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Gender Differences in the Returns to Education over Time for Married Couples

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Research Article

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Abstract: Using US Census data from 1960 to 2000 and American Community Survey data from 2010, this paper analyzes gender differences in the return to education for married couples. Results from this analysis show that the return to schooling has increased over time for both genders; however, the relative return to schooling for females has fallen since the 1990s. In 2010, married women who are under age 35 and are in the top 20 percent of the income distribution had lower returns to schooling compared to men. These results are consistent with several demographic shifts that occurred during the last half of the 20th century.

Keywords: marriage, human capital, returns to education, assortative mating

JEL Codes: J12, J24, J31

1 Introduction

This paper uses US Census data from 1960 to 2000 and American Community Survey (ACS) data from 2010 to analyze gender differences in the return to education over time. Most studies examining the return to schooling focus on the relationship between education and labor earnings. This paper focuses on the relationship between education and family income. Using a sample of married individuals, we estimate the family income return to schooling for husbands and wives in each decade and compare how these returns have changed over time.

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For married individuals, family income derives mainly from the personal income of each partner, and for most individuals, personal income is mainly comprised individual labor earnings.[1] Examining family income is appropriate when studying the return to education for couples because education serves two purposes. First, schooling provides skills that increase productivity and, therefore, earnings. This is education's direct effect on financial well-being. Second, educational institutions serve as a marriage market (e.g. Goldin 1992). Receiving more education increases the probability of marrying someone with more schooling and higher earnings. Additionally, research suggests that a spouse's education bestows a positive return to own-labor earnings by augmenting own-productivity (e.g. Benham 1974; Jepsen 2005; Jolly 2019). These are education's indirect effects on financial well-being. Examining family income for couples captures the direct and indirect effects of education on total financial well-being.

It is reasonable to expect that the total financial return (i.e. the total family income return) to education has grown for both genders. This growth is due to increases in the direct and indirect effects of education for both men and women. With regards to the direct effect, research shows that, regardless of gender, the return to schooling with respect to labor earnings has increased over time (Dougherty 2005; Jepsen 2005; Jolly 2019; Kim and Sakamoto 2017; Levy and Murnane 1992; Long 2010). As Long (2010) notes, researchers point to changes in the relative supply and demand of college graduates for the increase in these returns to education.

Temporal changes in assortative mating with respect to education (educational homogamy) and earnings (economic homogamy) suggest an increasing indirect effect of education on total financial well-being for both genders. Mare (1991), Schwartz and Mare (2005), and Eika, Mogstad, and Zafar (2019) show that educational homogamy strengthened throughout the 20th century. Individuals with similar levels of schooling should have relatively similar labor earnings. Therefore, higher rates of educational homogamy should lead to increases in economic homogamy.[2] Gonalons-Pons and Schwartz (2017) show that economic

1 Contributions to family income can come from sources outside of the couple, such as the earnings of an adult child living at home. Similarly, personal income may derive from sources other than labor earnings, such as income from transfer payments. However, for the majority of individuals, family income equals the sum of own and spouse personal incomes, and personal income equals labor earnings. As an example, this is true for approximately 75% of individuals in the 2010 analytical sample used here.

2 Nakosteen and Zimmer (2001) provide evidence suggesting that partners sort into marriage based upon earnings and unobservable earnings traits. Positive matching on earnings is consistent with the idea that gains from marriage arise from the joint consumption of goods purchased in the market (Lam 1988).

homogamy has strengthened since the 1970s. The authors attribute the rise in economic homogamy to changes in the division of paid labor in the household and the rise in dual-earner marriages.

The preceding discussion suggests that the total income return to education should increase for married men and women because of growth in the direct and indirect returns to schooling. This does not mean that the level or growth in the financial return to education should be the same across gender. In fact, various historical institutions and social norms suggest that the family income return to schooling should be higher for women relative to men. However, changes in these institutions and norms indicate that this relatively higher return should have declined over time. In other words, while the total financial return to schooling should be higher for women, it should have grown faster for men. This would be due to gender differences in the evolution of the direct and indirect returns to education.

Goldin (2006), Kim and Sakamoto (2017), and Jolly (2019) provide a detailed account of changes to institutions and social norms that affected the labor earnings return to education for women throughout the 20th century. Before the 1930s, women, particularly married women, had few labor market opportunities, and their labor force participation was low (Goldin 2006). As Goldin (2006) notes, a stigma associated with married women working existed because the jobs available at the time were considered dangerous and dirty. Marriage bars existed, and part-time work schedules were nearly non-existent. Married women who were able to obtain professional occupations were mainly employed as teachers and clerical workers. Goldin (2006) emphasizes that the earnings return to education for married women was rather low.

These institutions and social norms suggest that married women would have a low direct return to education; however, since no stigma, marriage bars, or part-time employment options existed for married men, the indirect return to schooling for women would be rather large. In fact, Goldin (1997) indicates that half of the total return to schooling for female college graduates between 1945 and 1960 was attributed to marrying a high-earning spouse (Kim and Sakamoto 2017). The opposite would be true for married men. They would have a relatively higher direct, and lower indirect, return to education. The relatively higher indirect return to schooling for married women suggests that they would also experience a relatively higher total family income return to schooling compared to married men.

From the 1930s–1950s, marriage bars were nearly eliminated, part-time work schedules expanded in popularity, and the demand for office and clerical workers rose (Goldin 2006), which reduced the stigma associated with working wives and expanded women's labor market opportunities. Beginning in the 1960s, women

began expecting longer working lives with more employment stability (Goldin 2006). In preparation for prolonged employment, women began enrolling in college at rates faster than their male counterparts (Goldin, Katz, and Kuziemko 2006). By the 1980s, female college enrollment/completion rates surpassed those of men (Goldin 1992, 2006; Goldin, Katz, and Kuziemko 2006; Kim and Sakamoto 2017; Van Bavel, Schwartz, and Esteve 2018). Additionally, during this period, gender gaps in college major, graduate/professional school completion, and occupation declined (Goldin 2006). These shifts lead to an increase in earnings and the return to schooling for women relative to men (Goldin 2006; Gonalons-Pons and Schwartz 2017; Stevenson and Wolfers 2007). In fact, evidence indicates that the return to education is higher for women than men (Dougherty 2005; Kim and Sakamoto 2017). Dougherty (2005) describes how this may be due to an inverse relationship between educational attainment and discrimination and tastes for work. These demographic and economic shifts that occurred throughout the last half of the 20th century suggest that the direct effect of education on financial well-being grew faster for women.

Furthermore, these demographic movements have changed economic and educational assortative mating patterns. Increases in female college attendance/completion and the relative rise in female labor earnings have led to large increases in the probability of observing couples where a wife earns more and has more education than her husband does (Van Bavel, Schwartz, and Esteve 2018). Moreover, marriages where the wife earns more and has more education are more stable now than in the past (Van Bavel, Schwartz, and Esteve 2018). All else equal, these changes inherently imply that the indirect return to schooling may have grown faster for men than for women. Faster growth in the indirect return to schooling for married men suggests that they should also experience faster growth in the total family income return to education.

While these changes suggest that the total financial return to education should increase over time, with the increase being higher for men, the earlier literature provides conflicting results. Kim and Sakamoto (2017) find evidence supporting this hypothesis using a sample of individuals aged 35–44 from the 1990 and 2000 US Census and the 2009–2011 ACS. DiPrete and Buchmann (2006) find opposing evidence using a sample of 25–34-year olds from the 1964–2002 March Current Population Survey.

We contribute to this literature by expanding upon the previous analyses. While informative and important in contribution, the earlier papers were limited in a few areas. DiPrete and Buchmann (2006) restrict their analysis to a comparison of average incomes between high school graduates and those with at least a college degree. Additionally, the authors analyze a sample of individuals aged 25–34, with the bulk of their estimates for the 30–34-year old age group.

Kim and Sakamoto (2017) limit their analysis to those aged 35–44. More importantly, the earlier papers were limited in their comparison of returns to education across different demographic groups. DiPrete and Buchmann (2006) do separate their samples by whether the individual is white or black; however, again, their analysis is limited to a comparison of mean incomes between two education groups. Kim and Sakamoto (2017) provide no heterogeneity analysis with respect to the relative returns to schooling.[3] Instead, since family income changes because of fluctuations in own and spouse labor earnings and other sources of income, the literature focused on decomposing the temporal changes in returns to schooling into changes in these income components.

In this paper, we use a sample of individuals aged 25–55 and investigate heterogenous returns to education by delineating the sample by age and race and by using quantile regression techniques. Understanding how returns to schooling by gender have changed for various demographic groups is important. Labor market outcomes and assortative mating patterns determine the total financial return to education, and these factors vary across demographic groups. For example, older individuals may feel constrained by past social norms regarding female educational and occupational outcomes, whereas younger individuals make human capital investments in preparation for longer working lives. Additionally, whereas negative assortative mating with respect to earnings was prevalent historically because of specialization within the household, it is now much more common for positive mating with respect to earnings due to the demographic changes described above, particularly the dual-earner household (Stevenson and Wolfers 2007). Therefore, changes in the relative income returns to schooling may be different for older versus younger workers. Eika, Mogstad, and Zafar (2019) present evidence showing that whites and blacks have different educational assortative mating patterns; thus, relative income returns to education may differ by race. The extensions here will have implications for the decomposition analyses performed in the earlier literature. We further build upon the literature by performing these decompositions for each of the subgroups investigated here.

