowest
- Overall, the large increase in maternal time does not compensate for the large decrease in fathers time!

Effect on Input in Children

Variable	White	Black	(Earnings)	(Matching)	(Marriage)	(Divorce)
Total mother's time	9.64	7.935	8.056	7.82	11.874	8.469
	(7.502)	(6.334)	(6.850)	(6.032)	(6.942)	(7.057)
Average mother's time per child	4.644	3.986	**4.029**	4.042	**4.736**	4.334
	(2.224)	(2.198)	(1.892)	(1.685)	(1.648)	(1.939)
Total father's time	6.983	7.047	6.881	8.05	5.599	6.508
	(6.063)	(6.294)	(5.953)	(6.460)	(5.112)	(5.693)
Average father's time per child	3.538	3.611	**3.761**	4.294	**2.531**	3.714
	(2.461)	(2.615)	(2.245)	(2.260)	(2.218)	(2.431)

Earnings Outcomes

- Educational achievement does not translate directly to earnings
- Earnings depend on labor market experience and current labor supply
- Closing the earnings gap increase the earnings to a level higher than that of whites
- While changing the matching patterns had the largest impact on the educational gap it actually increased the earnings gap for females

		Earnings					
		White	Black	Earning gap	Matching	Probability	Divorce
Girls	Total earnings: ages 17-55	803,644	707,489	862,937	548,308	572,336	662,000
	Yearly earnings at age 35	23,987	20,627	24,666	18,138	**18,446**	20,326
Boys	Total earnings: ages 17-55	1,220,075	1,033,688	1,329,949	1,102,699	1,085,440	1,137,489
	Yearly earnings at age 35	36,328	30,381	37,651	**31,836**	30,369	31,889

Earnings Gap and Racial Gap in Outcomes of Children

- Closing the earnings gap will substantially reduce achievement gap in education and labor market outcomes
- There is a large literature on discrimination and a debate on whether it is the source of racial inequality
- Many argue that the gaps are due to pre-market skill gaps and not discrimination (Neal and Johnson 1996; see survey by Fryer (2011))
- Some argue that if the returns to black parents investment is lower, discrimination can cause pre-market skill gaps
- We do not find evidence that blacks have lower returns to investment (O'Neill 1990; Cameron and Heckman 2001; Rouse 2005)
- We do not take a stand on whether the gap is a result of discrimination or pre-market unobserved skills gaps
- However, if there is discrimination, we show that it can have an effect on pre-market skill formation through its effect on family income and time allocation
- This channel has not been explored in the literature

Conclusion

- Analyze intergenerational transmission of human capital
- Develop and estimate a model with endogenous single parenthood, time allocation and quantity-quality trade-off
- Black mothers' time input in young children is lower, they are more likely to be single mothers but there is a large gap for married mothers as well
- Married households: black women work more, black males work less and spend more time on housework than their white counterparts
- We find that both family structure and the earnings gaps are important sources of the racial achievement gap
- But it is the assortative mating and divorce probabilities that contribute to the education gap the most

Future Work

- Three main reasons for racial difference in family structure in academic the literature
  - Decline in "marriageability" of black men with low levels of education
  - Incentives created by government policies (e.g. welfare benefits Earned Income Tax Credit)
  - Decreasing cultural significance of marriage for black and women in low-income communities
- Policy implications: labor market earnings gaps contribute to gaps in pre-market skills formation
- Policies aims at equalizing resources available to households during early childhood may be effective
- It is unclear what is the effect of policies aimed at changing family structure, but our research demonstrates that parental incentives and behavior responds to economic incentives

Black-White Education Attainment Gap (II)

OLS: Dependent variable, Educational Outcome of Child; Exclude class is Less than High School

	(1)			(2)		
Variable	High School	Some College	College	High School	Some College	College
Female	0.0047	0.1257***	0.0671***	0.0027	0.1250***	0.0850***
	(0.0130)	(0.0194)	(0.0163)	(0.0150)	(0.0239)	(0.0201)
Black	-0.0188	-0.0233	-0.0473**	0.0283	0.0256	-0.019
	(0.0152)	(0.0227)	(0.0191)	(0.0176)	(0.0281)	(0.0236)
High school father	0.0478**	0.0723**	0.0251	0.0521**	0.0664	0.0058
	(0.0216)	(0.0322)	(0.0271)	(0.0256)	(0.0408)	(0.0343)
Some college father	0.0401**	0.1083***	0.0623***	0.0274	0.0900***	0.0423
	(0.0175)	(0.0260)	(0.0219)	(0.0203)	(0.0324)	(0.0273)
College father	0.0016	0.1172***	0.1538***	-0.0196	0.0699*	0.1321***
	(0.0199)	(0.0296)	(0.0249)	(0.0229)	(0.0366)	(0.0308)
High school mother	0.1346***	0.1781***	0.0481	0.0831***	0.1631***	0.0472
	(0.0240)	(0.0357)	(0.0299)	(0.0293)	(0.0468)	(0.0393)
Some college mother	-0.0031	0.0718***	0.0691***	-0.0022	0.0877***	0.0921***
	(0.0169)	(0.0252)	(0.0211)	(0.0195)	(0.0311)	(0.0262)
College mother	0.02	0.0687**	0.0917***	0.0004	0.047	0.0388
	(0.0206)	(0.0307)	(0.0258)	(0.0241)	(0.0384)	(0.0323)
Mother's labor income				-0.0014	0.0001	0.0013
				(0.0013)	(0.0021)	(0.0017)
Father's labor income				0.0026***	0.0033***	0.0043***
				(0.0007)	(0.0012)	(0.0010)
Constant	0.7028***	0.1234***	0.0222	0.7181***	0.0917*	-0.0506
	(0.0252)	(0.0375)	(0.0315)	(0.0321)	(0.0512)	(0.0430)
Observations	2,306	2,306	2,306	1,541	1,541	1,541

[Parental Time Definition ▷] [Motivation ▷]

Black-White Education Attainment Gap (II)

3SLS: Dependent variable, Educational Outcome of Child; Exclude class is Less than High School

