Marriage Patterns of Black Women: Education, Competition, and the Shortage of Available Men

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PRELIMINARY: COMMENTS WELCOME†

Abstract

Black women who drop out of high school are far less likely to marry than those who do not. I hypothesize that these discrepancies are due to differences in the marriage markets women face at each education level. I motivate this with a simple model based on Becker (1981)'s work, which includes two key features: marriage markets that are integrated across education levels and positive assortative mating on education. This model predicts that the marriage prospects of any woman depend on both the total number of available black men at all education levels and the competition from more educated black women. Importantly, it predicts that any gender imbalance disproportionately affects the marriage prospects for the least educated. Using data from the 1979-2004 waves of the NLSY79, I estimate discrete-time hazard models of first marriages for black women, capturing a womans marriage prospects in three ways: (i) using an education-specific simple sex ratio from the educationally segmented marriage markets that dominate the literature, (ii) using a cascading sex ratio implied by Beckers model, and (iii) using a more flexible specification that includes separate measures for the relative availability of men as well as the prevalence of competing women at each education level. I find that: (i) marriage market measures that allow integration over education levels are better able to explain educational differences in marriage patterns than typical measures that assume independent marriage markets by education level, (ii) the effects of competition from other women are significant, and (iii) the supply of men has larger effects the more similar the education levels.

Key words: Education, Race, Marriage, Discrete-time hazards

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1 Introduction

The recent trend of the most educated women having higher marriage probabilities than less educated women overall has been well-documented in the literature[1] as have the drastic differences in marriage rates of black and white women. Figures 1 and 2 provide continuing evidence of this gap over time for the cohort of women born between 1957-1965. Figure 1 shows, over the last 50 years, the percentage of women who have remained unmarked until age 40 by race and education. Marriage rates for white women have been fairly stable over time with a slight decrease in recent years–from a peak of 95 percent of white women age 40 having ever been married in 1980, to between 82 and 88 percent in 2009. In addition, the difference in marriage rates by education level is very small. The decrease in marriage rates for black women, however, has been much more pronounced leading to a persistent and growing gap in marriage rates between black and white women. To explain these differences people have tried using variation in race specific incarceration rates[2] or race-specific sex ratios[3] with varying levels of success. Wilson (1987) hypothesized that is was not the sheer lack of available men driving these differences, but a lack of "marriageable" men, which has been interpreted to mean several things, but most commonly refers to the number of employed (i.e. able to support a family) men to women. Papers such as Brien (1997) and Lichter et al. (1992) have tested this hypothesis and have found that sex ratios with some version of "marriageable" men in the numerator were able to better explain racial differences in marriage than measures that measure general availability. In addition to reduced form examinations of the marriage market, there have been recent structural models of the marriage market that have allowed the relative availability of potential spouses to affect marriage market outcomes. Choo and Siow (2006) created a static model that allowed them to estimate the gains to marriage based on the number of available men and women of different types, where one's type is one's age, and the prevalence of matches between these types. Seitz (2009) created a dynamic model where the endogenously determined sex ratio influenced an individual's marriage and employment decisions. She found that race, region, and age specific sex ratio's could account for 20 percent of the racial differences in marriage.

Albrecht et al. (1997) noted the educational differences in marriage patterns, and found that higher race-specific sex ratios are lead to higher marriage prevalence and higher quality spouses for each education level, but was not able to say anything about the reasons for the educational differences. Furthermore, when we look at marriage patterns by education level within black women, they diverge even more, with high school dropouts marrying at increasingly lower rates

[1] seeLefgren and McIntyre (2006), Goldstein and Kenney (2001), Martin (2004), and Isen and Stevenson (2010)
[2] see Mechoulan (2011), Charles and Luoh (2010)
[3] see Brien (1997), Lichter et al. (1992)

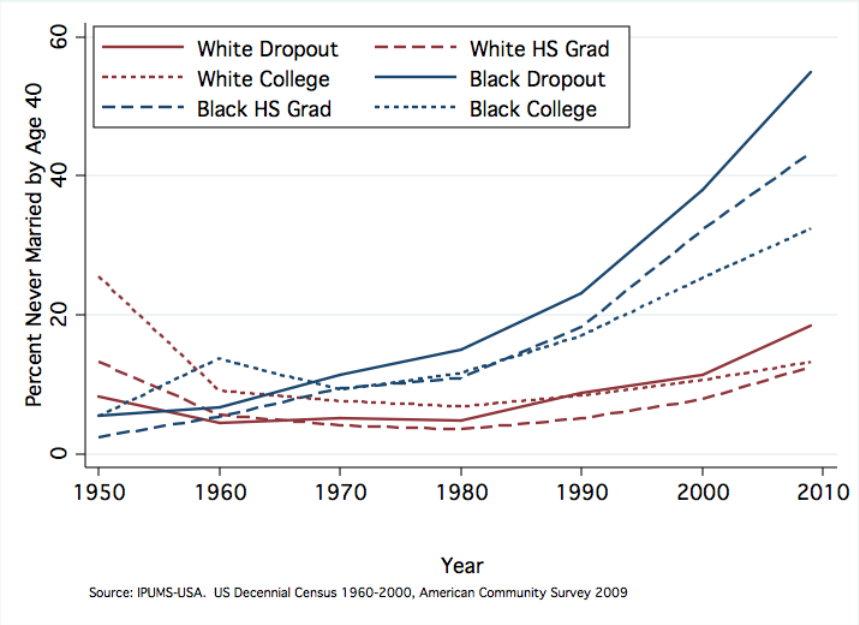

Figure 1: Percent of Women Never Married by Age 40, by Race and Education

than their high school and college graduate counterparts.