3 Kim and Sakamoto (2017) do run separate regressions by age group and race. They estimate those regressions using a combined sample of men and women. Their sample also includes married and single individuals. Their estimated equations include controls for gender and educational attainment. However, they do not include any interaction between their female binary variable and their education variables. Therefore, those regressions cannot compare the relative return to education for married women across different sub-groups. Instead, the authors used those regressions to compare the coefficients associated with a female dummy variable over time across age and race groups.

This paper proceeds by discussing the data and methodology used throughout the analysis. It then presents and discusses the results before offering concluding remarks.

2 Data & Methodology

We use IPUMS data from the 1960–2000 US Census and 2010 ACS (Ruggles et al. 2020). The 1960 and 1980–2000 data are from the 5% IPUMS samples, and the 1970 data are from the 1% form two state sample. The sample used here includes individuals who report being a household head or a spouse of a household head in an opposite-sex married couple with spouse present. We restrict the sample to individuals in couples where each partner is 25–55 years old and where neither partner is employed in the military, self-employed, an unpaid family worker, or is enrolled in school.[4]

The estimated equation is

$$\log(y_i) = \beta_0 + \sum_{j=1}^{4} \gamma_j \text{education}_i + \sum_{j=1}^{5} \delta_j \text{education}_i * \text{female}_i + x_i'\beta_1 + \varepsilon_i. \quad (1)$$

Following the earlier literature, the dependent variable is the natural log of family equivalized income.[5] Equivalized income equals family income divided by the square root of family size. The Census and ACS gather data on income from the calendar year preceding the survey. Since the last survey year is 2010, we convert all nominal dollar amounts to 2009 dollars using the Consumer Price Index for All Urban Consumers. The vector x includes a quadratic in age and binary variables for race and geographic region of residence. Finally, ε represents the error term.

The vector *education* consists of four educational attainment dummy variables. The four dummies include high school degree/GED, some college/associate degree, college degree, and beyond college (master's, professional, or doctoral degree).[6] Less than a high school degree is the omitted category. The term

4 In the 1960 Census, the question inquiring about school enrollment was not asked of respondents older than 34. To maintain comparability across the six decades, the 1960 sample includes couples where neither spouse is enrolled in school or where either spouse is at least 35 years old.

5 Individuals can report negative family income. Using the natural log of income removes those individuals from the analysis. In any decade, less than 0.4% of the sample report negative income. We replicated the analysis using family equivalized income in level form. The main qualitative results are unchanged and available upon request.

6 From 1960 to 1980, the Census obtained information on years of completed schooling instead of educational categories. For those years, the high school degree category is completing 12 years

*education*female* is an interaction between the educational categories and a female binary variable. Estimates of δ_j show the difference in the returns to schooling for women relative to men. Note how *female* is not in the *x* vector. This allows for an interaction between all five education categories and the *female* variable. Therefore, men with less than a high school degree represent the reference group.

We estimate Eq. (1) separately for each decade. Since the dataset consists of married individuals, equivalized income appears twice, once for the husband and once for the wife. Therefore, we cluster standard errors at the couple level and use survey weights throughout the analysis. Given the demographic changes described above, we expect that estimates of γ_j will grow while estimates of δ_j will decline over time.

3 Results

3.1 Gender Differences in Returns to Schooling

Table 1 displays descriptive statistics (means and proportions) of selected variables. Earnings and full-time work increased faster for women relative to men.[7] Female labor earnings increased from $6,231 in 1960 to $29,740 in 2010, a 377% increase. During this period, the percent of married women working full-time increased from 16 to 52%, a 223% increase. For husbands, the comparable increases were 49 and 0.3%. During this same period, family equivalized income increased 99%. These descriptive statistics suggest that the large gains in family income were mainly due to the labor market advances made by married women relative to married men. Educational attainment also increased faster for married women. In 1960, 5.77% of women completed at least a college degree. This increased to 37% by 2010. During this time, the percent of married men with at least a college education increased from 11 to 35%.

of schooling, the some college category includes completing three or fewer years of college, the college degree category equals four years of college, and the beyond college category includes five or more years of college.

7 From 1980 to 2010, we define full-time work as working at least 35 h per week for at least 40 weeks during the previous year. From 1960 to 1970, we define full-time work as working at least 35 h during the previous week and at least 40 weeks during the previous year. This difference in definition is due to different survey questions available in 1960 and 1970. During those years, the Census asked about hours worked during the previous week instead of average weekly hours during the previous year.

Table 1: Descriptive statistics.

	1960	1970	1980	1990	2000	2010
Female						
Annual earnings (2009 $)	6,231.59	10,380.58	14,435.23	21,069.61	26,161.27	29,740.91
Age	37.80	38.31	37.52	37.96	39.67	41.02
% Full-time	16.13	20.87	33.53	45.44	50.67	52.10
White	91.13	90.68	89.57	89.91	87.83	86.22
Black	8.17	8.07	7.88	6.35	6.80	5.85
Other race	0.70	1.25	2.54	3.74	5.37	7.93
Education						
<High school	47.35	35.23	22.43	15.06	12.52	8.51
High school	36.58	44.20	45.36	37.29	29.97	23.68
Some college	10.31	12.48	18.19	27.74	31.16	30.56
College graduate	4.41	5.82	8.77	13.88	18.03	24.08
Above college	1.36	2.26	5.25	6.03	8.32	13.17
Male						
Annual earnings (2009 $)	41,548.49	55,453.68	55,477.64	56,615.44	60,842.98	62,030.77
Age	40.52	40.88	39.91	40.11	41.53	42.80
% Full-time	82.48	83.91	86.86	86.32	86.51	82.72
White	91.16	90.80	89.70	90.07	87.99	86.54
Black	8.17	8.13	8.08	6.61	7.24	6.45
Other race	0.67	1.08	2.22	3.32	4.77	7.01
Education						
<High school	53.06	39.32	24.64	16.58	14.09	10.27
High school	25.17	32.55	34.53	31.27	29.03	26.64
Some college	10.64	12.82	18.56	26.76	28.58	27.94
College graduate	6.42	8.19	11.41	15.79	17.90	21.84
Above college	4.71	7.12	10.87	9.61	10.39	13.31
Equivalized family income	27,774.22	37,822.63	42,058.45	47,694.86	53,665.97	55,282.80
N	1,899,674	407,598	2,118,080	2,288,483	2,520,305	466,904

The sample includes married, with spouse present, individuals where both partners are aged 25 to 55, and neither spouse is currently enrolled in school, works in the military, is self-employed, or is an unpaid family worker.

Table 2 presents results from estimating Eq. (1) using the full sample. We only show the coefficients associated with the education variables as they are the ones of interest. The full set of results is available upon request. Estimates of γ_j, which

Table 2: Family income returns to education – entire sample.

	1960	1970	1980	1990	2000	2010
High school	0.2546***	0.2402***	0.3162***	0.3848***	0.4148***	0.4881***
	(0.0013)	(0.0029)	(0.0017)	(0.0022)	(0.0024)	(0.0068)
Some college	0.3831***	0.3876***	0.4530***	0.5844***	0.6328***	0.7565***
	(0.0018)	(0.0038)	(0.0019)	(0.0022)	(0.0024)	(0.0066)
College degree	0.5433***	0.5753***	0.6463***	0.8605***	0.9523***	1.1194***
	(0.0022)	(0.0045)	(0.002)	(0.0024)	(0.0026)	(0.0068)
Post college	0.5606***	0.6263***	0.6871***	0.9792***	1.0942***	1.3324***
	(0.0026)	(0.0049)	(0.0021)	(0.0027)	(0.003)	(0.0074)
<High school*female	0.0373***	0.0361***	0.0438***	0.0415***	0.0141***	−0.0110*
	(0.0006)	(0.0017)	(0.0012)	(0.0018)	(0.0021)	(0.0061)
High school*female	0.0491***	0.0619***	0.0642***	0.0622***	0.0383***	0.0016
	(0.0010)	(0.0018)	(0.0008)	(0.0011)	(0.0013)	(0.0037)
Some college*female	0.0690***	0.0951***	0.0913***	0.0880***	0.0469***	0.0024
	(0.0020)	(0.0039)	(0.0014)	(0.0012)	(0.0012)	(0.0033)
College degree*female	0.0781***	0.0884***	0.0590***	0.0714***	0.0459***	0.0178***
	(0.0028)	(0.0052)	(0.0019)	(0.0016)	(0.0016)	(0.0035)
Post college*female	0.1641***	0.1636***	0.1341***	0.0816***	0.0516***	0.0310***
	(0.0045)	(0.0075)	(0.0021)	(0.0024)	(0.0023)	(0.0046)
R^2	0.22	0.20	0.18	0.25	0.25	0.29
N	1,899,674	407,598	2,118,080	2,288,483	2,520,305	466,904

*, **, *** statistically significant at the 10, 5, and 1 percent level, respectively. Robust standard errors clustered at the household level are in parentheses. The dependent variable is the log of family equivalent income. All regressions include a quadratic in age and dummies for race and geographic region. The omitted categories include men with less than a high school diploma, white, and the Northeast. The sample includes individuals aged 25–55 with spouses aged 25–55, neither spouse is enrolled in school, and neither spouse is employed in the military, is self-employed, nor is an unpaid family worker.

is the man's return to education, are in the first four rows. Estimates of δ_j, which is the relative difference in returns to schooling between women and men, are in the subsequent five rows. As an example, for interpretation, in 1960, men with a college degree earned 72% ($= e^{0.5433} - 1$) more than men with less than a high school degree. College educated women earned 86% ($= e^{0.5433+0.0781} - 1$) more than men with less than a high school degree.