Variable	High School	Some College	College
High school father	0.063	0.003	-0.002
	(0.032)	(0.052)	(0.044)
Some college father	0.055	0.132	0.055
	(0.023)	(0.038)	(0.031)
College father	-0.044	0.008	0.120
	(0.032)	(0.051)	(0.042)
High school mother	0.089	0.081	-0.019
	(0.040)	(0.065)	(0.052)
Some college mother	0.007	-0.041	0.017
	(0.030)	(0.049)	(0.039)
College mother	0.083	0.120	0.040
	(0.036)	(0.057)	(0.047)
Mother's time	**-0.014**	**0.080**	**0.069**
	(0.021)	(0.034)	(0.027)
Father's time	**0.031**	**0.100**	**0.026**
	(0.019)	(0.029)	(0.025)
Mother's labor income	-0.025	-0.013	0.005
	(0.009)	(0.014)	(0.011)
Father's labor income	0.001	0.001	0.002
	(0.003)	(0.004)	(0.003)
Female	**-0.002**	**0.135**	**0.085**
	(0.017)	(0.028)	(0.022)
Black	*0.020*	*0.082*	*0.043*
	(0.039)	*(0.063)*	*(0.051)*
Number of siblings younger than age 3	-0.014	-0.107	-0.043
	(0.017)	(0.027)	(0.022)
Number of siblings between ages 3 and 6	-0.029	-0.047	-0.012
	(0.019)	(0.030)	(0.025)
Constant	0.855	-0.231	-0.359
	(0.108)	(0.172)]	(0.140)]
Observations	1335	1335	1335

[IDENTIFICATION ▷] [Parental Time Definition ▷] [Motivation ▷]

3SLS system estimation the education production function

Estimation.

- Problems estimating the causal intergenerational schooling effect of parents' education.
  1. ability "bias" : more "able" mothers may obtain more schooling, if their children are more "able", they will also have more schooling.
  2. The relationship among parental traits, investment, and children's outcomes is normally estimated for mothers-children only. $\Rightarrow$even among mothers with the same abilities: higher education may have children with greater educational and labor market performances because of assortative mating.
- Our estimation strategy internalizes these concerns:
  - The estimated fixed effect included the education production function to mitigate the ability bias.
  - Accounting household: Fathers' education and home time in the education production function.

[◁ Back to Table]

3SLS system estimation the education production function

Estimation

- Endogeneity of which parent and type of household spend parental time.
  1. Output of education production function determined across generations→the inputs determined over the life-cycle of each generation.⇒ inputs predetermined.
  2. A system of equations with simultaneously: Education production function, labor supply, income, time spent with children, and fertility.
- Need exclusion restrictions motivated by the theoretical model.
  1. Sex composition of siblings (Angrist and Evans (1998)): enters the parental time and fertility equation but not labor supply or education production function directly
  2. The difference in the age-earnings profile by education – provide quasi-experimental variation in income, labor hours, and subsequent fertility.

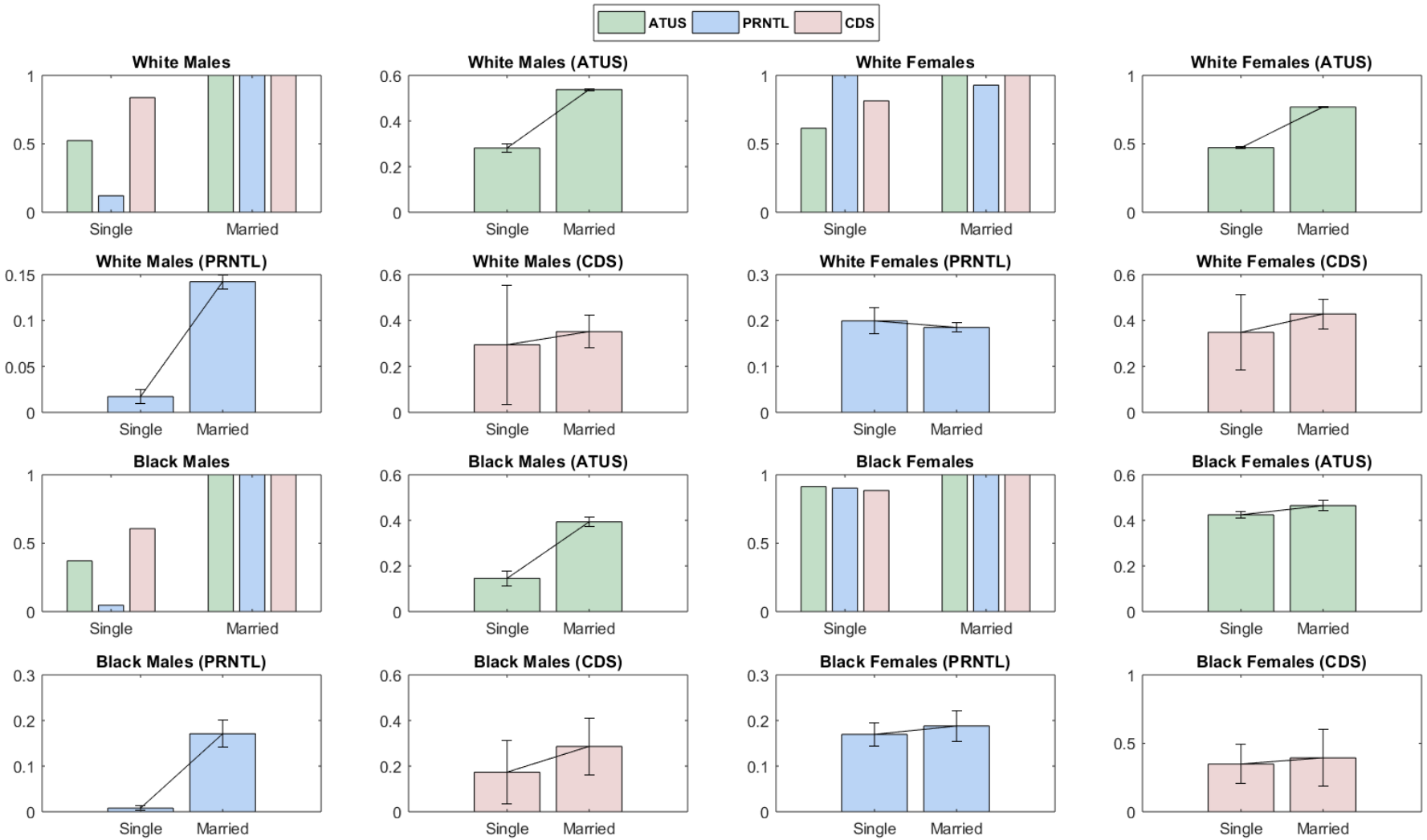
[◁ Back to Table]