Focusing only on the cohort that turns 40 between 1997 and 2005 from the NLSY79[4] shows large differences in marriage probabilities by race and education, as expected from the historic patterns. Figure 2 presents a Kaplan-Meier survival graph for black and white female respondents from the NLSY79, where survival is equivalent to remaining single (or never marrying). The survival estimates for both black dropouts and high school graduates clearly differ, and lie well above those for white dropouts and high school graduates, which are essentially the same by age 40. This shows evidence of large racial differences in marriage for this cohort and large differences by education level for black women that are nearly nonexistent for white women.

If we focus on only black women and look at this same cohort but separate it into finer levels of education, as in figure 3, these educational differences in propensities to marry are drastically different[5]. By age 40, dropouts are 16 percent less likely to have married than those women with a high school diploma, and even less likely to have married than those women with some college education.

This paper seeks an explanation for the large gap in the likelihood of marriage by education

[4]The NLSY79 is a longitudinal survey of youth aged 14-22 in 1979, more information in section 3

[5]I originally used 5 education groupings (dropouts, GEDs, high school graduates, some college education, and college graduate). Survival curves for some college and college graduates were insignificantly different from each other as were the survival curves for Dropouts and GEDs. For simplicity, I combine some college and college graduates into one "ever attended college" category. GEDs I drop entirely for reasons explained in A

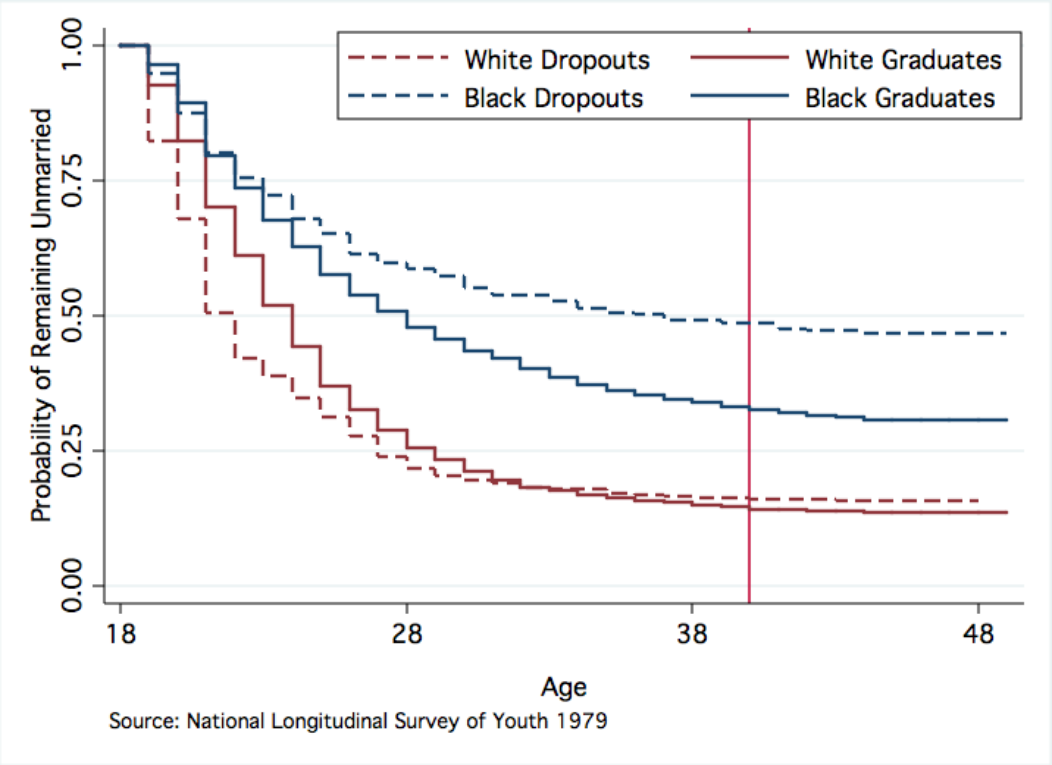

Figure 2: Kaplan-Meier Survival Estimates, by Race and Education

level for black women. Beyond developing a better understanding of marriage patterns, this is an important question to address because there is evidence of significant existing inequality by education level (e.g. earnings, wealth, longevity, etc.). If, as a group, uneducated black women are much less likely to be able to access the benefits of marriage such as the ability to pool resources and risk, better health outcomes, and greater wealth acumulation[6], then this could exacerbate existing differences in well-being across education level and lead to increasing inequality. Additionally, there is evidence that children from two parent households fare better in terms of cognitive, social, and behavioral outcomes since parents have more time and resources to invest in their well-being and growth[7]. If these women are marrying at lower rates while their fertility rates are not changing, this has possibly large negative implications for future generations and could lead to a cycle of increasing inequality between the most and least educated women.

