

# What Explains the Growing Gender Education Gap?

*The Effects of Parental Background, the Labor Market and the Marriage Market on  
College Attainment*

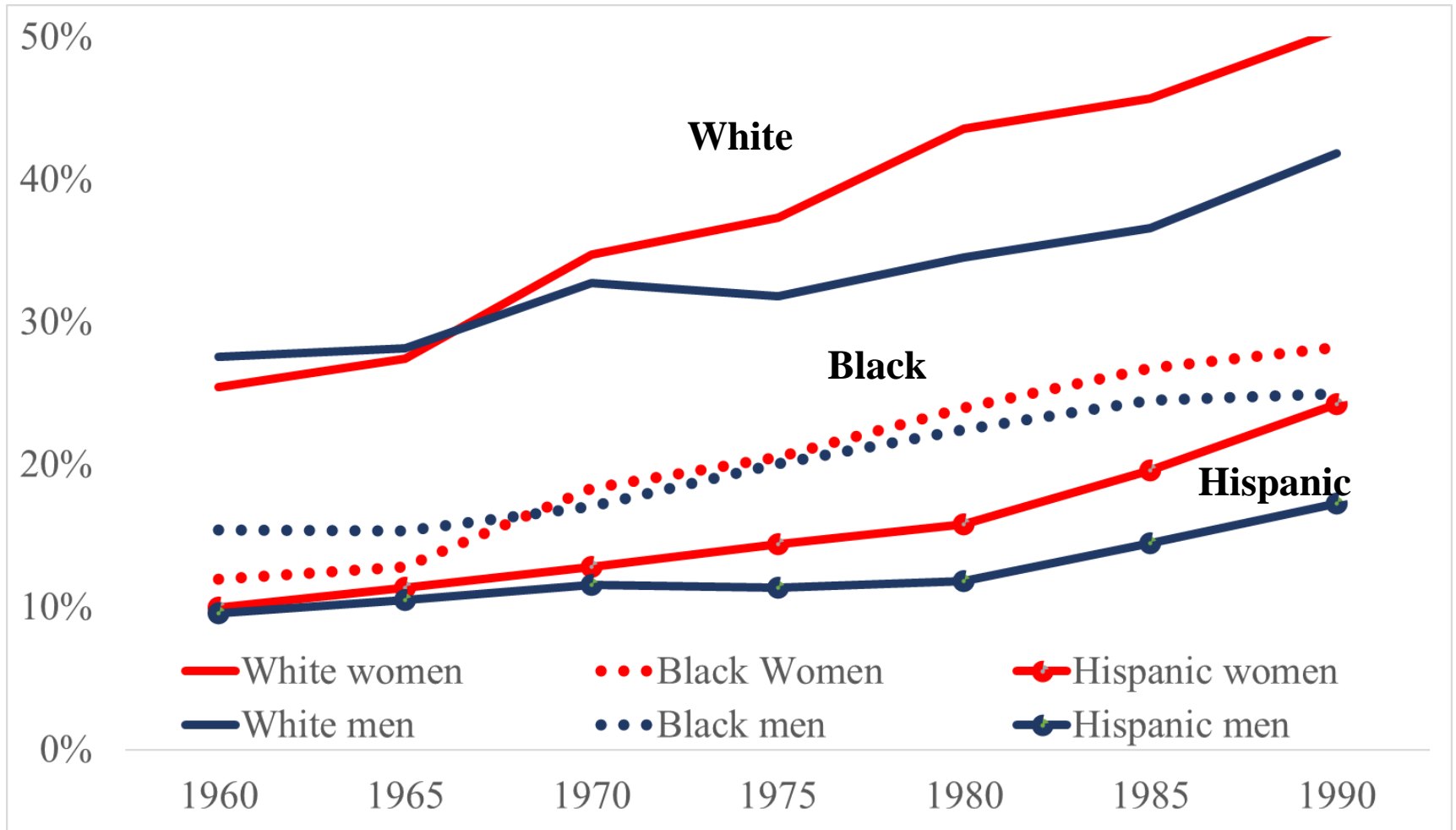
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# The Growth in the Gender Education Gap: reversed in 1970-80 cohorts for all ethnic groups



Note: We plot the college graduation rate for 5-year birth cohorts from 1960 to 90.

# Research Overview

## Questions:

1. What explains College Graduation Rates (CG) by gender, ethnicity and cohorts born 1960 - 1980?
2. What are the predicted CG by gender, ethnicity and aggregate for cohorts born 1990, 2000 and 2010?
3. What is the intervention policy that would reduce the CG gaps between Blacks and Hispanics to Whites?

# Our Objective:

- Formulate and estimate a model seeks to **explain endogenously** lifetime changes in: Education, Labor supply, Marriage, Fertility, Welfare

**Assuming fixed preferences** across the **cohorts** and **ethnic** groups

Following Eckstein, Keane and Lifshitz (EKL, 2019), KW (1997, 2010)

Using **Exogenous differences/changes** in main three sources:

1. **Parental Background (PB)** - college graduate? single or married? born in US?
2. **The Labor Market (LM)** - Wage and Job Offers, Taxes and Welfare Rules
3. **The Marriage Market (MM)** – Probability of marriage offers by age and education.