Estimates of γ_j are positive and increase over time for each educational category. Aside from women with less than a high school degree in 2010, each estimate of δ_j is positive. Therefore, women have a relatively higher financial return to schooling. This relative return remained stable from 1960 to 1990. However, from 1990 to 2010, this return declined across each educational category. To better visualize the temporal changes in these coefficients, they are plotted

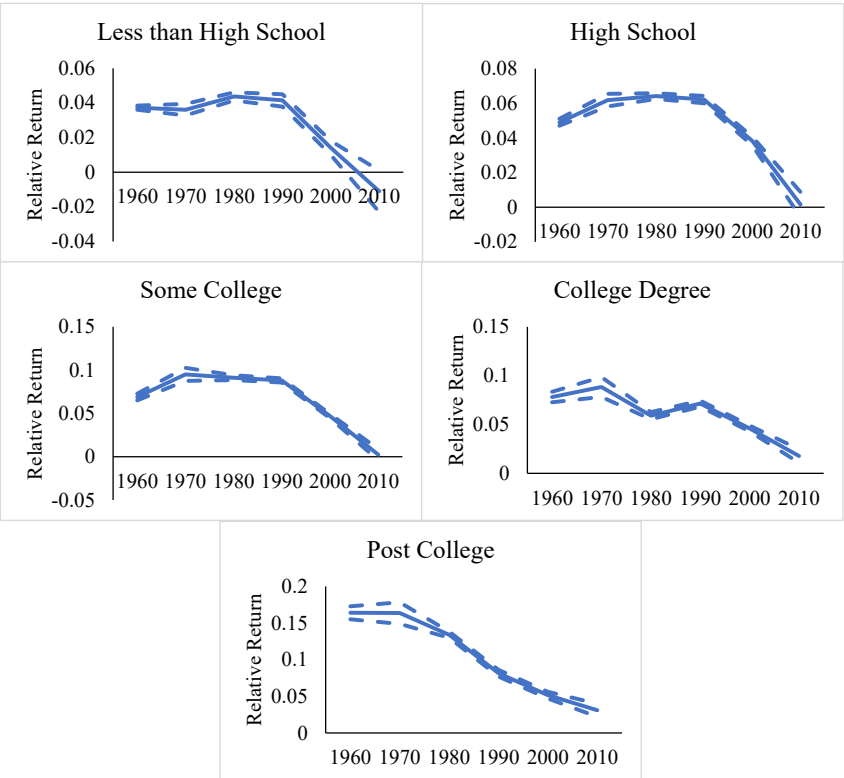

Figure 1: Female relative return to education over time – entire sample.

in Figure 1 along with a 95% confidence interval. By 2010, only women with at least a college degree had significantly higher returns to schooling than men. Married women with less than a high school degree earned significantly less than their male counterparts. Therefore, the financial return to schooling increased for married men (estimates of γ_j) and women (estimates of $\gamma_j + \delta_j$). However, the increase was larger for men.

Table 3 separates the sample by age group: ages 25–34 in panel A, 35–44 in panel B, and 45–55 in panel C. As above, we plot the estimates of δ_j in Figures 2–4, respectively. Regardless of age, results follow the same qualitative pattern of Table 2. In other words, the financial return to schooling increased over time faster for men than for women. However, there is heterogeneity across groups. In 2010, only 45–55-year old married women experience higher returns to schooling than men. The relative returns for women aged 35–44 are insignificant for each educational category; married women between 25 and 34 years old have significantly lower returns to schooling than men for each category except post-college.

Table 3: Family income returns to education by age group.

	1960	1970	1980	1990	2000	2010
Panel A: ages 25–34						
High school	0.2376***	0.2319***	0.3411***	0.3872***	0.4082***	0.4940***
	(0.0024)	(0.0059)	(0.0035)	(0.0043)	(0.0050)	(0.0160)
Some college	0.3463***	0.3923***	0.4838***	0.6076***	0.6583***	0.8099***
	(0.0032)	(0.0071)	(0.0037)	(0.0043)	(0.0048)	(0.0150)
College degree	0.4839***	0.5651***	0.6775***	0.9263***	1.0289***	1.2285***
	(0.0035)	(0.0081)	(0.0038)	(0.0045)	(0.0051)	(0.0150)
Post college	0.4882***	0.6025***	0.7286***	1.0273***	1.1444***	1.3736***
	(0.0046)	(0.0092)	(0.0041)	(0.0061)	(0.0066)	(0.0169)
<High school*female	−0.0253***	−0.0395***	−0.0052*	−0.0343***	−0.0430***	−0.0477***
	(0.0017)	(0.0047)	(0.0031)	(0.0040)	(0.0045)	(0.0144)
High school*female	0.0231***	0.0254***	0.0338***	0.0036*	−0.0293***	−0.0956***
	(0.0017)	(0.0033)	(0.0016)	(0.0020)	(0.0029)	(0.0100)
Some college*female	0.0670***	0.0539***	0.0670***	0.0342***	−0.0166***	−0.0751***
	(0.0032)	(0.0063)	(0.0021)	(0.0022)	(0.0025)	(0.0079)
College degree*female	0.0926***	0.0808***	0.0565***	0.0457***	0.0109***	−0.0371***
	(0.0041)	(0.0081)	(0.0027)	(0.0027)	(0.0029)	(0.0071)
Post college*female	0.1838***	0.1674***	0.1358***	0.0818***	0.0462***	0.0513***
	(0.0084)	(0.0129)	(0.0034)	(0.0057)	(0.0055)	(0.0103)
R^2	0.20	0.17	0.15	0.23	0.27	0.33
N	609,235	129,904	796,302	759,278	638,807	100,051
Panel B: ages 35–44						
High school	0.2422***	0.2198***	0.3155***	0.3905***	0.4171***	0.5044***
	(0.0020)	(0.0049)	(0.0029)	(0.0039)	(0.0039)	(0.0117)
Some college	0.3745***	0.3551***	0.4592***	0.5797***	0.6250***	0.7811***
	(0.0028)	(0.0062)	(0.0032)	(0.0039)	(0.0038)	(0.0113)
College degree	0.5437***	0.5466***	0.6421***	0.8320***	0.9508***	1.1549***
	(0.0035)	(0.0072)	(0.0036)	(0.0041)	(0.0041)	(0.0114)
Post college	0.5533***	0.6041***	0.6901***	0.9863***	1.0955***	1.3899***
	(0.0040)	(0.0077)	(0.0035)	(0.0045)	(0.0049)	(0.0124)
<High school*female	0.0434***	0.0515***	0.0757***	0.0774***	0.0242***	0.0012
	(0.0015)	(0.0040)	(0.0028)	(0.0040)	(0.0040)	(0.0115)
High school*female	0.0592***	0.0778***	0.0785***	0.0872***	0.0386***	−0.0021
	(0.0016)	(0.0036)	(0.0016)	(0.0021)	(0.0021)	(0.0073)
Some college*female	0.0717***	0.1145***	0.0920***	0.1084***	0.0453***	−0.0016
	(0.0033)	(0.0069)	(0.0027)	(0.0020)	(0.0021)	(0.0060)
College degree*female	0.0613***	0.0837***	0.0392***	0.0619***	0.0261***	−0.0026
	(0.0048)	(0.0094)	(0.0037)	(0.0027)	(0.0027)	(0.0063)
Post college*female	0.1527***	0.1598***	0.1173***	0.0752***	0.0361***	−0.0034
	(0.0074)	(0.0131)	(0.0038)	(0.0036)	(0.0043)	(0.0078)
R^2	0.19	0.17	0.15	0.21	0.21	0.29
N	754,272	145,843	713,272	901,414	1,011,239	169,786

Table 3: (continued)