Similar to the research that has examined the racial gap in marriage and, more generally,

[6] see Waite (1995) for an enumeration of these
[7] see Ram and Hou (2003)

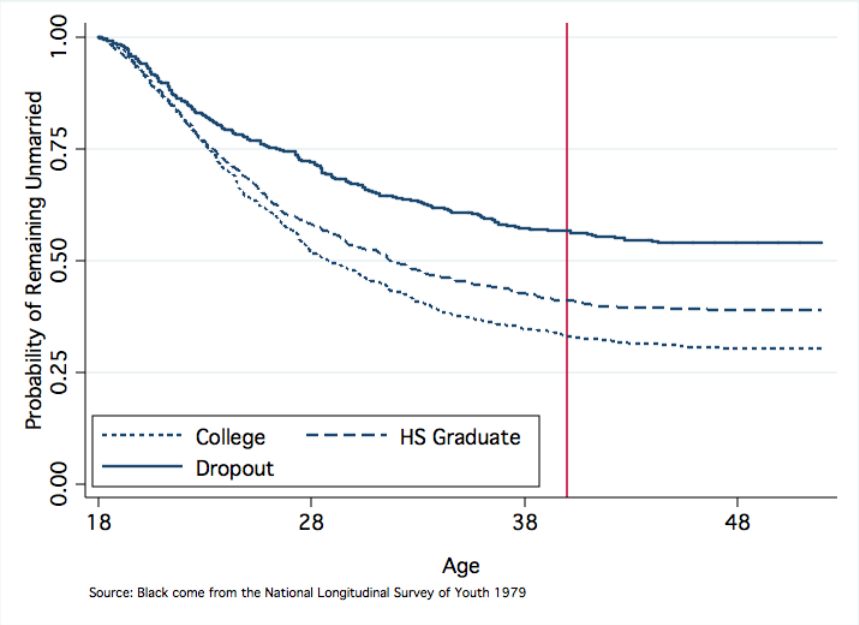

Figure 3: Kaplan Meier Survival Estimates for Black Women, by Education

union formation patterns[8], I also hypothesize that the difference in marriage patterns within black women is due to the women's marriage market prospects. If we think of a marriage market for any black woman as consisting of all black men in the same location[9], this could not be driving these changes as there would be no variation in marriage prospects by education level, only by location. However, if we think about marriage market prospects as differing by education level and changing over time, then we may be able to use location, race, and education specific marriage market measures to explain the educational differences in marriage rates. I will compare two types of education specific sex ratios, a simple sex ratio that limits one's marriage market to people of the same education level and a cascading sex ratio based on economic theory that captures the cross education level competition for men. One common way to think about education specific marriage markets is to segment marriage markets by education level so that only the number of men relative to women of the same education group matter in explaining marriage. The insights provided by Becker (1981)'s basic marriage market model with identical individuals and distinct quality levels suggest that constraining marriage markets within education levels and denying competition between women of different education levels should not be able to account for the educational differences that are evident in marriage

[8]see Brien (1997), Lichter et al. (1992), Lichter et al. (1991), Raley (1996),Guzzo (2006), Seitz (2009), Schoen and Kluegel (1988)

[9]There are, of course, interracial marriages, but on the whole most people marry within their own racial group. This is especially true for black women.

patterns for black women. Using the intuition from this model, I develop an education specific marriage market measure where the number of available men for women of education level e is the total number of men minus the number of higher quality women (i.e. more educated) who are competing against them.

Using individual level data from black females 18-40 in the NLSY79 and sex ratios calculated using US Decennial Census data from 1980, 1990, and 2000, I run logistic (or logit) regressions of first marriage on education indicators, sex ratios, and background variables to assess the ability of different marriage market measures to account for the educational differences in marriage patterns. I find that the measures that account for competition are better able to explain the differences in odds of marriage by education level. In addition, I am able to include ratios of men and women at all education levels to women of education level e in an effort to assess the relevant marriage markets for these women. I find evidence that for dropouts and college educated women, their odds of marriage are positively related to the number of men of the same education level and the number of high school graduate men, while their odds of marriage are negatively related to the number of high school graduate women.

These results have implications for measurement of the marriage market when concerned with educational differences. Due to the shortage of men faced by black women, education specific simple sex ratios are not sufficient measures of their marriage prospects. The competition women face from other women plays a large roll as well. This warns that any model of marriage that segments marriage markets along educational lines may be missing the significant influence of this competition.

Section 2 explains the measures of education-specific marriage markets, section 3 describes the data, section 4 uses the marriage market indices to explain educational differences in marriage, section 5 examines the role of competition using a flexible specification, and section 6 concludes.

2 Availability of Marriageable Men: Background and Theory

There has also been significant attention in the literature to developing proper measures of the marriage market. Fossett and Kiecolt (1991) assessed many of the options, including various sex ratios, Goldman et al. (1984)'s availability ratios, and Wilson's male marriageable pool index. They note that sex ratios using wider age ranges are better able to explain marriage patterns than those using narrow age ranges. Brien (1997) also found that state-level marriage market variables tend to be more reliable than more local measures. Previous research examining the racial differences in marriage patterns employed simple location and race specific sex ratios

Table 1: Number of men available for every 100 women ages 25-33 in 1990 US Decennial Census

	Black	White
Total	81	100
College Educated	70	95
GEDs and HS Grads	92	102
Dropouts	93	120

Notes: 25-33 are the ages of NLSY respondents in 1990. These ratios do not include men and women living in institutions (e.g. prison)

to capture marriage market prospects. One logical way, perhaps due to recent literature on educational assortative mating[10], to define a relevant marriage market for a woman of education level e is to assume that the relevant men are only those of the same education level. Brien (1997) disaggregated marriage markets is along educational lines, so he also considers location, race, and education-specific sex ratios; Blau et al. (2000) separated marriage markets along the same lines in their paper looking at the effect of labor and marriage markets on the marriage decisions of women by race and education level.