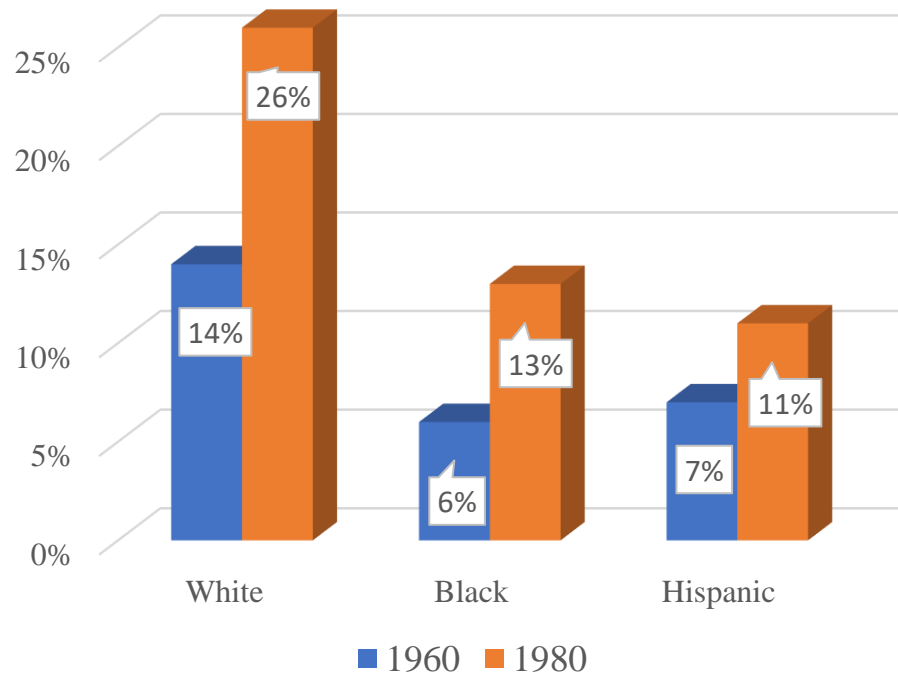
[Some literature](#)

# 1. Parental Background: social mobility

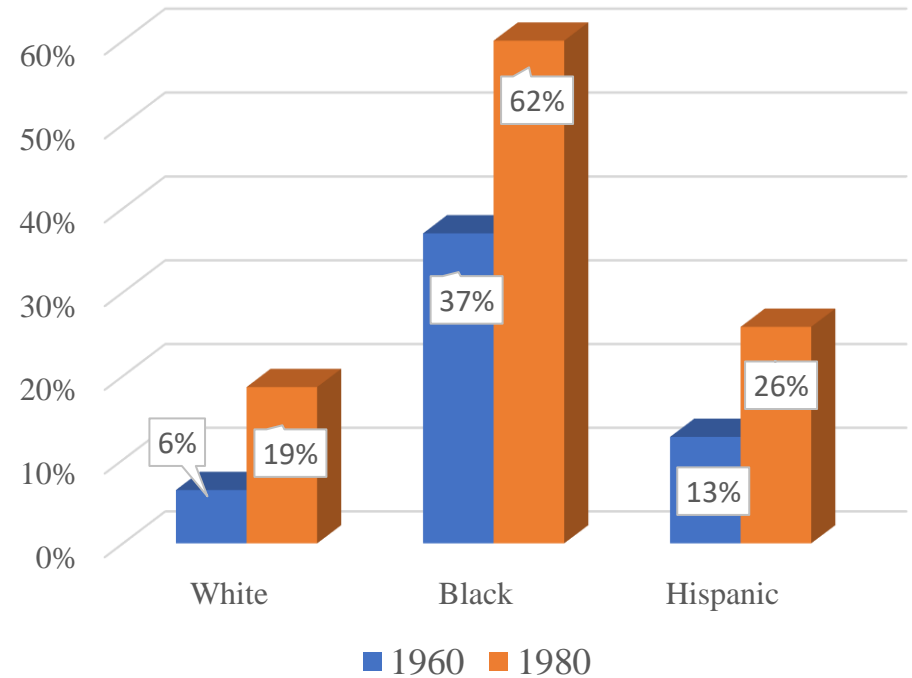
**Mother's CG+PC increased dramatically:** positive association with CG siblings

**Single-parent households increased:** Negative association with CG siblings

Family Background - College Graduate Mother –  
1960 and 1980 cohorts



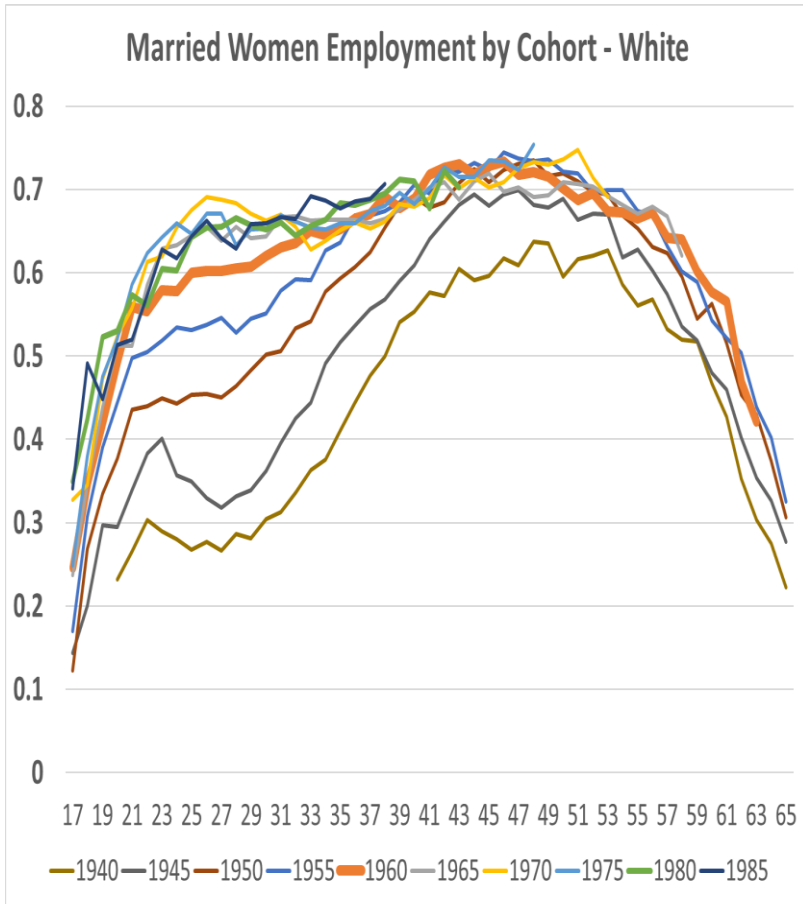
Family Background - Single Mother –  
1960 and 1980 cohorts