Data

- Family-Individual File of the Michigan Panel Study of Income Dynamics (PSID) from 1968 to 1996.
- Two generations, 17-55. Married households
- The PSID measures annual hours of housework for each individual
- Normalized data for time with children: this approach can be found in Hill and Stafford (1974, 1980), Leibowitz (1974), and Datcher-Loury (1988)
- Time with children is computed as the deviation of housework hours from the average housework hours of individuals with no child.
- Account gender and education and year
- Negative values are set to zero
- Discretize to 3 levels of time investment

[CDS and ATUS validation ▷] [◁ Back to Table]

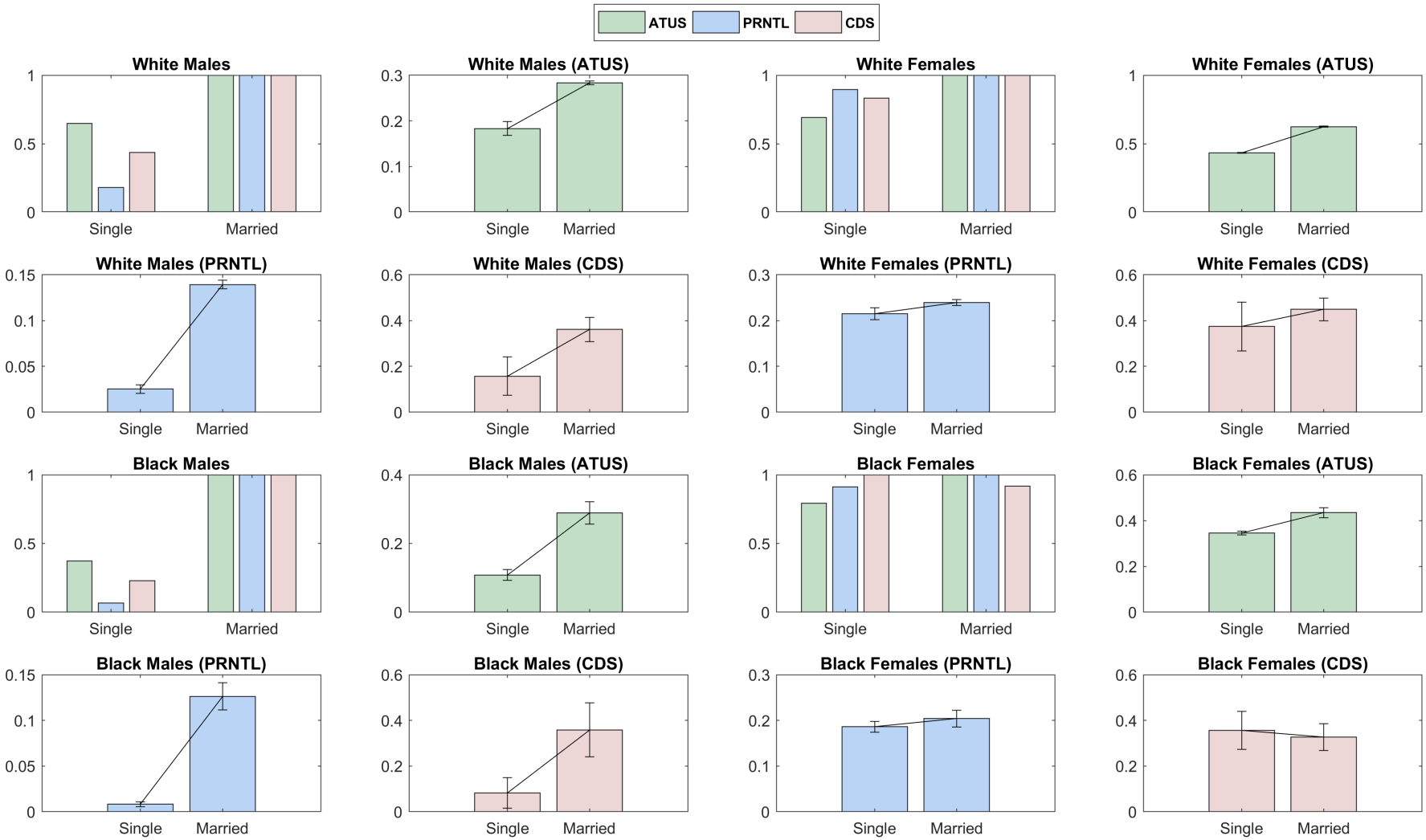
Parental Time Validation - Mean Hours by Marital Status and Race for 2 Children Families



[◁ Back To PT Def.]

[◁ Back to Table]