	1960	1970	1980	1990	2000	2010
Panel C: ages 45–55						
High school	0.2705***	0.2488***	0.2909***	0.3734***	0.4130***	0.4655***
	(0.0026)	(0.0047)	(0.0026)	(0.0035)	(0.0041)	(0.0098)
Some college	0.4137***	0.3974***	0.4090***	0.5708***	0.6216***	0.7082***
	(0.0035)	(0.0066)	(0.0031)	(0.0036)	(0.0040)	(0.0097)
College degree	0.6056***	0.5981***	0.6172***	0.8354***	0.8999***	1.0295***
	(0.0051)	(0.0082)	(0.0034)	(0.0041)	(0.0043)	(0.0101)
Post college	0.6371***	0.6633***	0.6476***	0.9482***	1.0730***	1.2604***
	(0.0052)	(0.0088)	(0.0035)	(0.0043)	(0.0046)	(0.0109)
<High school*female	0.0632***	0.0560***	0.0490***	0.0704***	0.0611***	0.0182
	(0.0015)	(0.0036)	(0.0022)	(0.0035)	(0.0044)	(0.0111)
High school*female	0.0703***	0.0709***	0.0757***	0.0943***	0.0899***	0.0539***
	(0.0027)	(0.0038)	(0.0018)	(0.0022)	(0.0023)	(0.0055)
Some college*female	0.0635***	0.1010***	0.1174***	0.1209***	0.0991***	0.0457***
	(0.0045)	(0.0079)	(0.0033)	(0.0028)	(0.0022)	(0.0053)
College degree*female	0.0724***	0.0842***	0.0572***	0.0712***	0.0653***	0.0468***
	(0.0068)	(0.0117)	(0.0044)	(0.0041)	(0.0031)	(0.0063)
Post college*female	0.1484***	0.1490***	0.1126***	0.0593***	0.0429***	0.0202**
	(0.0090)	(0.0147)	(0.0051)	(0.0047)	(0.0036)	(0.0082)
R^2	0.21	0.19	0.16	0.22	0.21	0.23
N	536,167	131,851	608,506	627,791	870,259	197,067

*, **, *** statistically significant at the 10, 5, and 1 percent level, respectively. Robust standard errors clustered at the household level are in parentheses. The dependent variable is the log of family equivalent income. All regressions include a quadratic in age and dummies for race and geographic region. The omitted categories include men with less than a high school diploma, white, and the Northeast. The sample includes individuals aged 25–55 with spouses aged 25–55, neither spouse is enrolled in school, and neither spouse is employed in the military, is self-employed, nor is an unpaid family worker.

The estimates in Table 3 highlight the importance of investigating differences in the relative return to schooling across various demographic groups. Kim and Sakamoto (2017) use a sample of individuals between 35 and 44 years old and obtain similar qualitative findings to those found here, i.e. there is no significant gender difference in the family income returns to schooling for married individuals. However, the results in Table 3 show that while the gap in returns to schooling has fallen for all ages, there is heterogeneity across age groups. Younger women (those younger than 45) have generally experienced faster declines in the relative return to schooling compared to older women; for the youngest women, this has led to a reversal in which gender possesses higher returns to education.

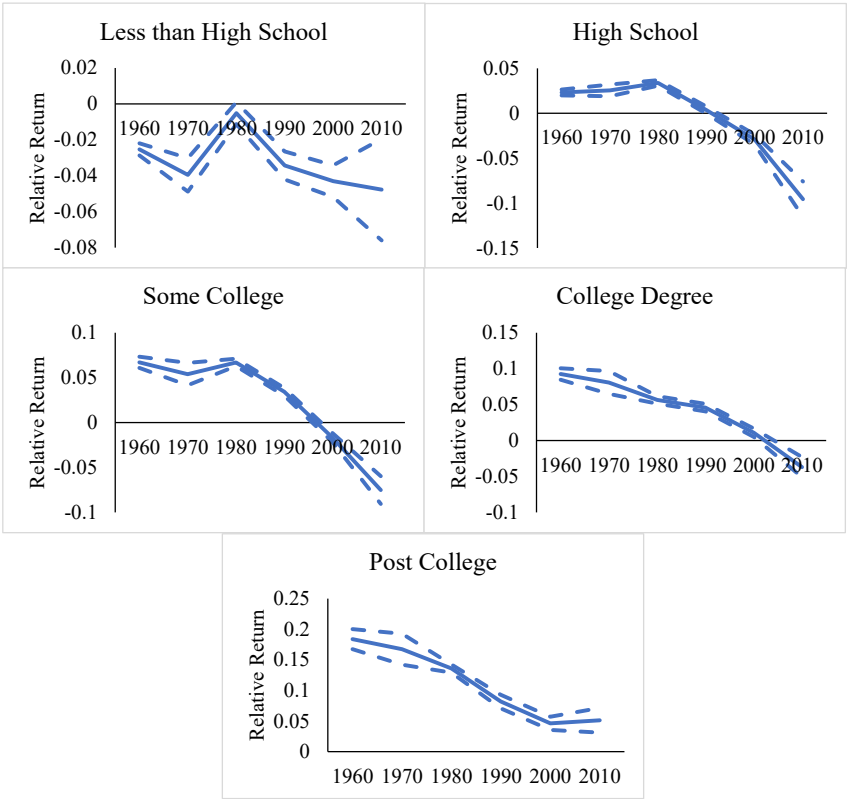

Figure 2: Female relative return to education over time – 25 to 34 years old.

Table 4 separates the sample by race. Panel A displays results from a sample where both partners are white; panel B presents estimates when each partner is black. Estimates of δ_j are plotted in Figures 5 and 6, respectively. White women consistently experienced higher returns to schooling than men did until 2000. By 2010, only white women with at least a college degree have significantly higher returns to schooling than their male counterparts, whereas white women with less than a high school degree earn less. Black women experience a different pattern of relative returns to education. From 1960 to 1990, black women with at least a college degree had a significantly higher return to education than black men did. By 2010, black women with less than a college degree experienced significantly lower returns.

Since assortative mating with regard to earnings strengthened over time (Gonalons-Pons and Schwartz 2017), the female relative return to schooling may have changed differently throughout the income distribution. To investigate this,

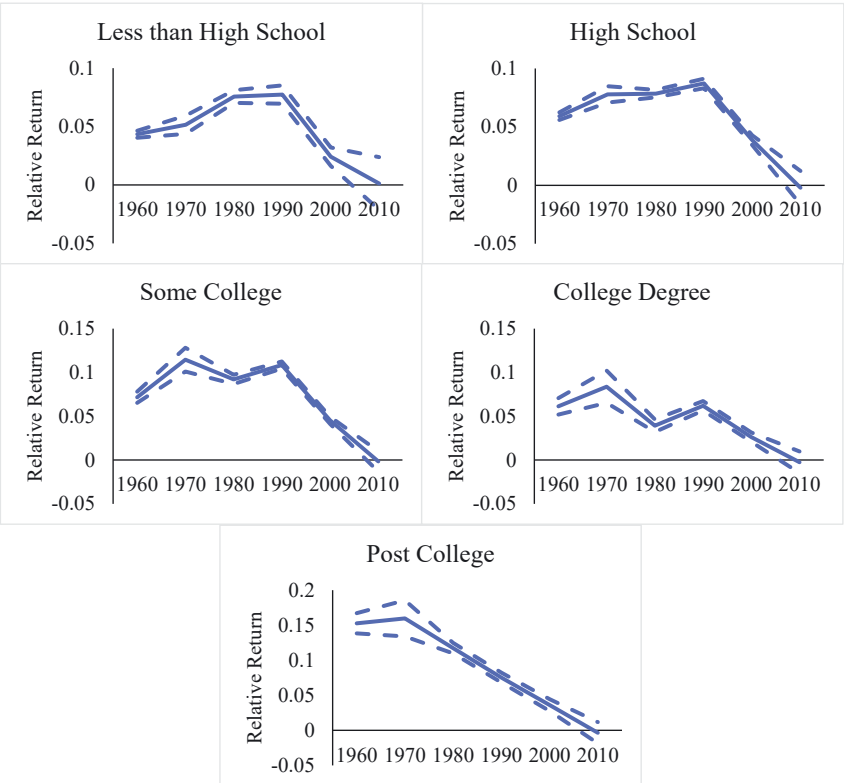

Figure 3: Female relative return to education over time – 35 to 44 years old.

we estimate Eq. (1) using quantile regressions for the second, fourth, fifth, sixth, and eighth deciles of the log equivalent income distribution. Because of the high-dimensional nature of the estimation (five educational categories across five percentiles of the distribution over six decades), presenting results becomes cumbersome. For easier presentation, we alter Eq. (1) in two ways. First, we add *female* to the vector of demographic controls. Second, we replace the educational dummies with a variable representing years of completed schooling.[8] Now, the coefficient associated with the education/female interaction represents the return

8 From 1990 onward, the Census and ACS categorize education in three different ways: degree completion (e.g. bachelor's degree), ranges of grades (i.e. completing Grades 1–4), and completed year of education (such as Grade 10). When constructing the years of schooling variable from 1990 to 2010, we define a high school degree equal to 12 grades, an associate's degree as two years of college, a bachelor's degree as four years of college, and a master's degree or above