# 2. Labor Market: Employment and Wages

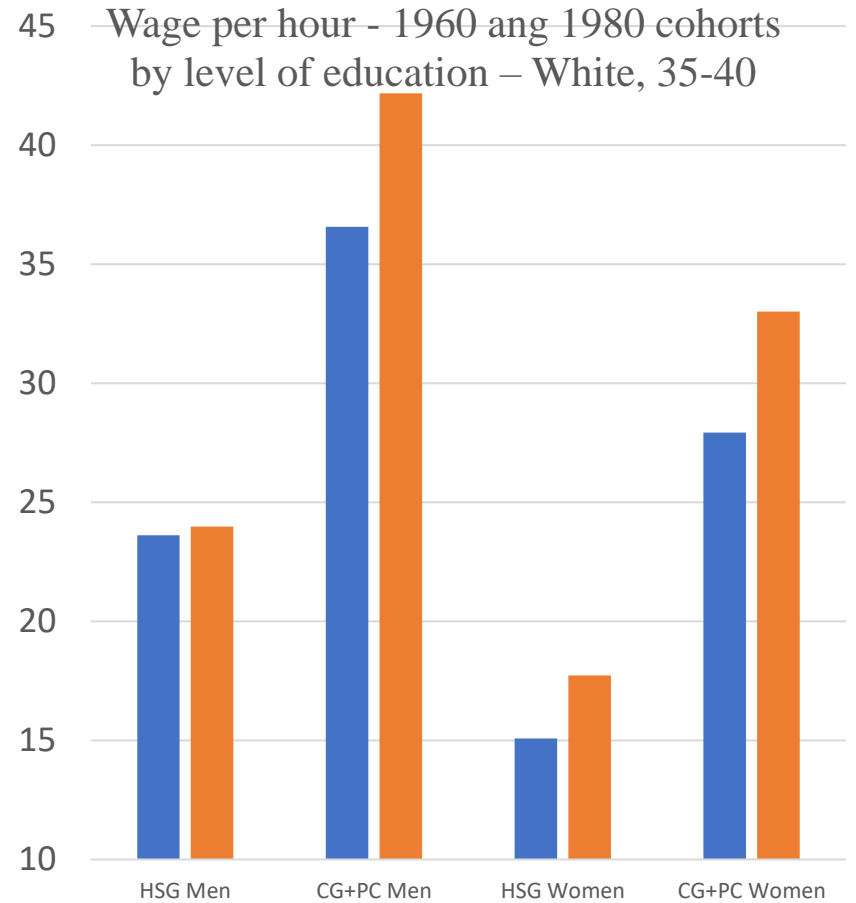
## Employment

No change since 1960 cohort



## Wages

SBTC – wages for college graduate increased, more so for men.



# The Model

- **Females** and **males** make annual decisions from age 17 to 65.
- **At 17 – all singles** in school, differ by **gender**, and **family background**

## Choices:

- **Schooling:** *HSD, HSG, SC, CG, PC* ;
- **Employment:** full time, part time or not employed;
- **Married:** or Divorce;
- **Fertility:** for females or couples
- **Welfare:** for single mothers

# Current utility from schooling:

$$\vartheta_{jt} s_t ; \vartheta_{jt} = \vartheta_{0j} + TC \cdot I(E_t > HSG) + \vartheta_{1j} PE + \vartheta_{2j} \mu_j^W(PE, PM)$$

$TC$  – college tuition;  $PE = 1$  mother CG;  $PM = 1$  Parents married; gender:  $j = f, m$

$\mu^W(PE, PM)$  skill endowment; 3 levels :Low, Med, Hi. Function of PB – same to ALL

## Value functions for single women

$$U_t^f(\Omega_{ft}) = \left( \frac{1}{\alpha} (C_t)^\alpha + L_j(l_t) - \Psi g_t \right) (1 - s_t) + \vartheta_{ft} s_t + \pi_t p_t + A_f^S Q(l_t, 0, Y_t, N_t) \\ + \delta E_{MAX} \left( M_{t+1} U_{t+1}^{fM}(\Omega_{m,t+1}, \Omega_{f,t+1}) + (1 - M_{t+1}) U_{t+1}^f(\Omega_{f,t+1}) \right)$$

**Income:**  $Y_t = Y_t^j = w_t^j h_t^j - \tau_t^S(w_t^j h_t^j, N_t) + CS_t \cdot a_t \cdot I[N_t > 0]$

$$+ wb(N_t, w_t^f h_t^f, G_t) \cdot g_t$$



# The Model Summary

- **Value functions for single men**
- **Value functions for married – weighted utility of partners**
- **Labor Market**
- **Marriage Market**