If we let M_{est} (W_{est}) denote the number of men (women) ages 16-55 of education level e in state s in time t then restricting marriage markets by education level implies that the relevant number of available men for a woman of education level e is M_{set}. Thus the relevant marriage market index for women assuming marriage markets are constrained to be within education level is what we will call the simple sex ratio:

$$\text{Simple SR}_{est} = \frac{M_{est}}{W_{est}} \tag{1}$$

Table 1 highlights the notable differences in the availability of men by race and education level in the 1990 Census[11]. This table highlights quite a few important facts. First, there are noticeable racial differences in the availability of men with 100 white men available for every 100 white women and only 81 black men available for every 100 black women. This overall difference in the availability of men by race has been widely used to explain the racial differences in marriage; however, we can break this down further by education level: for 100 white women the number of available men is close to or above 100 at all education levels. In contrast, for the most educated black women there are only 70 men per 100 women and this ratio approaches 100 men per 100 women for black women who dropped out of or graduated from high school. Based on the observed lower marriage rates for less educated black women, it may seem counterintuitive that they actually face the most favorable sex ratio. To understand these patterns it is helpful to consider factors influencing these ratios.

[10] Pencavel (1998), Schwartz and Mare (2005)

[11] In 1990, the men and women of the NLSY79(the dataset I will use) are 25-33, prime ages for marriage

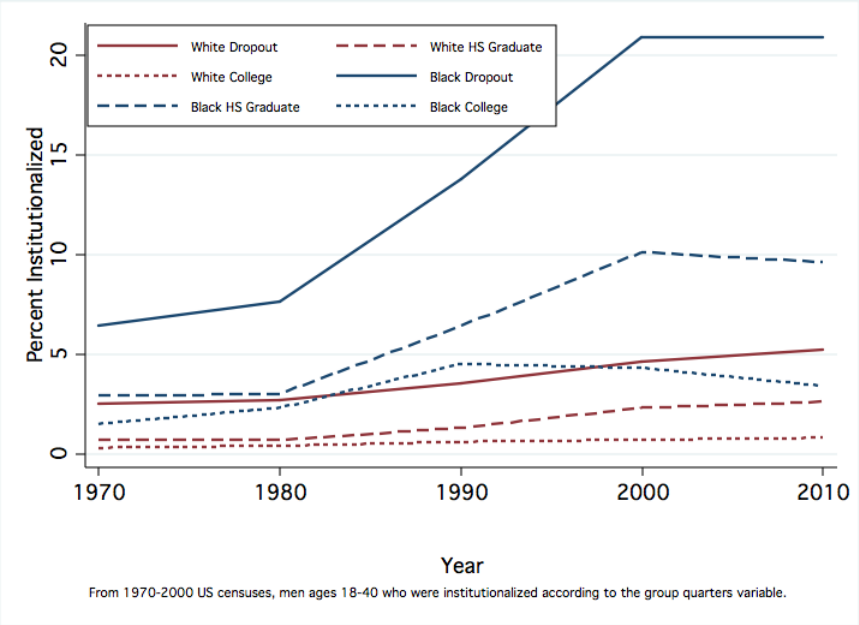

Figure 4: Percent of Men 18-40 Institutionalized 1970-2010, By Race and Education

The primary reason for lower sex ratios for blacks versus whites is the disproportionate number of black men in prison. While this problem mainly affects less educated black men, it is certainly not confined to those who dropped out of high school: incarceration rates for black males are much higher than for white males at every education level. For example, in the 1990 census roughly 17 percent of black male dropouts were incarcerated[12] (9 percent of black men overall), whereas for whites 4 percent of male dropouts were incarcerated (1 percent of whites overall). Such high incarceration rates greatly decrease the pool of available men at every education level, but disproportionately at lower education levels. As we can see however, even without including people living in group quarters the simple race and education specific sex ratios seem more favorable for less educated women, which means the sheer availability of men of one's same education level cannot account for the educational differences in marriage patterns that we see for black women. Hand in hand with higher levels of incarceration are higher levels of mortality for black men, especially the least educated black men.

A secondary reason for the lower sex ratios is that education of women compared to men has been increasing overall, but these increases have been much larger for black women. This is the main reason we see such low sex ratios for highly educated black women.

[12]These are black males ages 25-33 in the 1990 census where group quarters status is assumed to mean incarcerated

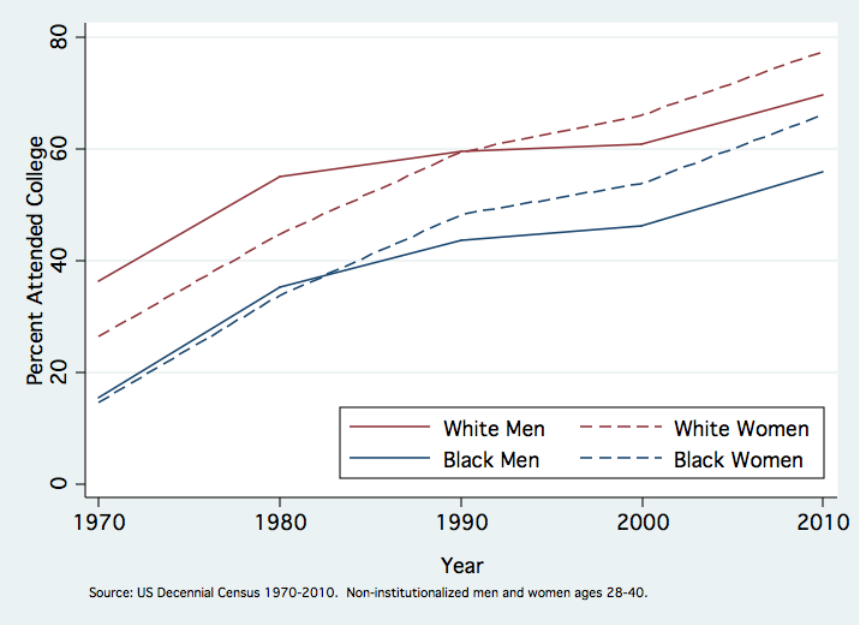

Figure 5: Percent Attended College 1970-2010, By Race and Gender

Finally, interracial marriage rates are much higher for black men than for black women[13]. Less than 5 percent of black women at any education level marry interracially, while that number is more than double for black men overall, and 14 percent for college educated black men[14].