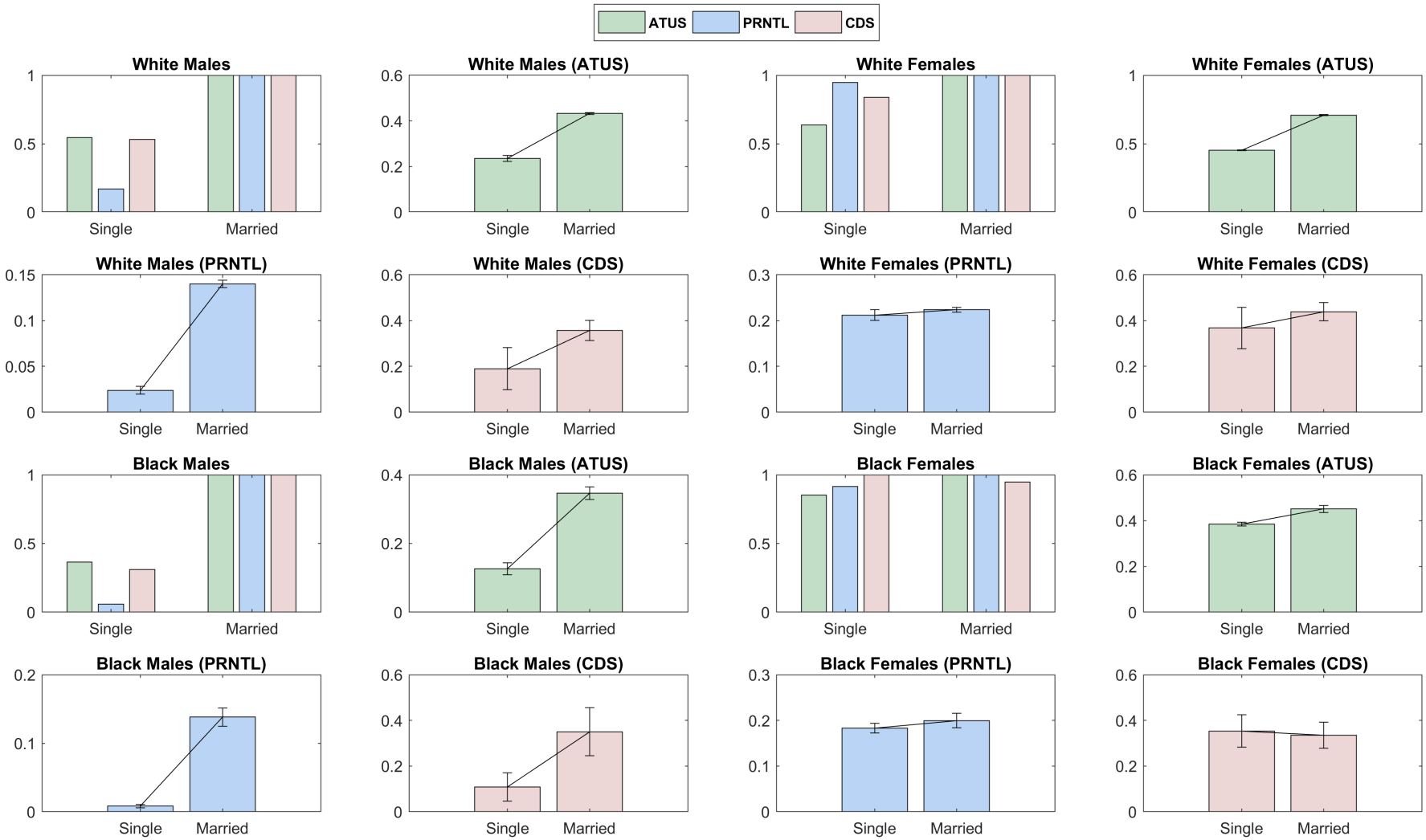
Parental Time Validation - Mean Hours by Marital Status and Race for 1 Child Families



[◁ Back To PT Def.]

[◁ Back to Table]

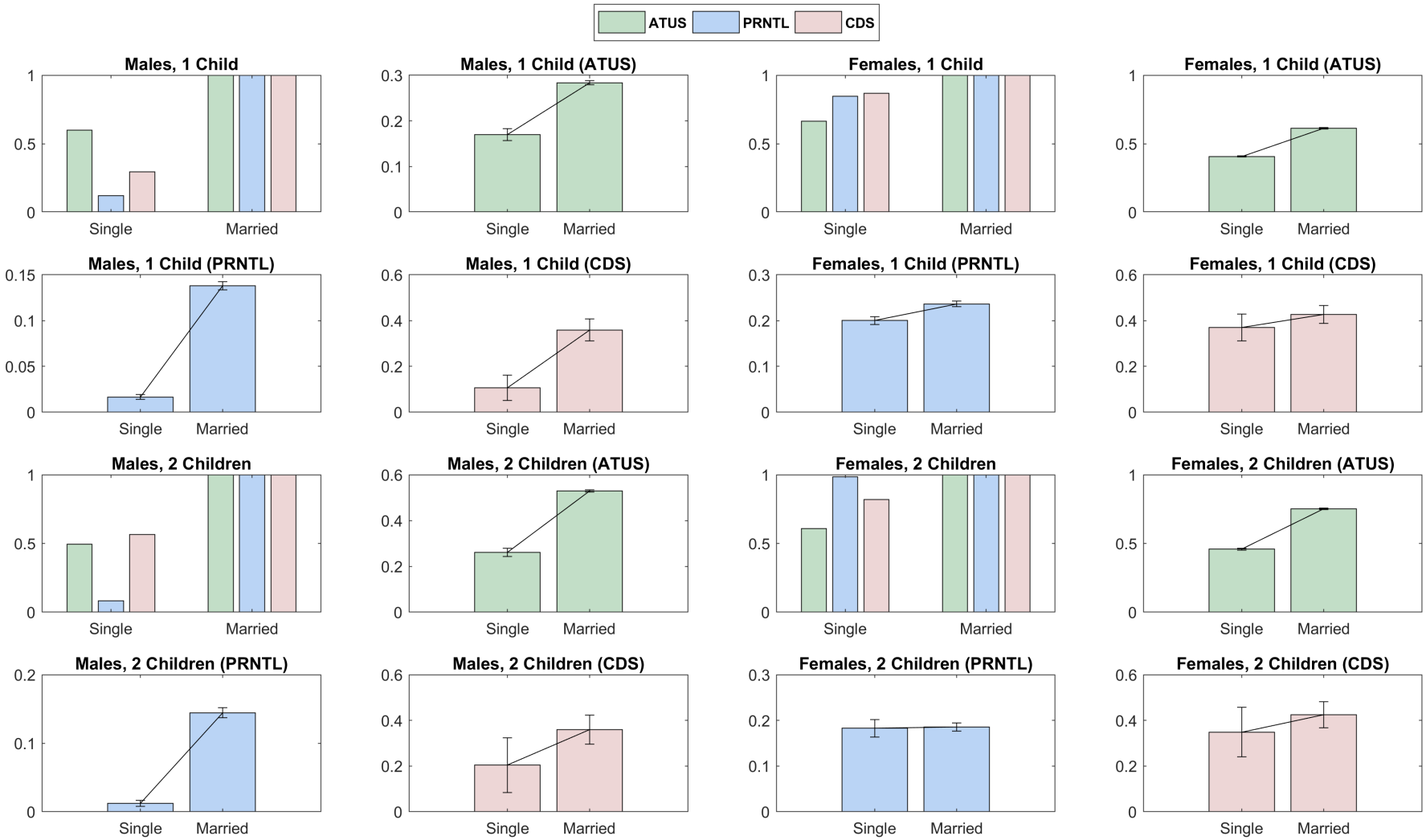
Parental Time Validation - Mean Hours by Marital Status and Race



[◁ Back To PT Def.]