## Estimation

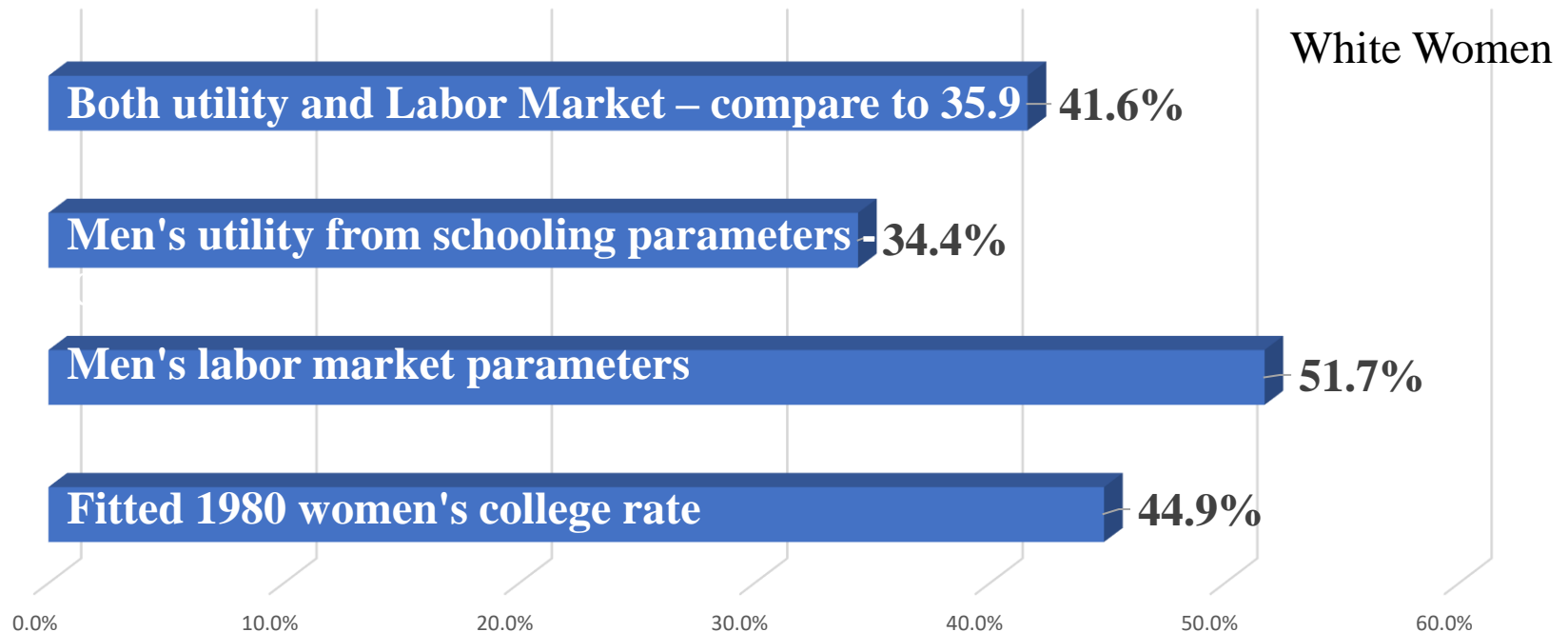
- **DP problem is solved** recursively from age 65 to 17
- For each cohort we simulate 5000  $f$  and 5000  $m$  at age 17 conditional on PB.
- **Estimate by simulated GMM using CPS data**
- **Keep all preferences parameters fixed by cohort and ethnicity**
- **Estimate exogenous process for each cohort/ethnicity separately: FB, LM, MM.**
- **Control for selection** of endogenous variables

# Result and Model Fit

We fit the following moments for each cohorts and the three ethnic groups with same preferences -- only by changing the 3 exogenous processes:

- **Education Moments:** 5 levels by gender and age
- **Labor Market Moments:** **Employment Rates** conditional on Education, Women, Age 32-36, **Annual Wage by age**, education, gender, and marital status, **FT and PT work by age**, education, gender, and marital status, **Welfare Share** by age and employment
- **Marriage Market Moments:** **Marriage and Divorce rate** by age, **Assortative mating** by education level, **Children by age** and marital status,

# Why are Recent Cohorts of Women getting more Education than Men? PV of College is higher

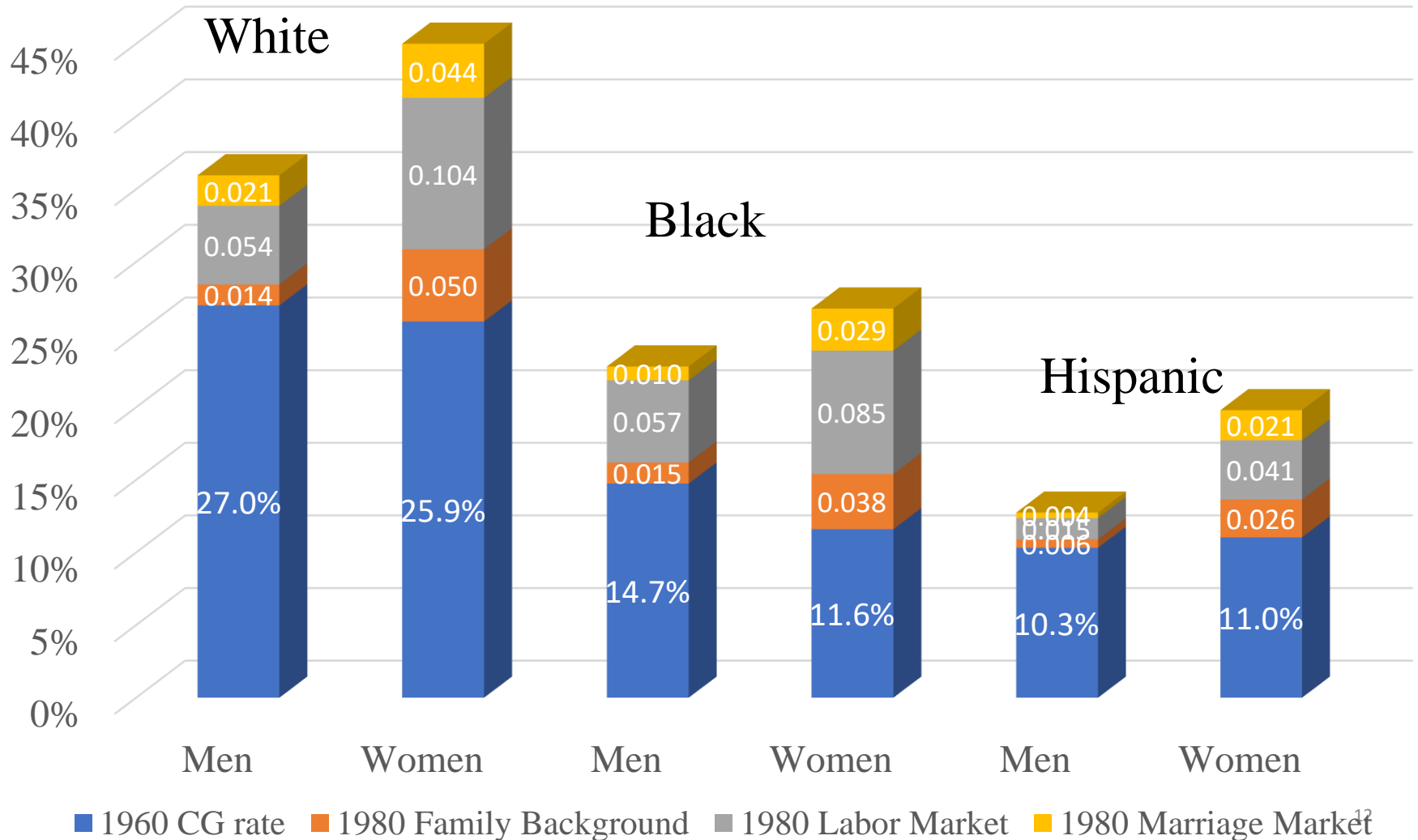


Utility from schooling is much lower for men:

$$\vartheta_{jt} = \vartheta_{0j} + TC \cdot I(E_t > HSG) + \vartheta_{1j}PE + \vartheta_{2j}\mu_j^W (PE, PM)$$

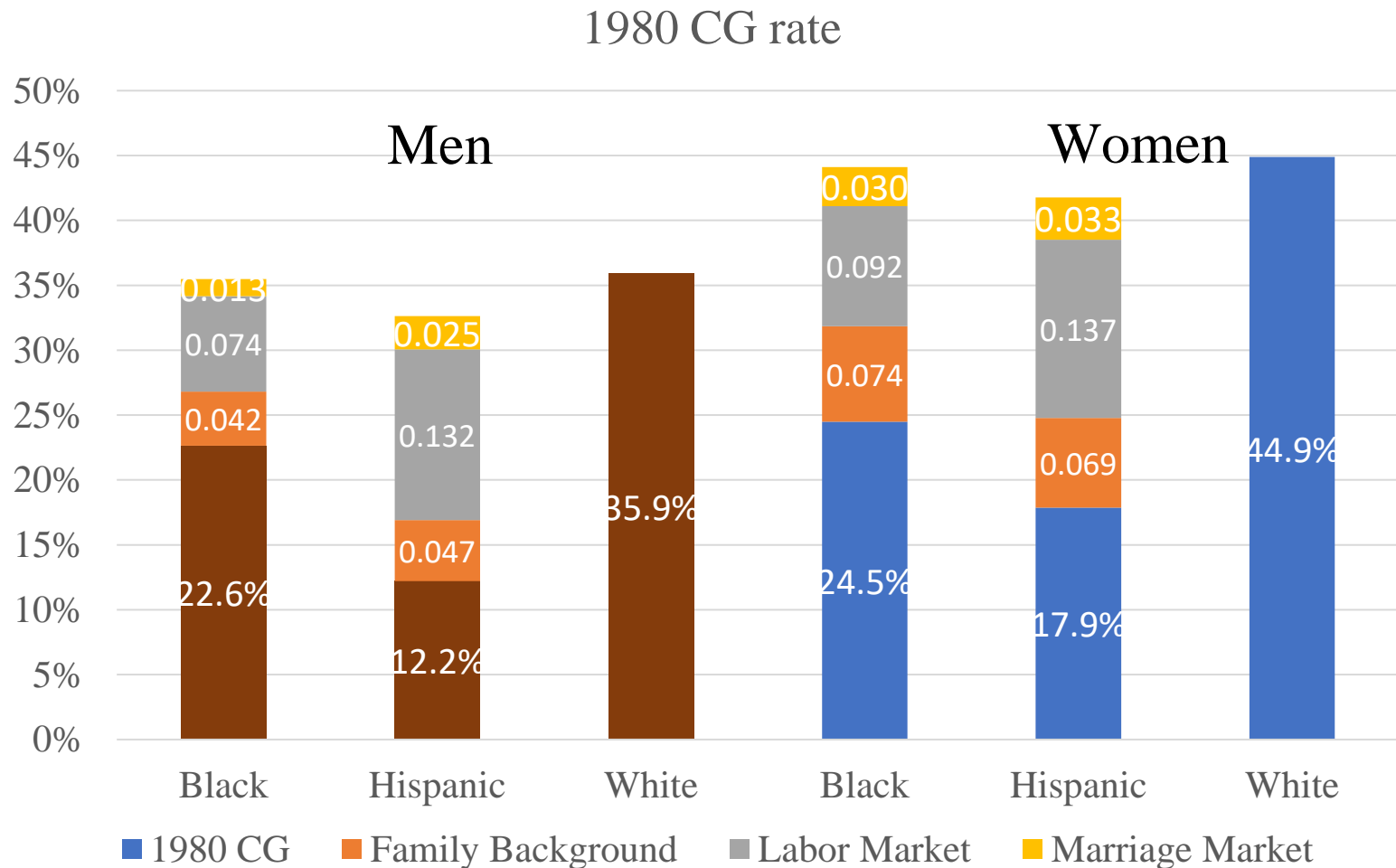
# Table 10: Factors Driving Increasing Education from 1960 to 1980 Cohorts: The marginal impact