To examine what constitutes a relevant marriage market for a particular woman in order to consider the implications of a shortage of men within the context of Becker's model of the marriage market. In his seminal work on the economics of marriage, Becker (1981) characterizes the marriage market equilibrium such that, assuming individuals are identical, a shortage in the number of available mates will lead to an equilibrium where only a fraction of the population that is over-abundant matches. This suggests that the number of men available relative to women will affect the marriage rates of women. He also extends this analysis to allow for different types (or quality levels) of people in the marriage market, with individuals of the same type being identical. This model has the following features:

- all individuals in the less abundant group marry
- gains to marriage shift to induce the higher quality types in the more abundant group to marry down

[13] see Crowder and Tolnay (2000) for evidence that higher levels of interracial marriage negatively affect marriage prospects for black women

[14] for men and women ages 25-33 in the 1990 decennial census.

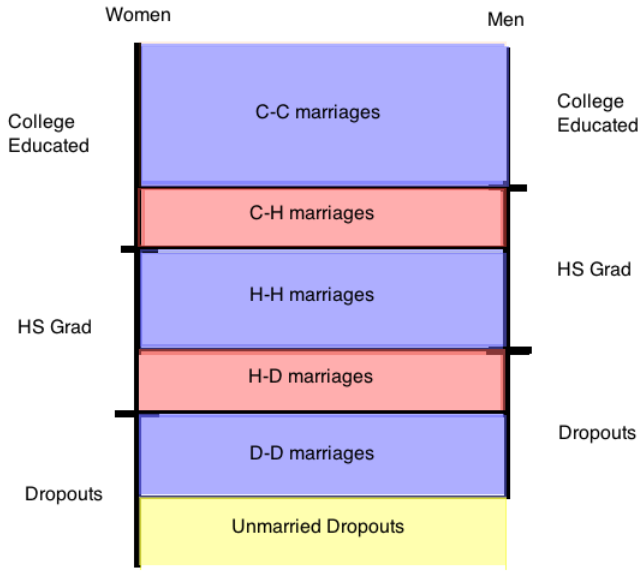

Figure 6: The black marriage market: implications of Becker's marriage model

- those in the least desirable category end up being the most affected by availability mismatches due to competition from higher quality types.

We can easily apply this model to the black marriage market. Figure 6 illustrates a marriage market if there are more women than men and females have a higher education level on average.

This model presents a simplified way to look at marriage markets, as it ignores idiosyncratic noise and predicts that all men and all women at the higher education levels will marry, that no men will marry down, and women only marry at the same education level or below. Nonetheless, this model provides valuable intuition for characterizing marriage markets by education levels. According to this model, the number of available men for women of education level e, in state s, at time t is:

$$\text{Available Men}_{est} = (\sum_{e'} M_{e'st}) - (\sum_{e''>e} W_{e''st}) \tag{2}$$

where D, H, and C stand for Dropout, HSGrad, and College (respectively), $e, e', e'' = D, H, or C$, $M_{e'st}(W_{e''st})$ is the number of men (women) ages 16-55, with education level $e'(e'')$, in state s, at time t, and D is the lowest quality, followed by H, then C. The first term is the total number of men at all education levels, and the second term is the number of men who are matched to more educated women. Hence, the relevant marriage market index for a woman of

Table 2: Percentage of black women of education level e married to men with education level f ($P^w_{ee'}$)

Men \ Women	Dropout	HS/GED	College
Dropout	**.498**	.186	.086
HS/GED	.313	**.539**	.236
College	.189	.275	**.679**
Total	1	1	1

Notes: Calculated for married men and women ages 25-33 in 1990 (ages of NLSY respondents). Boldfaced text indicates the fraction of educationally homogamous marriages for women of a particular education level.

education level e is what I call a cascading sex ratio of the form:

$$\text{Cascading SR}_{est} = \frac{(\sum_{e'} M_{e'st}) - (\sum_{e''>e} W_{e''st})}{W_{est}} \tag{3}$$

Thus,

- for college educated women, Cascading $\text{SR}_{Cst} = \frac{(M_{Cst}+M_{Hst}+M_{Dst}}{W_{Cst}}$
- for high school graduate women, Cascading $\text{SR}_{Hst} = \frac{(M_{Cst}+M_{Hst}+M_{Dst}-W_{Cst}}{W_{Cst}}$
- for dropout women, Cascading $\text{SR}_{Dst} = \frac{(M_{Cst}+M_{Hst}+M_{Dst}-W_{Cst}-W_{Hst}}{W_{Cst}}$

This implies that for all but the most educated women, one's odds of marriage should depend not only on the number of men available relative to women, but also the number of more educated women that are competing against them.