[◁ Back to Table]

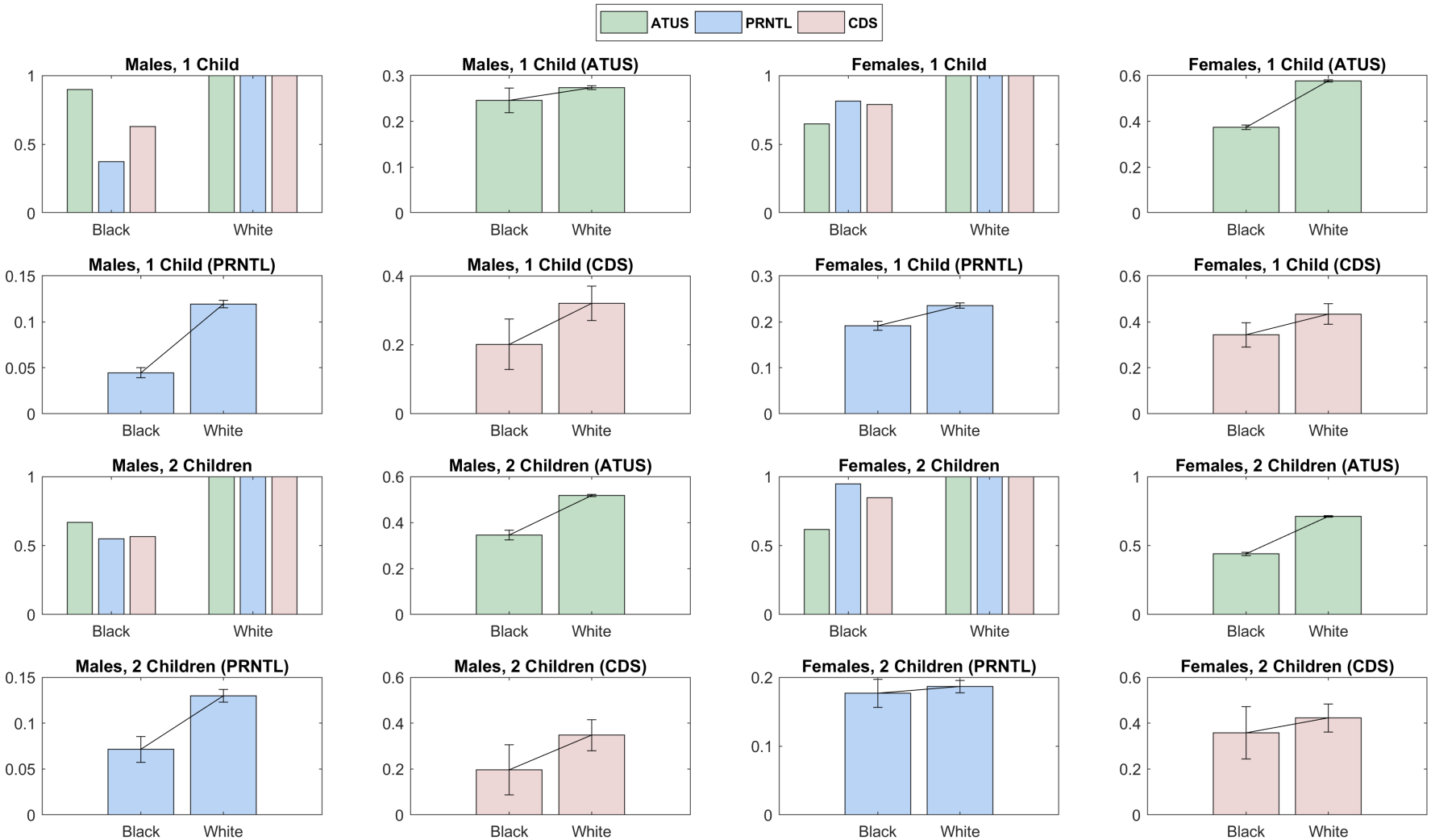
Parental Time Validation - Mean Hours by Marital Status



[◁ Back To PT Def.]

[◁ Back to Table]