CG rate - 1960 to 1980



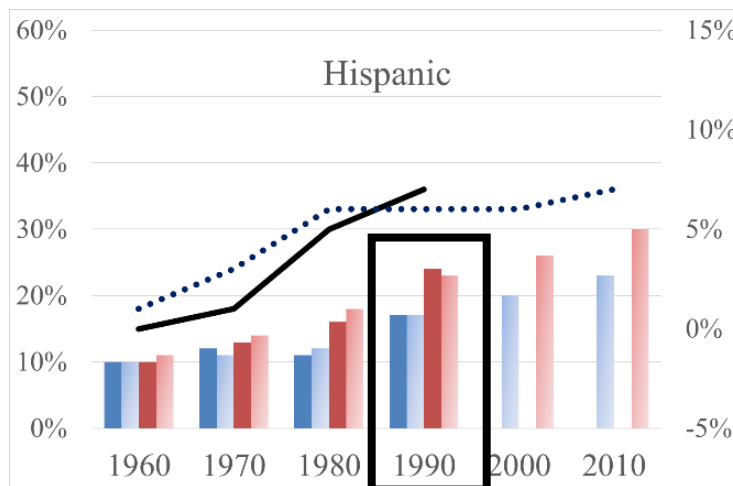
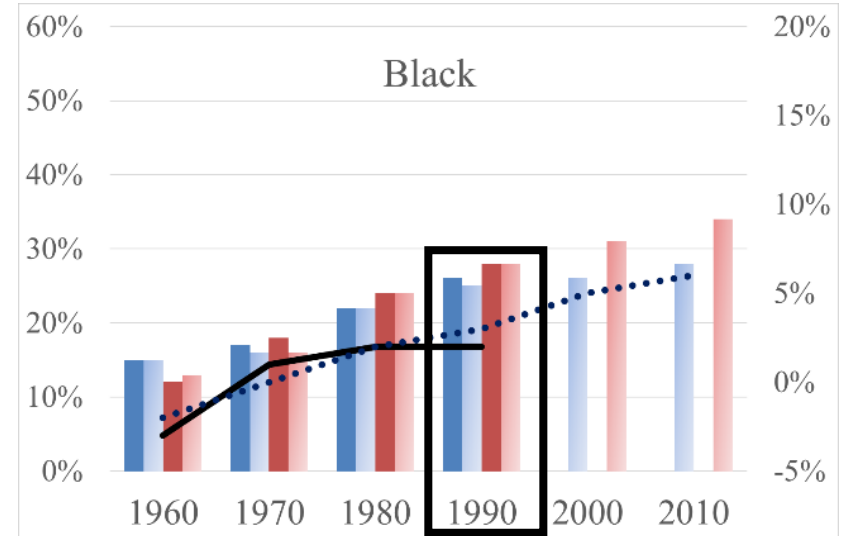
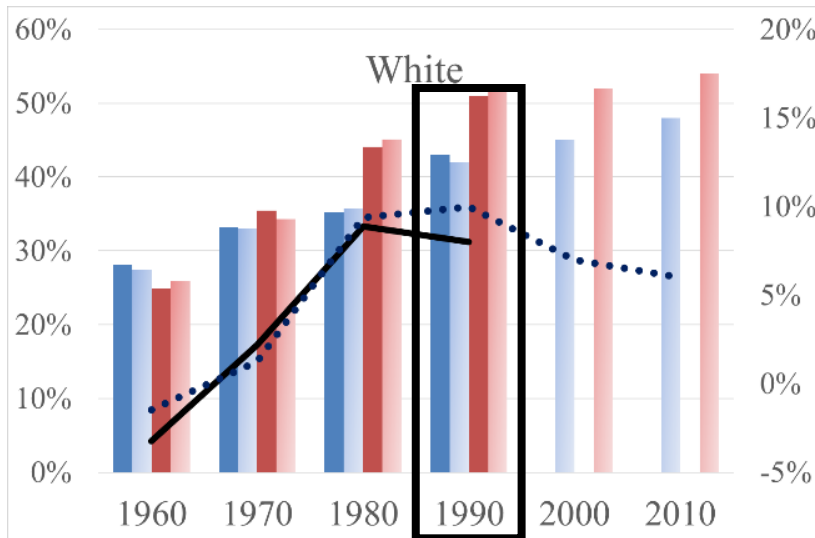
# What is the source for the CG gap between White to Blacks and Hispanics for 1980 cohort?

The contribution of the exogenous processes to the CG gap between groups: Give them the white PB, LM, MM