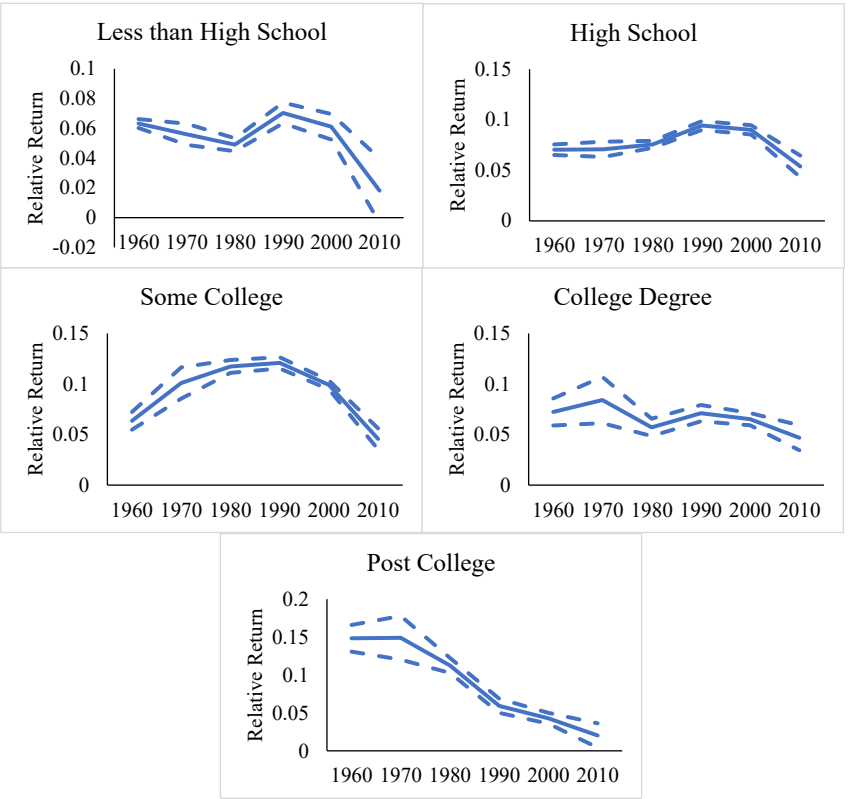

Figure 4: Female relative return to education over time – 45 to 55 years old.

to an additional year of schooling for women relative to men. The coefficients associated with the education/female interaction are in Table 5.

Regardless of decade, the relative return to schooling declines as family equivalized income increases; however, the coefficients from 1990 onwards are generally lower than in the earlier decades for each decile of the distribution. Furthermore, the gap in coefficients between decades grows with income. Therefore, the relative return to schooling has declined faster for women who are higher in the income distribution. To better visualize the comparisons, results from 1970 to 2010 appear in Figure 7.

equal to six years of college. When the response is a range of grades, we use the midpoint of the range. To maintain consistency across the six decades of data, we cap years of schooling at 19.

Table 4: Family income returns to education by race.

	1960	1970	1980	1990	2000	2010
Panel A: both partners white						
High school	0.2486***	0.2301***	0.3118***	0.3903***	0.4284***	0.5011***
	(0.0013)	(0.0030)	(0.0018)	(0.0024)	(0.0026)	(0.0073)
Some college	0.3754***	0.3745***	0.4444***	0.5850***	0.6395***	0.7640***
	(0.0018)	(0.0039)	(0.0019)	(0.0024)	(0.0025)	(0.0070)
College degree	0.5366***	0.5672***	0.6426***	0.8657***	0.9641***	1.1340***
	(0.0023)	(0.0046)	(0.0021)	(0.0025)	(0.0027)	(0.0072)
Post college	0.5490***	0.6160***	0.6761***	0.9818***	1.0967***	1.3261***
	(0.0026)	(0.0049)	(0.0022)	(0.0029)	(0.0032)	(0.0080)
<High school*female	0.0419***	0.0423***	0.0493***	0.0440***	0.0118***	−0.0181***
	(0.0007)	(0.0018)	(0.0013)	(0.0019)	(0.0022)	(0.0063)
High school*female	0.0518***	0.0665***	0.0691***	0.0652***	0.0397***	0.0033
	(0.0010)	(0.0019)	(0.0009)	(0.0011)	(0.0013)	(0.0039)
Some college*female	0.0708***	0.1009***	0.0967***	0.0938***	0.0513***	0.0053
	(0.0020)	(0.0039)	(0.0015)	(0.0013)	(0.0013)	(0.0035)
College degree*female	0.0687***	0.0847***	0.0570***	0.0711***	0.0442***	0.0123***
	(0.0028)	(0.0053)	(0.0019)	(0.0017)	(0.0016)	(0.0038)
Post college*female	0.1443***	0.1550***	0.1318***	0.0749***	0.0432***	0.0259***
	(0.0046)	(0.0078)	(0.0022)	(0.0025)	(0.0025)	(0.0052)
R^2	0.16	0.17	0.17	0.25	0.26	0.30
N	1,728,384	368,532	1,882,004	2,033,845	2,176,378	393,543
Panel B: both partners black						
High school	0.3023***	0.2966***	0.3100***	0.3241***	0.3100***	0.3685***
	(0.0072)	(0.0121)	(0.0061)	(0.0082)	(0.0095)	(0.0306)
Some college	0.4439***	0.5152***	0.4939***	0.5661***	0.5705***	0.6683***
	(0.0104)	(0.0178)	(0.0072)	(0.0082)	(0.0093)	(0.0306)
College degree	0.7565***	0.7570***	0.7005***	0.8324***	0.8616***	0.9893***
	(0.0161)	(0.0309)	(0.0096)	(0.0103)	(0.0107)	(0.0333)
Post college	0.9408***	0.9592***	0.8174***	0.9509***	1.0008***	1.2064***
	(0.0177)	(0.0319)	(0.0101)	(0.0133)	(0.0139)	(0.0367)
<High school*female	0.0012	−0.0206***	−0.0216***	−0.0175***	−0.0206**	−0.0440
	(0.0019)	(0.0050)	(0.0038)	(0.0066)	(0.0088)	(0.0382)
High school*female	0.0076	0.0053	−0.0027	0.0064	−0.0047	−0.0368**
	(0.0069)	(0.0099)	(0.0040)	(0.0050)	(0.0052)	(0.0152)
Some college*female	0.0192	0.0003	0.0080	0.0029	−0.0166***	−0.0701***
	(0.0121)	(0.0209)	(0.0063)	(0.0054)	(0.0047)	(0.0138)
College degree*female	0.1220***	0.1212***	0.0659***	0.0491***	0.0421***	0.0219
	(0.0169)	(0.0332)	(0.0098)	(0.0089)	(0.0076)	(0.0197)
Post college*female	0.1899***	0.1434***	0.1048***	0.0793***	0.0799***	0.0480*
	(0.0204)	(0.0357)	(0.0103)	(0.0126)	(0.0119)	(0.0248)

Table 4: (continued)

	1960	1970	1980	1990	2000	2010
			Panel B: both partners black			
R^2	0.21	0.20	0.14	0.20	0.18	0.22
N	153,780	32,720	165,265	142,080	163,946	25,204

*, **, *** statistically significant at the 10, 5, and 1 percent level, respectively. Robust standard errors clustered at the household level are in parentheses. The dependent variable is the log of family equivalent income. All regressions include a quadratic in age and dummies for race and geographic region. The omitted categories include men with less than a high school diploma and the Northeast. The sample includes individuals aged 25–55 with spouses aged 25–55, neither spouse is enrolled in school, and neither spouse is employed in the military, is self-employed, nor is an unpaid family worker.

3.2 Decompositions

Thus far, results from the analysis show that, historically, married women enjoy a higher return to schooling compared to their male counterparts across all levels of education. The total financial return to schooling has increased over time regardless of gender; however, the increase has been relatively faster for men. For some demographic groups, the return to education is now lower for women than men. Recall that total family income derives from the personal income of each spouse and income from other sources. The purpose of this subsection is to decompose the changes in family income for women into changes in their own personal income, their husband's income, and other income sources, with a specific focus on changes in own and spousal personal income. Since our results support Kim and Sakamoto (2017) as opposed to DiPrete and Buchmann (2006), we follow the strategy employed by Kim and Sakamoto (2017).

For this part of the analysis, we use the dollar amount of family equivalized income as opposed to the natural log, because the natural log of the sum is not equal to the sum of the natural logs of each component of total family income. Although we use the dollar amount of equivalized income, we still limit the sample to those with positive family income to keep the samples between this and the previous sub-section the same. We analyze the change in each component of income from 1990 to 2010. The results in Tables 2–5 show that the returns to schooling for women begin declining substantially starting in 1990 for most educational categories and demographic groups; therefore, analyzing changes between these two years is appropriate.