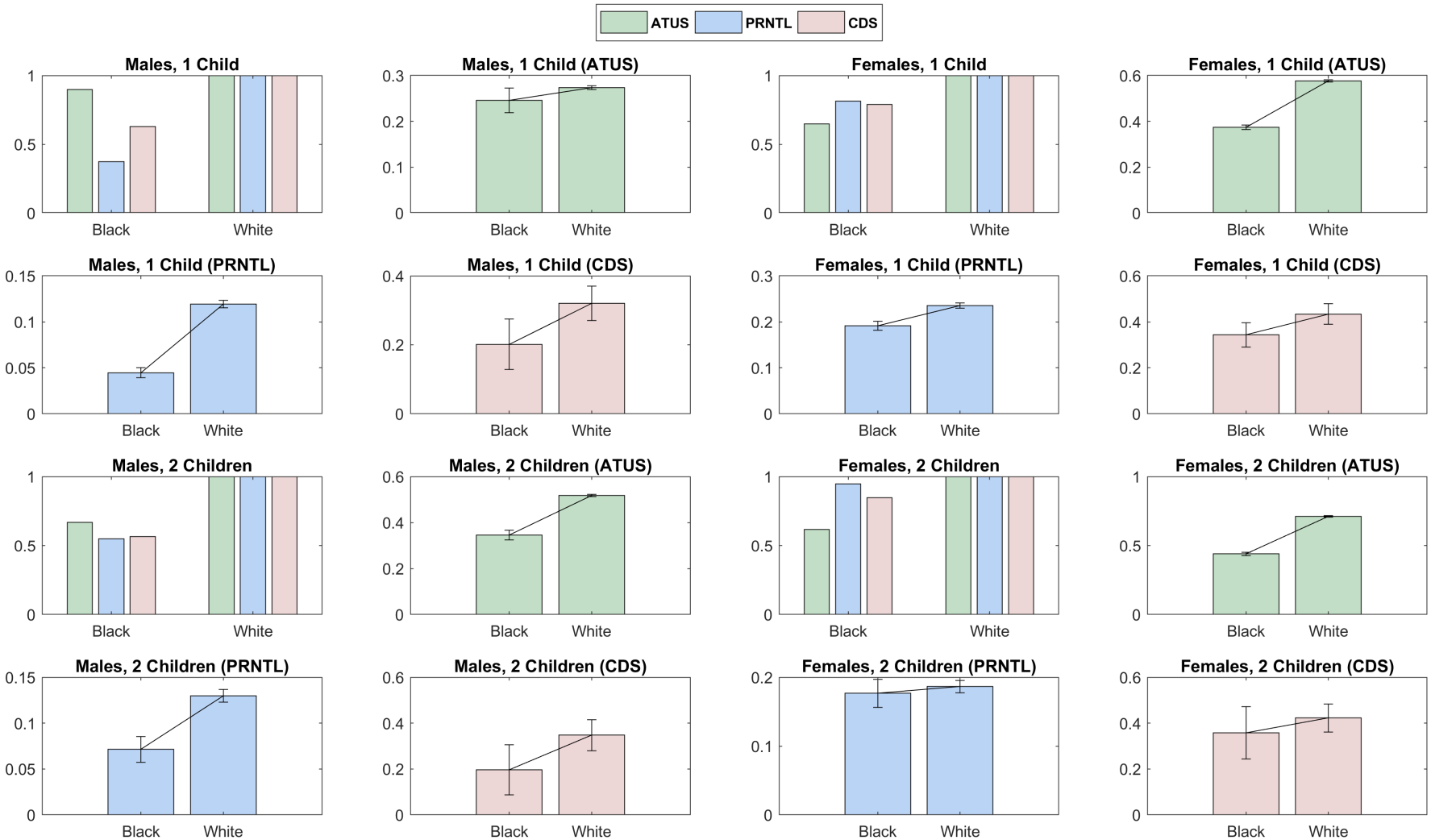
Parental Time Validation - Mean Hours by Race



[◁ Back To PT Def.]

[◁ Back to Table]

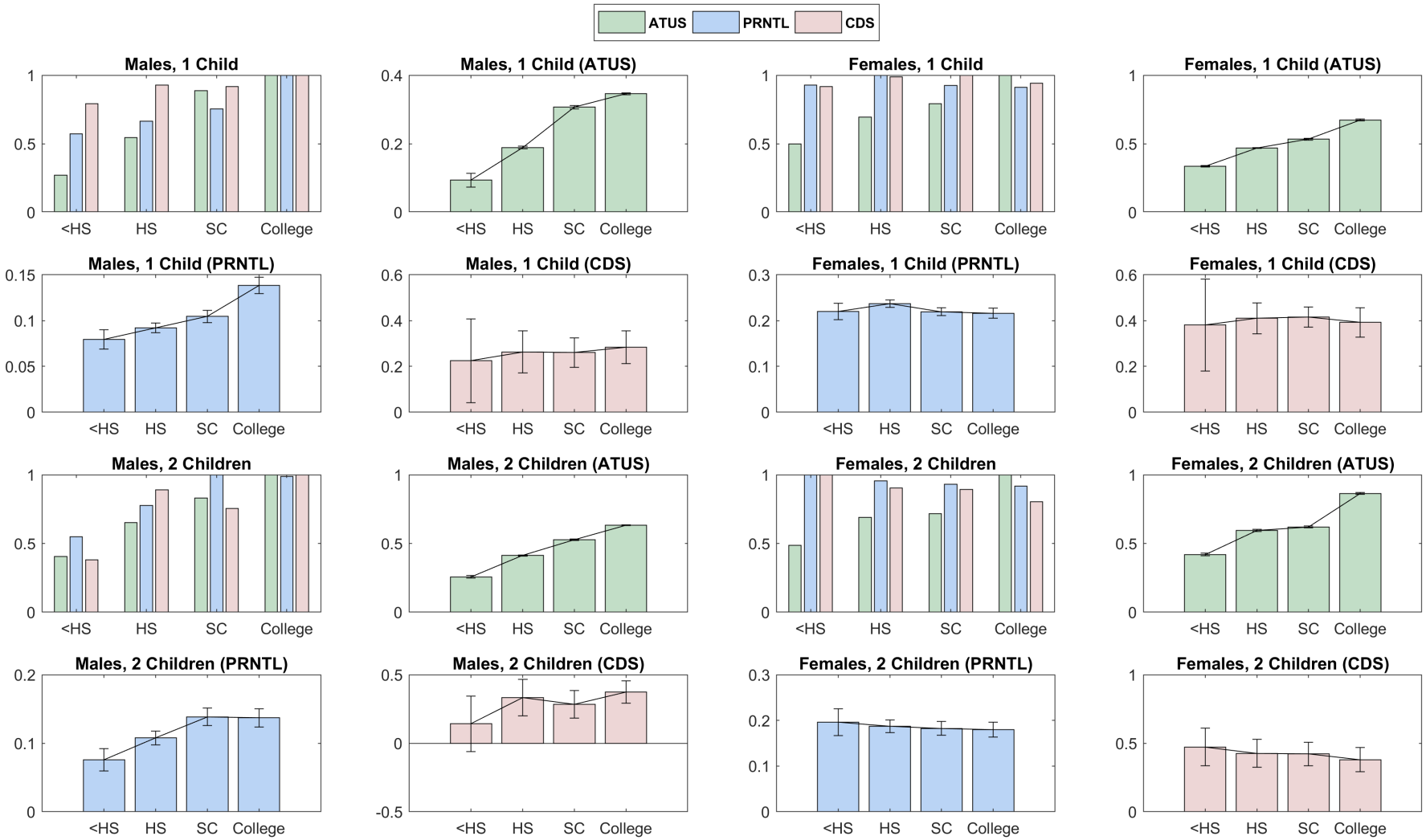
Parental Time Validation - Mean Hours by Race



[◁ Back To PT Def.]