This simple education specific sex ratio should not be able to explain the educational differences we see in marriage patterns, since as noted above in table 1, ratios are more favorable for less educated women. The sex ratios implied by Becker's model, which account for competition, should be better able to account for the patterns we see by education level.

Both the simple sex ratio and the cascading sex ratio make some very strong assumptions about marriage markets. For instance, we know that people are not required to only search among people of the same education level, that within a particular education level not all men or women are identical, and just because men or women are available doesn't mean that people will get married since marriage opportunities and decisions are the result of a complicated search process. Looking at tables 2 and 3 shows that both men and women are marrying across all education levels, though it is much more common to marry someone of a similar education level. Thus it is reasonable to think that women's likelihoods of marriage depend more heavily on the availability of men at the same or adjacent education levels and less on the availability of much

Table 3: Percentage of black men of education level f married to women with education level e ($P^m_{e'e}$)

Women \ Men	Dropout	HS/GED	College
Dropout	**.404**	.133	.054
HS/GED	.336	**.496**	.187
College	.260	.371	**.759**
Total	1	1	1

Notes: Calculated for married men and women ages 25-33 in 1990 (ages of NLSY respondents). Boldfaced text indicates the fraction of educationally homogamous marriages for men of a particular education level.

Table 4: Number of employed men available for every 100 women ages 25-33 in 1990 US Decennial Census

	Black	White
Total	81	90
College Educated	60	89
GEDs and HS Grads	70	92
Dropouts	53	93

Notes: 25-33 are the ages of NLSY respondents in 1990. These ratios do not include men and women living in institutions (e.g. prison)

more or much less educated men, and also that a woman's main competition comes from women at the same or adjacent education levels and less so from far more or far less educated women. If this is true, then it might be that no single index (or at least neither of the indices presented above) will be able to accurately explain woman's different marriage patterns by education level. In the next section, I will discuss the flexible specification I use to evaluate these indices.

2.1 Wilson's Hypothesis in the context of Becker's marriage model

Wilson (1987) proposed the idea that it is not the sheer availability of men that matters, but the availability of "marriageable" men (i.e. employed). Table 4 shows the availability of employed men per 100 women ages 25-33 by education level in the 1990 census; if only employed men are "marriageable," the picture grows bleaker at every education level, but especially at the bottom of the distribution. This idea can be easily nested within Becker's framework, such that there is a fourth type of man who is unemployed and who women cannot be induced to marry. Figure 7 captures such a model. Under the Wilson hypothesis, the number of available men for women of education level $e$is:

$$\text{Available Men}_{est} = (\sum_{e'} M^E_{e'st}) - (\sum_{e''>e} W_{e''st}) \tag{4}$$

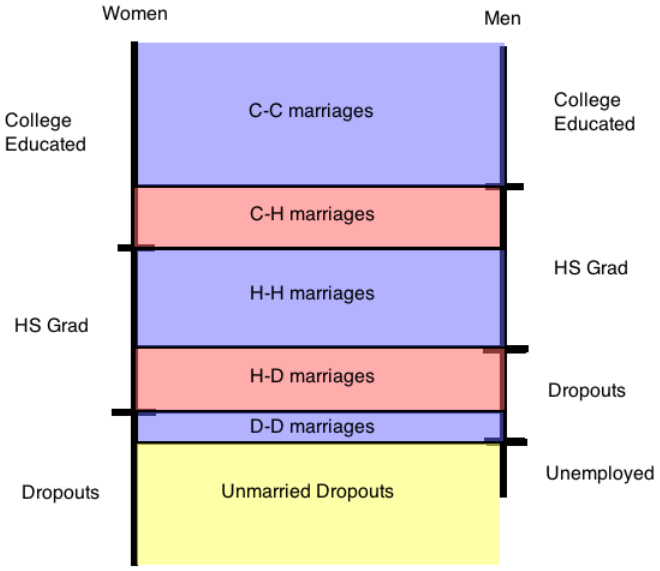

Figure 7: The black marriage market: Wilson's hypothesis as a special case of Becker's model

Thus the relevant sex ratio for a woman of education level e would be:

$$SR_{est} = \frac{(\sum_{e'} M^{E}_{e'st}) - (\sum_{e''>e} W_{e''st})}{W_{est}} \tag{5}$$

3 Data

3.1 Panel Data

For individual level panel data I use the NLSY79 which surveyed 12,686 people aged 14-22 on January 1, 1979 annually from 1979-1994, and subsequently biannually. Information was gathered about many aspects of an individual's life. Most importantly for this study, the NLSY79 collected data on the respondents' family background and allows us to construct a marital history for each respondent so that we know the year in which their first marriage occurred.

For this paper I look only at black women ages 18 and older[15] who are not in the military. I also drop those women with GEDs instead of high school diplomas, as this is an ambiguous category[16]. This leaves 1102 women and 12,340 person-years for our analysis.

[15]Though marriage prior to legal adulthood does happen, it is not the norm and only causes us to lose xx observed marriages

[16]see appendix **??**

Table 5: Summary Statistics: Black Women Ages 18-40, 1979-2004

Covariate	Dropouts	HS Graduates	College
AFQT	9.035	15.986	31.583
Born in South	0.643	0.689	0.605
Mother's Education	9.490	10.151	11.473
Urban Area at 14	0.790	0.748	0.833
Catholic	0.043	0.055	0.099
Protestant	0.876	0.903	0.874
Non-Christian	0.005	0.003	0.002
Non-religious	0.075	0.039	0.025
Lived with Parents at 14	0.345	0.494	0.552
Child before 18	0.369	0.178	0.092
ln(Income) at 25	3.558	5.863	7.733
Enrolled in School at 25	0.013	0.012	0.134
County Population Density at 25	3174.906	2293.682	3300.152

Table 14 shows basic marriage statistics for each education level. As is also shown in figure 3, more educated women are marrying later, but by age 40 a higher proportion have ever married than less educated black women.