# Graduation Rates, 1990 to 2010 cohorts predicted to increase:

1990 to 2010 are based only on actual FB but LM and MM of 1980

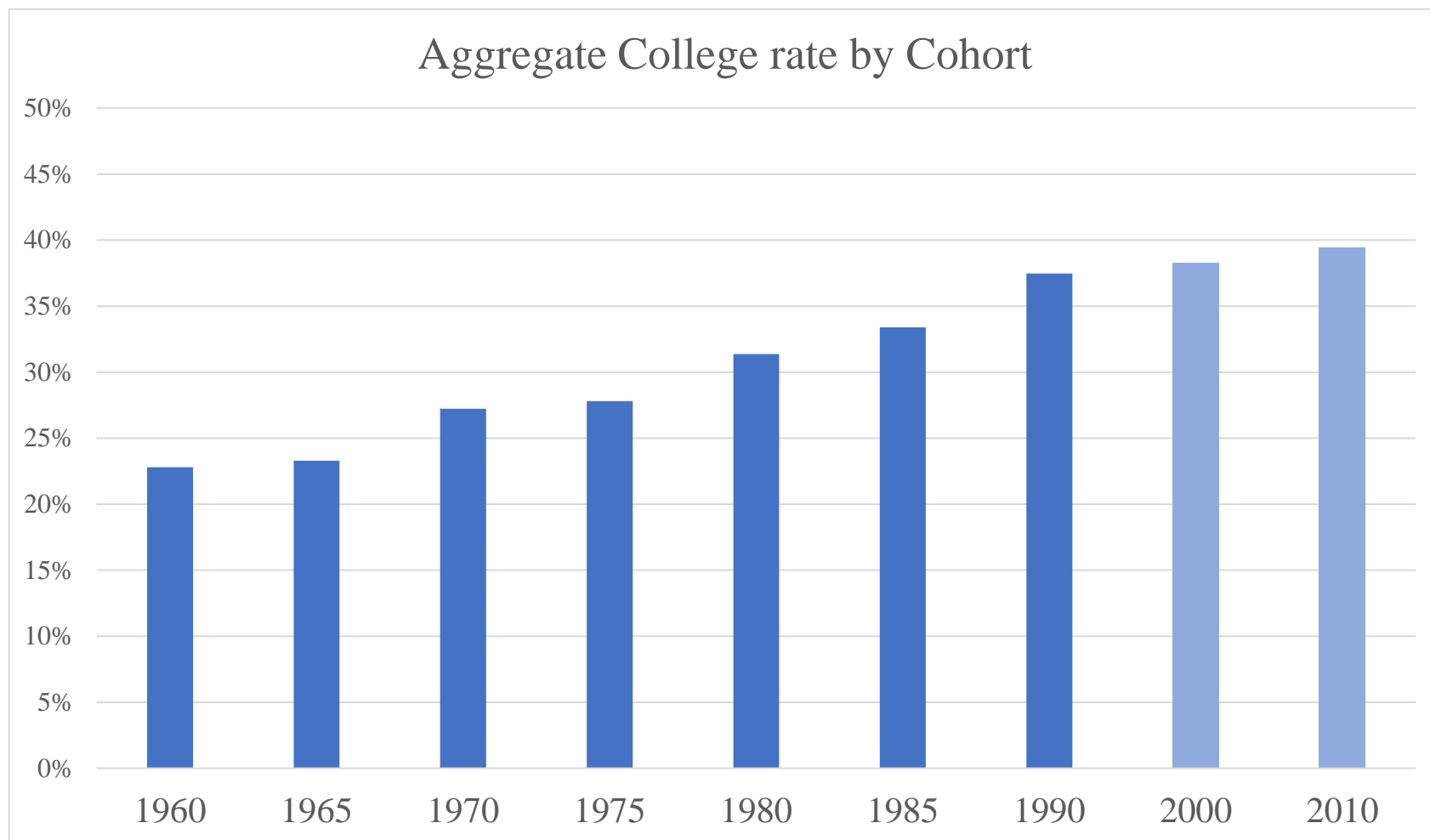


Dark – actual  
 Light – Predicted  
 Line - actual gap  
 Dots - predicted Gap

**Fit for 1990 CG is almost perfect based on 1990 FB and 1980 LM and MM**

# Why is aggregate college enrolment almost flat? Demographics: More Hispanic and Black

**Predicted aggregate CG rate is almost flat 1990, 2000, and 2010 cohorts**



**Share of whites 63% to 57% and Hispanics from 25% to 35% from 1990 to 2010**

**Thanks**



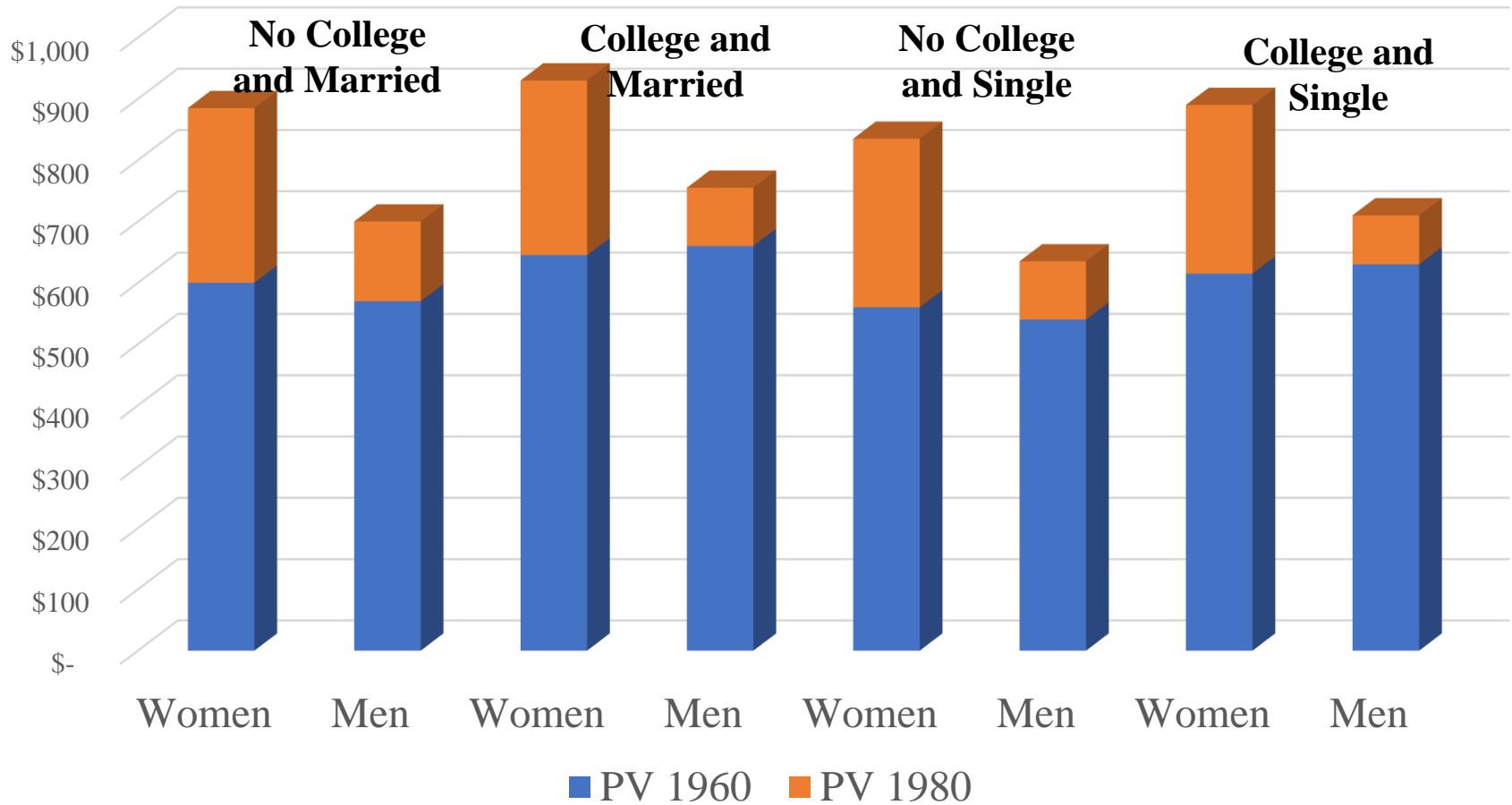


# Fit of Marriage and Divorce rates

	1960		1970		1980		1960		1970		1980		1960		1970		1980	
	White		White		White		Black		Black		Black		Hispanic		Hispanic		Hispanic	
	Actual	Fitted	Actual	Fitted	Actual	Fitted	Actual	Fitted	Actual	Fitted	Actual	Fitted	Actual	Fitted	Actual	Fitted	Actual	Fitted
<b>Family moments</b>																		
Marriage Rate - Ages 27-31	0.68	0.67	0.63	0.62	0.58	0.57	0.37	0.39	0.32	0.30	0.28	0.26	0.65	0.65	0.62	0.64	0.57	0.59