[◁ Back to Table]

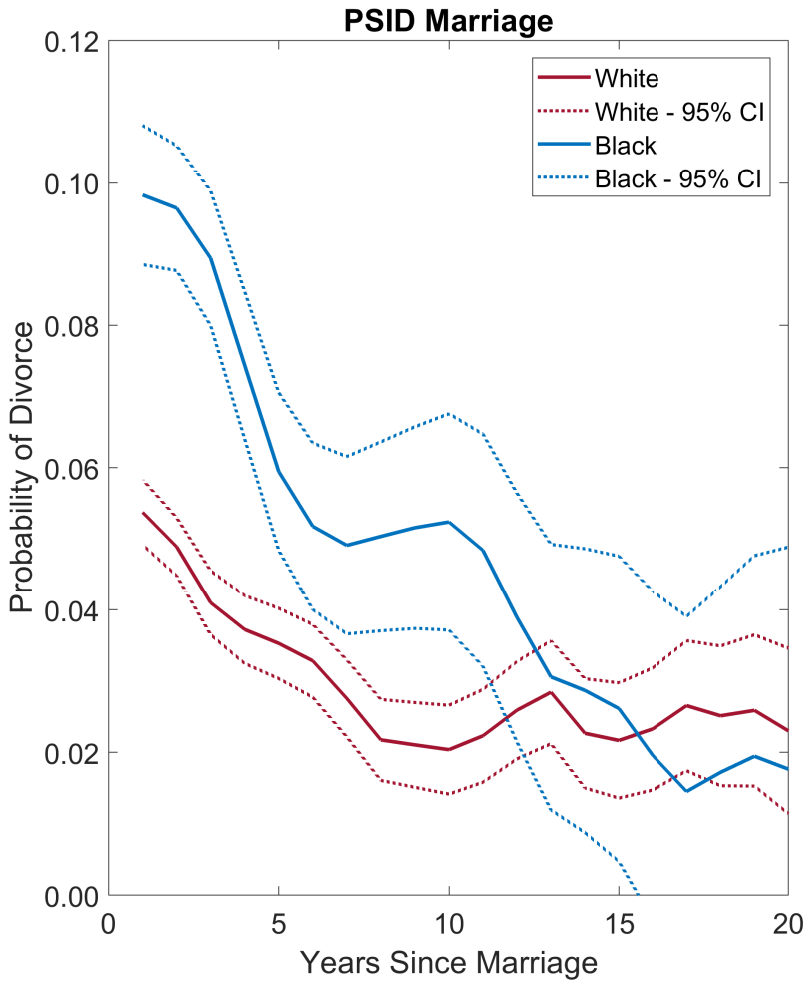
Parental Time Validation - Mean Hours by Education Level

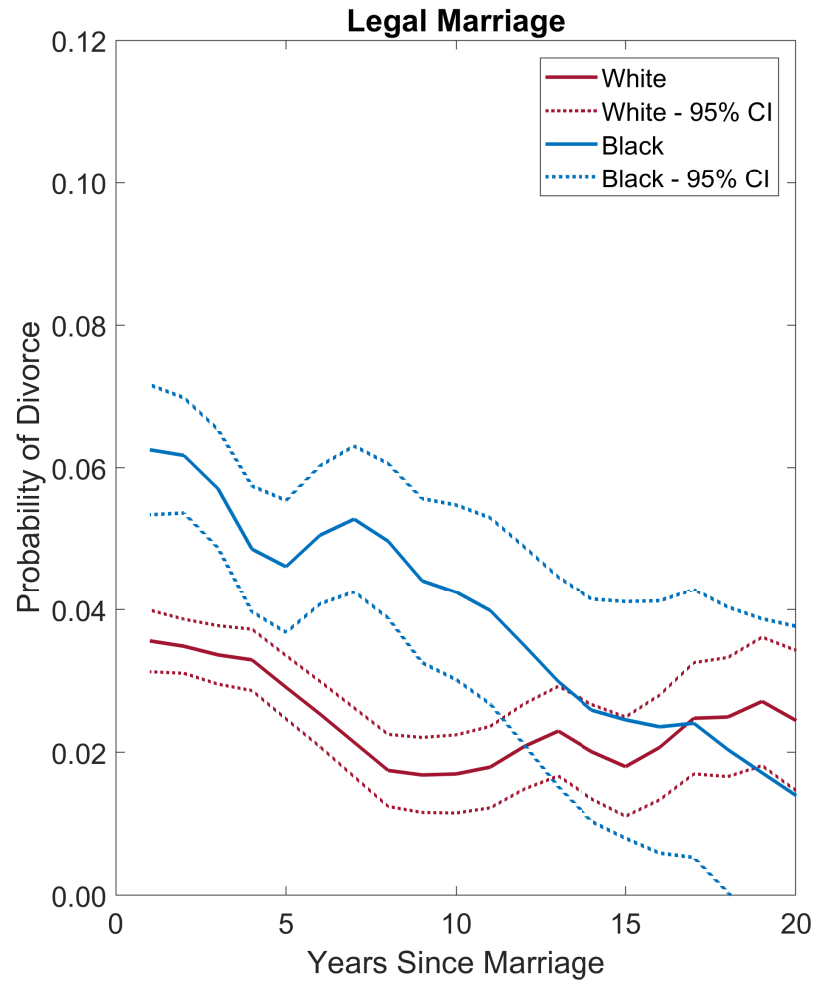


[◁ Back To PT Def.]