The analysis also includes a variety of background variables thought to influence the marriage decision. The variables fall into two categories: those designed to capture a respondent's background and values and those designed to capture a woman's economic independence and current situation. Variables in the former category are plausibly exogenous and include a person's AFQT score, whether or not they were born in the South, whether or not they lived in an urban area at age 14, their mother's education, an indicator for living with both parents at age 14, and religion dummies. The latter category consists of an indicator for having a child before age 18, log of income at time t, whether or not the respondent is enrolled in school at time t, and the county population density at time t. These are plausibly endogenous since it is natural to think that people make fertility, education, employment, and location decisions simultaneously. The results presented in this paper include only the exogenous covariates, but the inclusion of the endogenous covariates does not greatly change the results.

3.2 Marriage Market Variables

The NLSY79 provides confidential geo-coded data that allows respondents' states and counties of residence to be identified. The 5 percent sample from the decennial US census provides a large nationally representative sample of the US population. Because they collect detailed demographic, geographic, and economic data on these individuals, this census data can be used to

Table 6: Marriage Statistics by Education: Black Women Ages 18-40, NLSY79 1979-2004

	# in sample Median age of first marriage|gets married Average age of first marriage|gets married Percent married by 40
Dropouts	N=183 21 22.67 46.3%
HS Graduates	N= 337 23 24.79 61.1%
College	N=596 24 25 67.1%

construct age, education, and location specific marriage market measures as described in section 2. These marriage market measures can then be merged into the individual level NLSY79 data, so that there is a measure of the availability of men for each respondent's individual marriage market.

The census data is a wonderfully rich individual level data-set; however, it is only available every ten years. From 1979-2004, there is no dataset to the scale of the 5 percent census sample, so measurement error would be a concern for smaller geographic areas. Since the census is decennial I use ratios from the 1980 census for time periods from 1979-1985, the 1990 census for periods from 1986-1995, and the 2000 census for periods from 1996-2004. Thus there is some variation in these marriage market variables over time, but there is also variation as women change locations.

Table 8 shows the sample averages of the population ratios for each education level for all available[17] men and women. Looking at the education specific simple sex ratios ($M_{est}^{CC}, M_{est}^{HH}$, and M_{est}^{DD}) it is clear that $M_{est}^{CC} < M_{est}^{HH} < M_{est}^{DD}$ which would suggest that dropouts should be marrying at higher rates; however, this is not the case, so these simple sex ratios should not be able to explain the educational differences we see.

[17]Here, available men are those unmarried and not living in group quarters (i.e. incarcerated)

Table 7: Average Availability Ratios by Education Level

	Dropouts		HS Graduates		College Educated	
	All Men	Employed Men	All Men	Employed Men	All Men	Employed Men
$\frac{M_{Cst}}{W_{est}}$	0.578	0.436	0.703	0.515	0.593	0.425
	(0.313)	(0.244)	(0.378)	(0.314)	(0.088)	(0.075)
$\frac{M_{Hst}}{W_{est}}$	0.630	0.407	0.769	0.508	0.655	0.430
	(0.185)	(0.116)	(0.205)	(0.210)	(0.146)	(0.126)
$\frac{M_{Dst}}{W_{est}}$	0.889	0.339	1.126	0.432	1.000	0.384
	(0.056)	(0.058)	(0.304)	(0.139)	(0.455)	(0.206)
$\frac{W_{Cst}}{W_{est}}$	1.021		1.195		1.000	
	(0.452)		(0.467)		(0.000)	
$\frac{W_{Hst}}{W_{est}}$	0.820		1.000		0.871	
	(0.196)		(0.000)		(0.235)	
$\frac{W_{Dst}}{W_{est}}$	1.000		1.267		1.139	
	(0.000)		(0.357)		(0.557)	

Notes: Ratios constructed from the 1980-2000 US Census 5% samples and merged with the NLSY79 1979-2004 by location, year, and education. Standard Errors reported in parentheses.

Table 8: Average Marriage Market Indices by Education Level

	Simple Sex Ratio	Cascading Sex Ratio
Type of Men:	All	All
Dropouts	0.852	0.412
	(0.052)	(0.140)
HS Graduates	0.719	1.694
	(0.101)	(0.355)
College Educated	0.622	2.745
	(0.089)	(0.562)

Notes: Ratios constructed from the 1980-2000 US Census 5% samples and merged with the NLSY79 1979-2004 by location, year, and education. Standard Errors reported in parentheses.