We perform these decompositions separately for own personal income and the husband's personal income for each educational category. Like Kim and Sakamoto (2017), we use the Oaxaca–Blinder decomposition. The general form

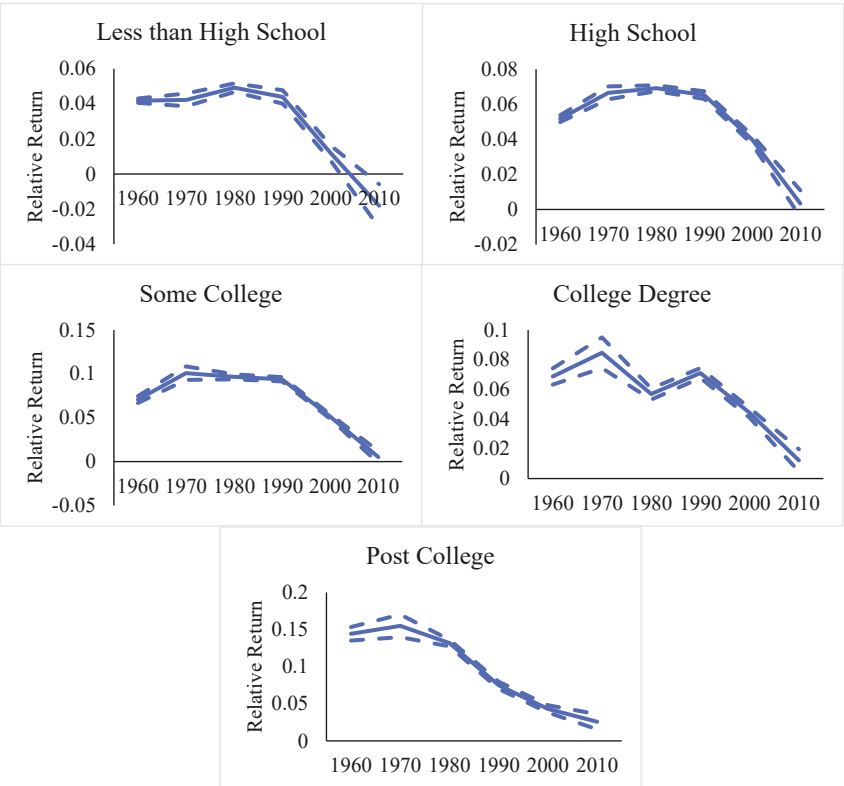

Figure 5: Female relative return to education over time – both partners white.

of the decomposition is:

$$\overline{y}^{2010} - \overline{y}^{1990} = \sum_{j=1}^{k} \hat{\beta}_j^{2010} \left(\overline{x}_j^{2010} - \overline{x}_j^{1990} \right) + \sum_{j=1}^{k} \overline{x}_j^{1990} (\hat{\beta}_j^{2010} - \hat{\beta}_j^{1990}). \tag{2}$$

In Eq. (2), $\overline{y}$ represents the average of either equivalized own personal income or that of the husband, $\hat{\beta}_j$ is the estimated coefficient associated with regressor j, and $\overline{x}_j$ is the average of regressor j in the year indicated in the superscript.

When the dependent variable is own equivalized personal income, the independent variables included in the regressions for the decompositions are the same as those used throughout the earlier analysis. However, since the sample includes only women, and since we perform the decompositions separately for each educational category, we do not include controls for educational attainment. When the dependent variable is the husband's income, we include years of completed schooling as in the quantile regressions. The first term on the righthand side of

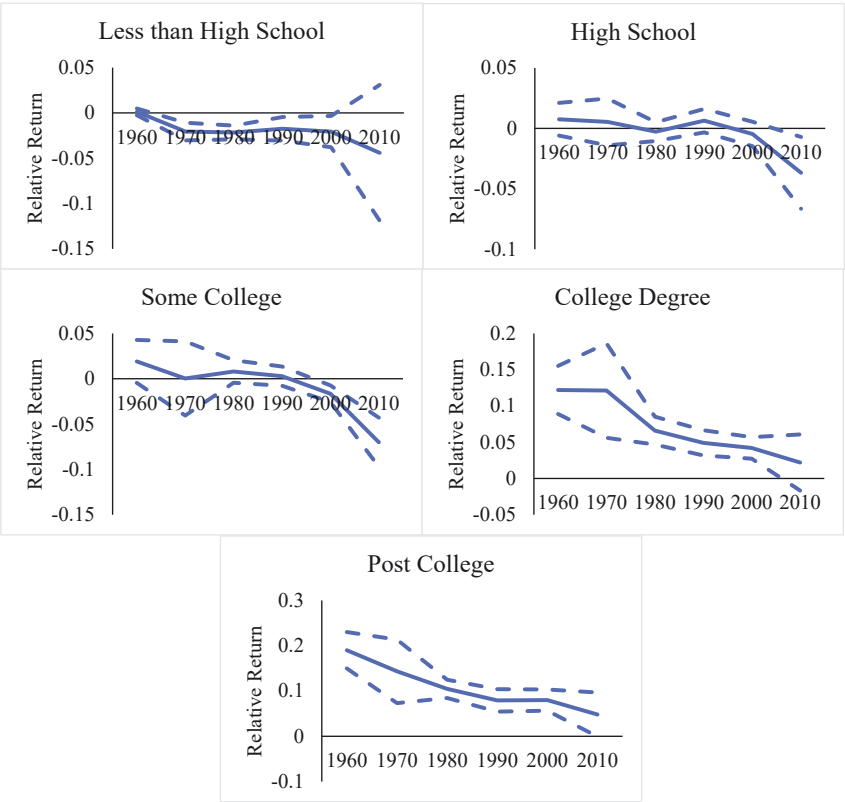

Figure 6: Female relative return to education over time – both partners black.

Eq. (2) attributes the change in income to changes in measurable characteristics, whereas the second term attributes the change in income to changes in returns to those characteristics.

The results from the Oaxaca–Blinder decompositions using the entire sample appear in Table 6. Table 6 consists of four panels: wife's personal income, husband's personal income, all other income sources, and the bottom panel is for total family income. In the personal income and spousal income panels, the column labeled total change represents the change in that income source from 1990 to 2010 for wives with the educational attainment indicated in the row. For example, personal equivalized income for wives with less than a high school degree fell by $1,253 between 1990 and 2010, and their husbands' income declined by $5,419. The column labeled characteristics shows the change in income associated with changes in measurable characteristics (i.e. the first term on the righthand side of

Table 5: Family income returns to education – quantile regressions.

	Decile 2	Decile 4	Decile 5	Decile 6	Decile 8
1960	0.0099***	0.0076***	0.0072***	0.0070***	0.0073***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
1970	0.0142***	0.0124***	0.0122***	0.0120***	0.0104***
	(0.0008)	(0.0006)	(0.0006)	(0.0006)	(0.0007)
1980	0.0138***	0.0121***	0.0110***	0.0103***	0.0080***
	(0.0004)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
1990	0.0094***	0.0077***	0.0072***	0.0061***	0.0043***
	(0.0005)	(0.0004)	(0.0003)	(0.0003)	(0.0004)
2000	0.0058***	0.0034***	0.0024***	0.0015***	−0.0010***
	(0.0005)	(0.0003)	(0.0003)	(0.0003)	(0.0004)
2010	0.0067***	0.0025***	0.0028***	0.0021**	−0.0004
	(0.0013)	(0.0010)	(0.0009)	(0.0008)	(0.0009)

*, **, *** statistically significant at the 10, 5, and 1 percent level, respectively. Robust standard errors are in parentheses. The dependent variable is the natural log of family equivalent income. All regressions include years of education, a female binary variable, an interaction between the female binary variable and years of education, a quadratic in age and dummies for race and geographic region. The omitted categories include men, white, and the Northeast. The sample includes individuals aged 25–55 with spouses aged 25–55, neither spouse is enrolled in school, and neither spouse is employed in the military, is self-employed, nor is an unpaid family worker.

Eq. (2)). The column labeled coefficients shows estimates of the change in income coming from changes in the returns to those characteristics. The other income and family income panels show the change in those sources of income between 1990 and 2010. Finally, adding together the change in personal income, spousal income, and other income provides the change in total family income.

While Table 1 shows that average family income increased 16% between 1990 and 2010, the results in Table 6 indicate that this increase was not uniform across educational categories. Only wives with at least a college degree experienced an increase in family income. Those with less than a college degree suffered a fall. The drop in income for those wives with fewer years of schooling was driven, not by losses in their own income, but by declines in their husband's income. Except for those with less than a high school degree, wives' personal income increased between 1990 and 2010. Changes in average characteristics and returns to those characteristics contributed to these increases. This is not the case for their husbands. Between 1990 and 2010, wives with less than a college education experienced a decline in their husbands' income.