[◁ Back to Table]

Probability of Divorce

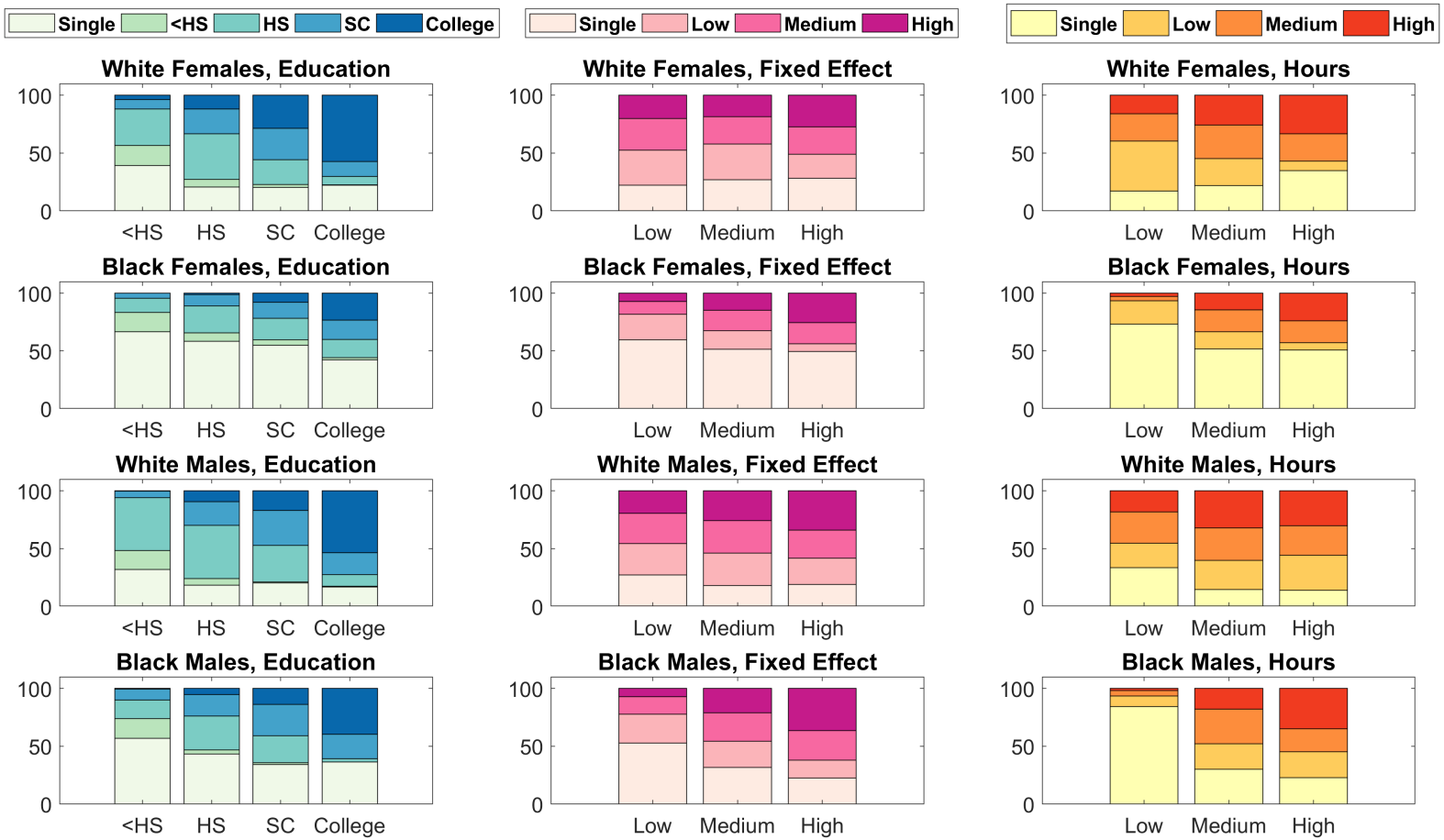




Source: PSID Data (1968-1997)

[◁ Back To Overview]

Assortative Matching



[◁ Back To Overview]

Gender	Variable	White	Black	(E)	(M)	(P)	(D)
				Education			
All	Less than high school	0.033	0.039	0.032	0.013	0.067	0.028
	High school	0.378	0.428	0.423	0.377	0.514	0.407
	Some college	0.355	0.388	0.397	0.436	0.283	0.4
	College graduate	0.235	0.146	0.148	0.174	0.136	0.169
Girls	Less than high school	0.032	0.038	0.036	0.016	0.075	0.034
	High school	0.326	0.386	0.389	0.33	0.482	0.387
	Some college	0.37	0.403	0.391	0.449	0.282	0.388
	College graduate	0.272	0.173	0.185	0.206	0.161	0.192
Boys	Less than high school	0.036	0.04	0.034	0.013	0.071	0.031
	High school	0.427	0.479	0.461	0.447	0.582	0.48
	Some college	0.332	0.361	0.38	0.406	0.247	0.361
	College graduate	0.207	0.12	0.124	0.134	0.101	0.127

What is it about married couples? *Division of Labor!*

Summary Statistics by Race and Gender for Assortatively Matched Couples

	College Graduates				High School		
	Female		Male		Female		M
Variable	White	Black	White	Black	White	Black	White
Annual time with children	*492*	*466*	*142*	*118*	446	267	98
	(514)	(463)	(239)	(277)	(507)	(388)	(231)
Number of children	1.87	1.89	1.80	1.93	1.72	1.80	1.67
	(0.77)	(0.63)	(.74)	(0.65)	(0.74)	(0.86)	(0.69)
Housework	*1057*	*1039*	*408*	*382*	1,262	1,047	339
	(563)	(503)	(310)	(330)	(611)	(527)	(334)
Age	35.2	35.2	36.7	36.9	29.4	29.2	32.4
	(5.77)	(5.27)	(5.78)	(5.39)	(6.36)	(6.31)	(6.33)
Education	16.5	16.6	16.5	16.7	12	12	12
	(0.50)	(0.50)	(0.50)	(0.46)	(0)	(0)	(0)
Labor income	*26,668*	*42,650*	*74,912*	*66,607*	12,687	14,721	39,288
	(28,229)	(21,132)	(46,027)	(22,819)	(13,038)	(12,566)	(20,561)
Wage rate	19.1	24.2	35.5	31.5	8.4	9.1	18.2
	(17.9)	(10.6)	(26.0)	(10.9)	(8.8)	(8.7)	(11.4)
Annual work hours	*1,100*	*1,709*	*2,287*	*2168*	1,105	1,309	2,188
	(867)	(560)	(561)	(549)	(910)	(860)	(648)
Observations	2,826	221	2,265	170	3,144	1,190	1,868

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