Marriage Rate - Ages 32-36	0.73	0.71	0.70	0.73	0.67	0.70	0.40	0.42	0.39	0.39	0.34	0.32	0.65	0.66	0.67	0.69	0.61	0.62
Marriage Rate - Ages 37-41	0.73	0.73	0.71	0.73	0.69	0.70	0.41	0.43	0.40	0.38	0.38	0.36	0.66	0.66	0.65	0.67	0.63	0.63
Divorce Rate - Ages 27-31	0.10	0.12	0.08	0.10	0.07	0.10	0.08	0.08	0.07	0.09	0.05	0.03	0.08	0.09	0.05	0.07	0.05	0.08
Divorce Rate - Ages 32-36	0.11	0.12	0.11	0.11	0.10	0.09	0.14	0.12	0.11	0.09	0.09	0.10	0.10	0.09	0.08	0.10	0.08	0.08
Divorce Rate - Ages 37-41	0.14	0.11	0.14	0.13	0.13	0.10	0.17	0.14	0.15	0.12	0.13	0.13	0.13	0.11	0.11	0.10	0.10	0.07

# Present Value of College by Type, for Whites (PV in 000 \$)

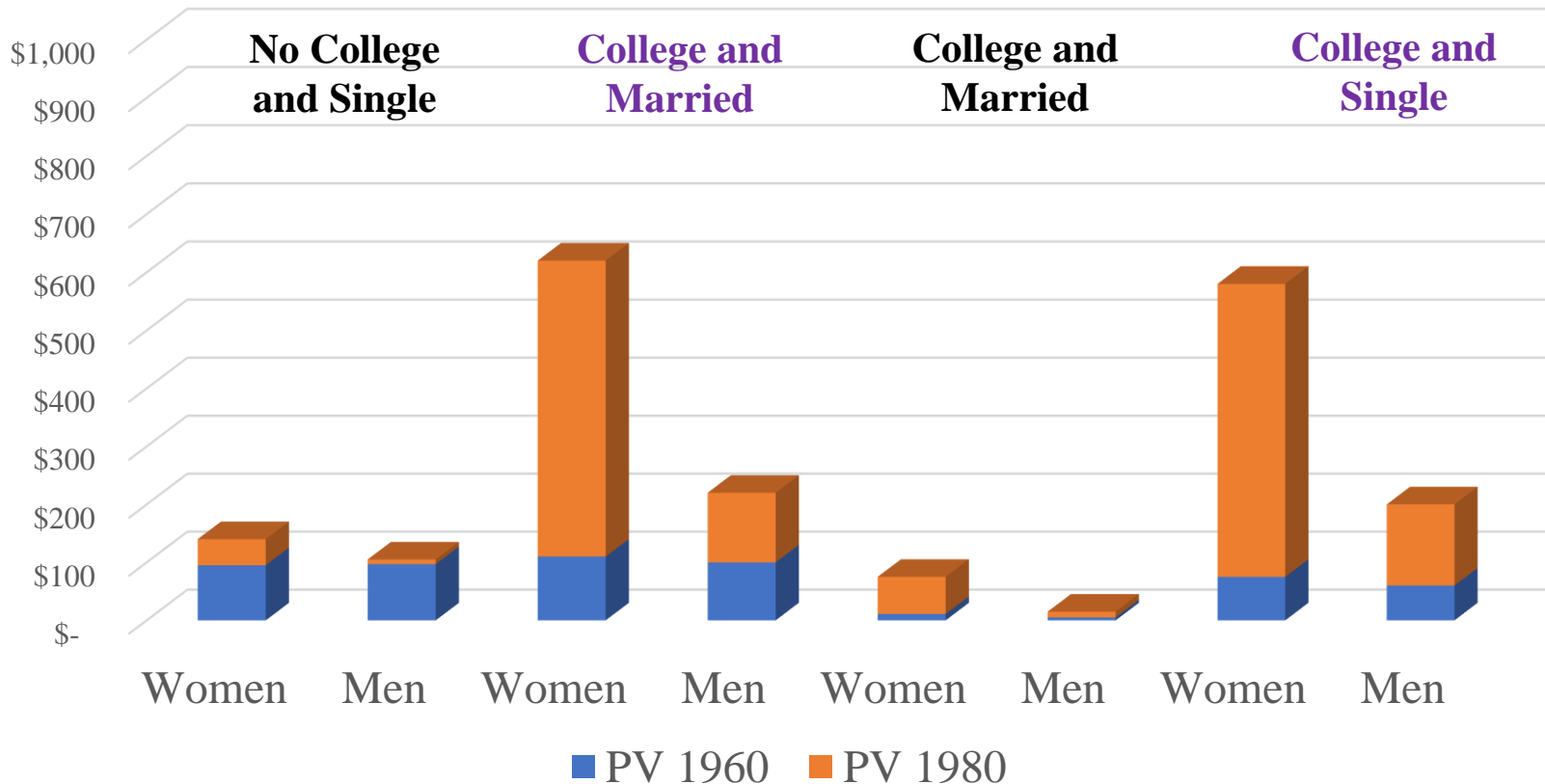
## PV of College - High Ability



**Above 85% of High ability individuals go to college in the 1960,  
Almost All go to college in the 1980 cohort**

# Present Value of College by Type, for Whites (PV in 000 \$)

## PV of College - Medium Ability



**Medium-ability individuals rarely go to college in the 1960 cohort (compare to 30% of men)**  
**Almost all Women with CG mother go to college in the 1980 cohort (compare to 30% of men)**