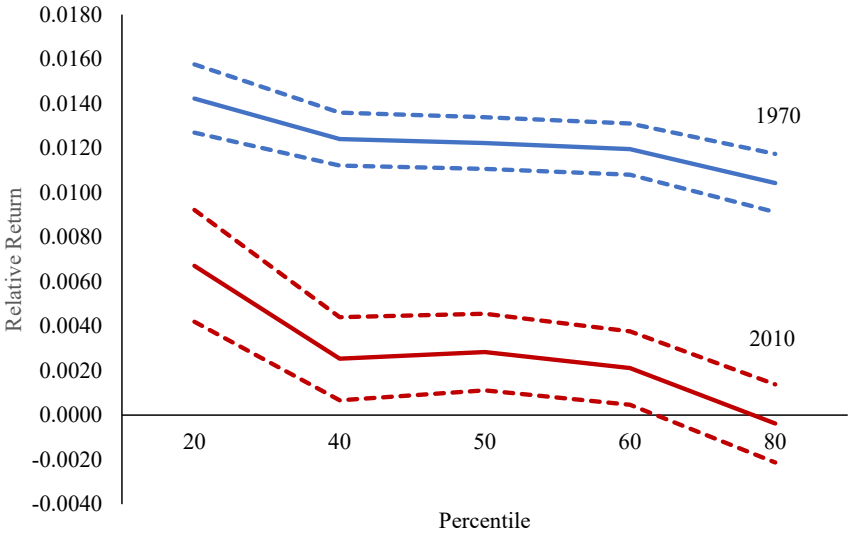

Figure 7: Female relative return to schooling – 1970 vs. 2010

Results associated with spousal income show that, generally, coefficients contribute negatively to changes in income, whereas characteristics contribute positively. However, this is not true when focusing specifically on the husband's years of completed schooling. The columns labeled quantity of education and return to education show the contribution of the husbands' years of schooling to the characteristics and coefficients calculations, respectively. Here, Table 6 shows that changes in husbands' average years of schooling negatively affect spousal income. This means that wives with a college degree or less are married to men with fewer years of schooling in 2010 relative to 1990, and husbands' lesser years of education is lowering spousal income for wives. Interestingly, however, returns to husbands' schooling contribute positively to changes in their income for nearly all educational categories.

Table 7 contains results from performing the Oaxaca–Blinder decomposition by age group. The estimates in panel A come from the sample of wives aged 25–34, panel B is from women between 35- and 44-years old, and the final panel comes from wives aged 45–55. Each panel in Table 7 is analogous to Table 6. Focusing on changes in wives' personal income, the results of those 35-years old and older are similar to those from the main sample. Wives' personal income tends to increase between 1990 and 2010 except for those with less than a high school education. Furthermore, changes in characteristics and coefficients both contribute positively to this income growth. This is not true for wives who are

Table 6: Oaxaca–Blinder decompositions of female equivalized family income – entire sample.

Personal income					
	Total change	**Characteristics**	**Coefficients**		
Less than high school	−1253.43	37.60	−1291.03		
High school	1108.08	889.82	218.26		
Some college	1618.95	1042.90	576.05		
College degree	3390.49	434.36	2956.14		
Post college	6332.34	258.06	6074.28		
Spousal income					
	Total change	**Characteristics**	**Coefficients**	**Quantity of educ.**	**Return to educ.**
Less than high school	−5419.12	−356.04	−5063.08	−649.86	−5009.28
High school	−3747.88	1165.30	−4913.19	−184.79	3326.39
Some college	−3774.52	326.46	−4100.98	−1447.04	8935.66
College degree	1118.81	251.28	867.53	−1496.57	36079.56
Post college	3300.02	−89.06	3389.08	127.03	37743.42
Other income					
Less than high school	−37.60				
High school	−222.78				
Some college	−16.46				
College degree	−91.40				
Post college	−498.78				
Family income					
Less than high school	−6710.14				
High school	−2862.58				
Some college	−2172.04				
College degree	4417.91				
Post college	9133.58				

Estimates under personal income and spousal income come from Oaxaca–Blinder decompositions. See the main text for the included independent variables in each regression. The estimates associated with other income and family income represent the change in that income type between 1990 and 2010. The sample used for these estimates is the same as that in Table 2.

younger than 35. Young wives (25–34 years old) with less than a college degree experienced a decline in their own personal income during the 20-year period analyzed here. Changes in average characteristics led to a reduction in income regardless of educational attainment, and changes in coefficients lowered wives' personal income for those with less than a college degree.

Table 7: Oaxaca–Blinder decompositions of female equivalized family income – by age group.

Panel A: wives between 25 and 34 years old					
Personal income					
	Total change	**Characteristics**	**Coefficients**		
Less than high school	−1597.24	−77.56	−1519.68		
High school	−920.28	−36.03	−884.25		
Some college	−435.30	−102.40	−332.90		
College degree	771.98	−455.31	1227.30		
Post college	3701.09	−785.76	4486.85		
Spousal income					
	Total change	**Characteristics**	**Coefficients**	**Quantity of educ.**	**Return to educ.**
Less than high school	−4088.53	−378.42	−3710.11	−546.84	−3951.52
High school	−5092.35	−423.45	−4668.90	−500.56	−2026.64
Some college	−4957.26	−823.78	−4133.48	−859.67	467.27
College degree	−1579.55	−550.15	−1029.40	−538.66	15867.54
Post college	1115.57	697.69	417.88	761.34	13420.85
Other income					
Less than high school	551.94				
High school	437.36				
Some college	272.80				
College degree	125.88				
Post college	−26.24				
Family income					
Less than high school	−5133.83				
High school	−5575.27				
Some college	−5119.77				
College degree	−681.69				
Post college	4790.43				
Panel B: wives between 35 and 44 years old					
Personal income					
	Total change	**Characteristics**	**Coefficients**		
Less than high school	−1682.06	−183.14	−1498.92		
High school	126.90	85.43	41.47		
Some college	769.97	90.60	679.37		
College degree	4141.79	−76.02	4217.81		
Post college	6328.18	279.99	6048.19		

Table 7: (continued)

Panel B: wives between 35 and 44 years old					
Spousal income					
	Total change	**Characteristics**	**Coefficients**	**Quantity of educ.**	**Return to educ.**
Less than high school	−5690.25	−580.49	−5109.76	−619.60	−5766.87
High school	−5442.45	−600.70	−4841.75	−565.98	556.56
Some college	−5738.30	−1876.87	−3861.44	−1869.23	3991.40
College degree	694.34	−2247.70	2942.04	−1883.29	37147.65
Post college	4003.14	−642.99	4646.12	−82.32	36458.20
Other income					
Less than high school	−546.26				
High school	−622.07				
Some college	−508.53				
College degree	−175.05				
Post college	−352.28				
Family income					
Less than high school	−7918.57				
High school	−5937.62				
Some college	−5476.87				
College degree	4661.08				
Post college	9979.03				
Panel C: wives between 45 and 55 years old					
Personal income					
	Total change	**Characteristics**	**Coefficients**		
Less than high school	−761.26	−27.96	−733.30		
High school	2113.03	30.62	2082.42		
Some college	2518.35	214.77	2303.59		
College degree	5014.50	237.57	4776.92		
Post college	8018.38	640.47	7377.91		
Spousal income					
	Total change	**Characteristics**	**Coefficients**	**Quantity of educ.**	**Return to educ.**
Less than high school	−7373.18	−486.22	−6886.95	−536.53	−6406.59
High school	−6495.65	260.53	−6756.18	682.20	4757.27
Some college	−8998.93	−2335.93	−6663.00	−1989.77	7161.19
College degree	−5369.02	−3931.97	−1437.05	−3640.52	37564.20
Post college	3006.73	−434.28	3441.01	−390.03	57597.29

Table 7: (continued)

Panel C: wives between 45 and 55 years old	
Other income	
Less than high school	−604.55
High school	−2358.40
Some college	−1888.78
College degree	−1842.47
Post college	−1643.93
Family income	
Less than high school	−8738.98
High school	−6741.01
Some college	−8369.35
College degree	−2196.99
Post college	9381.16

Estimates under personal income and spousal income come from Oaxaca–Blinder decompositions. See the main text for the included independent variables in each regression. The estimates associated with other income and family income represent the change in that income type between 1990 and 2010. The sample used for these estimates is the same as that in Table 3.

Moving to spousal income, women of all ages and levels of education marry men with fewer years of completed schooling in 2010 relative to 1990. The only exceptions to this are young wives with more than a college education and older wives with a high school degree. Additionally, the returns to husbands' years of education generally, with few exceptions, contribute positively to changes in spousal income. Therefore, from a qualitative perspective, educational assortative mating patterns tend to contribute to changes in wives' family income similarly across age groups.

Table 8 presents results from performing the decompositions by race. Estimates in panel A utilize a sample where both partners are white, and panel B uses a sample where each person in the marriage is black. As before, each panel in Table 8 is analogous to Table 6. The qualitative results in Table 8 for married women in marriages where both partners are white resemble the results from the main sample found in Table 6, showing that white women experience gains in their own personal income. Changes in characteristics and coefficients contribute to these gains. White women with less than a college degree experienced a general decline in their spouse's incomes and tend to marry men with fewer years of schooling in 2010 relative to 1990.

Table 8: Oaxaca–Blinder decompositions of female equivalized family income - by race.

Panel A: both partners white					
Personal income					
	Total change	**Characteristics**	**Coefficients**		
Less than high school	−1372.43	9.22	−1381.65		
High school	1206.38	976.88	229.50		
Some college	1732.89	1051.71	681.18		
College degree	3528.83	441.03	3087.80		
Post college	6564.25	502.08	6062.17		
Spousal income					
	Total change	**Characteristics**	**Coefficients**	**Quantity of educ.**	**Return to educ.**
Less than high school	−6256.94	−711.60	−5545.33	−765.22	−6127.02
High school	−3711.28	1378.17	−5089.45	−362.68	3091.46
Some college	−3993.77	300.02	−4293.78	−1748.59	8746.90
College degree	1021.00	418.43	602.56	−2082.03	37508.84
Post college	2536.91	−597.80	3134.71	−825.60	37946.90
Other income					
Less than high school	−37.57				
High school	−230.18				
Some college	−22.25				
College degree	−94.29				
Post college	−455.99				
Family income					
Less than high school	−7666.94				
High school	−2735.08				
Some college	−2283.12				
College degree	4455.54				
Post college	8645.16				
Panel B: both partners black					
Personal income					
	Total change	**Characteristics**	**Coefficients**		
Less than high school	−403.27	90.42	−493.69		
High school	593.25	799.84	−206.59		
Some college	1127.51	1556.35	−428.83		
College degree	3024.35	1910.97	1113.38		
Post college	5207.14	−22.19	5229.33		

Table 8: (continued)

Panel B: both partners black					
Spousal income					
	Total change	**Characteristics**	**Coefficients**	**Quantity of educ.**	**Return to educ.**
Less than high school	−1887.97	951.60	−2839.58	583.58	1480.79
High school	−2126.98	1927.26	−4054.24	893.69	6411.82
Some college	−1812.02	1923.49	−3735.51	298.74	7148.64
College degree	2498.01	2695.06	−197.05	525.74	17946.06
Post college	2461.56	1536.18	925.38	1424.21	32153.08
Other income					
Less than high school	−1063.04				
High school	−527.42				
Some college	−343.16				
College degree	114.27				
Post college	−859.43				
Family income					
Less than high school	−3354.29				
High school	−2061.16				
Some college	−1027.67				
College degree	5636.63				
Post college	6809.26				

Estimates under personal income and spousal income come from Oaxaca–Blinder decompositions. See the main text for the included independent variables in each regression. The estimates associated with other income and family income represent the change in that income type between 1990 and 2010. The sample used for these estimates is the same as that in Table 4.

Results for black women married to black men are also similar to the main results, with one important exception. The decompositions associated with spousal income show that the change in spousal income attributed to the quantity of spousal schooling is positive for each level of the wife's education. This means that regardless of their own educational attainment, black women were marrying black men with more education in 2010 than in 1990. The group of black women is the only demographic group examined here to experience an increase in average spousal schooling for each level of own education.

A comparison of average years of schooling across groups highlights why this is the case. Black women who are married to black men had 10.1 years of completed schooling in 1960. By 2010, their years of education increased to 14.5, which is a 44% increase. For their husbands, average years of schooling increased from 8.9

to 14.1, equaling a 58% increase. Therefore, while black women had higher years of schooling, they experienced a slower increase in average years of education relative to their husbands. The reverse is true for white women married to white men. Average years of schooling for white women increased from 11.8 in 1960 to 14.7 in 2010, an increase of 25%. Their husbands schooling increased by 23% over the same period.

4 Discussion

Institutions of education affect total financial well-being (i.e. total family income) directly by providing marketable skills and indirectly through the marriage market and assortative mating (Goldin 1992). Historically, the negative stigma associated with working women and various institutions, such as marriage bars and inflexible work schedules, suggest that the direct returns to schooling should be higher for married men than for married women, with the reverse being true for the indirect returns (Goldin 1992, 2006). This implies that married women should receive a higher income return to schooling relative to their husbands.

Throughout the 20th century, marriage bars were eliminated, flexible work schedules grew in popularity, the demand for office work increased, and the negative stigma associated with working women dissipated, which led to an increase in labor market opportunities for married women (Goldin 2006). To prepare for longer careers, women began enrolling in and completing college at faster rates than men did (Goldin 1992, 2006; Goldin, Katz, and Kuziemko 2006; Kim and Sakamoto 2017; Van Bavel, Schwartz, and Esteve 2018). The gender gap in college major, occupation, and earnings declined (Goldin 2006; Gonalons-Pons and Schwartz 2017; Stevenson and Wolfers 2007). The probability of finding couples where the wife earns more and has more education than her husband does is higher now than ever before (Van Bavel, Schwartz, and Esteve 2018). These changes suggest that the income return to education should have grown for both married men and women; however, this growth should be larger for men. In other words, the traditionally higher return to schooling for women should have decreased over time. Results from our analysis using a sample of married men and women between the ages of 25 and 55 support this. Married women tend to have a higher income return to schooling compared to their husbands, and the size of this relative return remained stable from 1960 to 1990. Starting in 1990, the returns to education began rising much faster for men. By 2010, only married women with at least a college degree received higher returns to schooling compared to their husbands.

Since the total financial return to schooling is due to labor market outcomes and assortative mating patterns, and because these differ by demographic group, we investigate heterogenous returns to education for various subsamples. We find that the female relative return to schooling has fallen faster for those at the top of the income distribution. Differences in labor supply between couples in the bottom half and the top half of the distribution provide a possible explanation for these findings. For example, in 2010, 59% of individuals above the median of the log income distribution are in couples where both partners work full-time. The same percentage for those at the median or lower is 26%. Therefore, men who are above the median in the income distribution are more likely to benefit from the strengthening female labor force attachment discussed here relative to those in the bottom half.

We further find that this relative return generally fell faster for married women under 45 years old. In fact, married women between the ages of 25 and 34 receive lower returns to their education when compared to their male counterparts, while married women over 45 still receive a relatively higher return to schooling. Older individuals may rely on past social norms regarding female educational and occupational outcomes, whereas younger individuals make human capital investments in preparation for longer working lives. Therefore, younger husbands may benefit more from the demographic changes described above relative to older husbands. Finally, we find that white women in 2010 had the same pattern of relative returns to schooling as black women did from 1960 to 1990.

To understand why family income is changing for married women between 1990 and 2010, we decompose the changes in family equivalized income into changes in own income and spousal income using the Oaxaca–Blinder decomposition. While average family income increased by 16% between 1990 and 2010, this was not the case for all married women. The decompositions show that family income actually fell for those married women with less than a college degree; declines in their husband's income drove this fall. One of the reasons that wives experienced a decline in their husbands' income is that women with a college degree or less are marrying men with fewer years of completed schooling in 2010 relative to 1990.

These findings from the decompositions regarding husband's completed years of schooling hold for each demographic group examined here except black women married to black men. This is consistent with the demographic changes described above regarding gender differences in rates of educational accumulation. With the exception of black women, females have increased their educational attainment at a faster rate than their male counterparts have.

The results presented above highlight the importance of understanding how demographic characteristics connect to labor market outcomes, returns to

schooling, and therefore, economic inequality (DiPrete and Buchmann 2006; Kim and Sakamoto 2017). On average, family income has increased over time. However, the rise in assortative mating along the dimensions of education and earnings suggest a corresponding rise in inequality and a polarization in economic well-being between individuals with high levels of education and those with lower levels of schooling. As shown here, family income for less educated women declined since 1990 despite large increases in average income for those wives with at least a college degree. Wives with less schooling experience a decline in family income not because of drops in their own personal incomes, but because of marrying husbands with, on average, fewer years of schooling and lower incomes relative to in the past. These differences in the underlying reason for changes in family income have implications for policies designed to combat economic inequality. Understanding that groups experience changes in income for various reasons and recognizing those reasons will aid in the development of policies to help mitigate inequality.

5 Conclusions

This paper uses US Census data from 1960 to 2000 and ACS data from 2010 to examine temporal changes to the total financial return to schooling for married men and women. Results indicate that the total return to schooling increased for both genders with a faster increase for men. Historically, married women experience higher returns to schooling. However, because of gender differences in education's direct and indirect effects on financial well-being, married women's relative return to schooling declined. By 2010, only women with at least a college degree observed a higher return to schooling than men.

Our results provide new insights to the literature and show that differences in the female relative return to schooling exist across demographic groups. The demographic changes described above affect labor market outcomes and assortative mating patterns, which have implications for various components of family income, particularly own and spouse labor earnings. Since labor market outcomes and assortative mating patterns differ across demographic groups, the components of family income may change in different ways for these groups. We highlight this by performing Oaxaca–Blinder decompositions of own and spousal income by age and race, and we show that younger women and black women who are married to black men experience changes in personal income and educational assortative mating, respectively, that are different from the sample as a whole.

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