4 Explaining Educational Differences in Marriage

In section 2, I highlight two indices that could be used to explain marriage patterns by education level. In the same vein as Brien (1997) and Lichter et al. (1992), and following the methodology laid out in Allison (1982), I use a logit model to approximate discrete-time hazards. In an effort to directly compare the efficacy of the two proposed marriage market measures in explaining the educational differences in marriage, I assign each individual the state and education specific sex ratios from equations (3) and (1) and run the following logit regressions with the measures of women's relevant marriage markets:

$$
\begin{aligned}
ln(\frac{P(marry_{iest})}{1-P(marry_{iest})}) &= \alpha_0 + \mu_D * Dropout_i + \mu_H * HSGrad_i \\
&+ \beta_C^{SR} * SR_{est} * College_i + \beta_H^{SR} * SR_{est} * HSGrad_i \\
&+ \beta_D^{SR} * SR_{est} * Dropout_i \\
&+ \theta * X_{it} + \tau * age + \tau_2 * age^2 \qquad (6)
\end{aligned}
$$

where SR_{est} is either the cascading sex ratio from equation (3) or the simple sex ratio from equation (1). The omitted group is women with some college education. Therefore, μ_D tells us if high school dropouts are more or less likely to marry in a given time period than women with some college education. Similarly, μ_H returns this value for high school graduates. The largest gap in figure 3 was between high school dropouts and graduates, so another main concern is whether or not we can reject the null hypothesis that $\mu_D = \mu_H$. Including the simple sex ratio should not be able to account for the educational differences; therefore, μ_D and μ_H should remain significant and we should reject the hypothesis that $\mu_D = \mu_H$. Including the sex ratio from equation (3) should show decreased differences by education level. In addition, the effect of this measure of the marriage market on odds of marriage should decrease with education level, i.e. $\beta_C^{SR} < \beta_H^{SR} < \beta_D^{SR}$ since the effects of competition should be most pronounced at the bottom of the education distribution.

Table 9 presents results from estimation of equation 6. The omitted education category is college educated women, so the closer a coefficient is to zero, the more similar the odds of marriage are to those of college educated women; if it is positive, that education group has higher odds of marriage, and if it is negative they have lower odds of marriage.

Column 1 of table 9 documents the base differences in the marriage patterns by education levels when only controlling for quadratic age effects. The coefficient on dropout says that an average 25 year old dropout are half as likely to marry[18] as college educated women, and this difference is significant at the 1% level. An average 25 year old high school graduate's odds of marriage are .77 times that of college educated women. Column 2 adds in exogenous covariates[19] and their interactions with education. Including these covariates does not greatly change the coefficients on dropout and high school graduate. These equations would say that even controlling for background differences, there are significant differences in odds of marriage between the most and least educated women.

[18] $e^{-0.703} = .495$

[19] these include AFQT score, mother's education, born in the south, religion dummies, lived in an urban area at 14, and lived with both parents at age 14

Table 9: Logit Regression Coefficients for First Marriages of Black Women Ages 18-40

	(1)	(2)	(3)	(4)
Dropout	-0.703***	-0.723**	-1.146***	-0.195
	(0.162)	(0.349)	(0.394)	(0.557)
HSGrad	-0.261**	-0.312	-0.579**	-0.171
	(0.122)	(0.199)	(0.230)	(0.227)
Sex Ratio			1.008**	0.255
			(0.450)	(0.200)
Tests:				
Drop=HS	0.0116†	0.264†	0.129†	0.962†
Drop=HS=0	5.06e-05†	0.0571†	0.00449†	0.752†
Psuedo R-squared	0.0251	0.0366	0.0379	0.0358
Exogenous Covariates		X	X	X
Simple Sex Ratio			X	
Cascade Sex Ratio				X

Notes: Robust standard errors in parentheses. † indicates p-values.*** p<0.01, ** p<0.05, * p<0.1.

All regressions include a constant, age, age^2, and their interactions with education.

Columns 2-4 include exogenous covariates and their interactions with education. All sex ratios included in log form.

Sources: NLSY79 1979-2004, US Decennial Census 1980-2000.

Column 3 adds in an education specific simple sex ratio. While this measure of the marriage market has a significant positive effect on a woman's odds of marriage, it is not able to account for the educational differences in marriage patterns; in fact, controlling for the availability of men of a woman's same education level increases the differences in marriage patterns across education levels. Now an average woman who is a dropout is .31[20] times as likely to marry as an average woman who goes to college.

Column 4 uses the model-implied cascading sex ratios to measure a woman's marriage market prospects. This measure has a positive effect, though not significant, but controlling for this measure of the marriage market significantly decreases the differences in odds of marriage by education level. Controlling for the cascading sex ratio, an average woman who is a dropout is .82[21] times as likely to marry as an average woman who goes to college. Neither β_D nor β_H is significantly different from zero once we control for the cascading sex ratio. This supports the idea that it is important to account for the competition a woman faces from women at other education level and also not to constrain a woman's marriage market prospects to be within her own education level.

Interacting these marriage market measures with the three education levels shows the different effects these marriage market measures have by education level. In this specification, the

[20] $e^{-1.146} = .318$

[21] $e^{-0.195} = .823$

Table 10: Logit Regression Coefficients for First Marriages of Black Women Ages 18-40

	(1)	(2)	(3)	(4)
Dropout	-0.703***	-0.723**	-0.716	-0.410
	(0.162)	(0.349)	(0.487)	(0.599)
HSGrad	-0.261**	-0.312	-1.148***	-1.090**
	(0.122)	(0.199)	(0.438)	(0.465)
Sex Ratio * Dropout			5.142**	0.659**
			(2.195)	(0.328)
Sex Ratio * HSGrad			-0.630	0.862
			(1.069)	(0.614)
Sex Ratio * College			1.182***	-0.443
			(0.428)	(0.344)
Tests:				
Drop=HS	0.0116†	0.264†	0.425†	0.239†
Drop=HS=0	5.06e-05†	0.0571†	0.0260†	0.0604†
Psuedo R-squared	0.0251†	0.0366†	0.0391†	0.0373†
Exogenous Covariates		X	X	X
Simple Sex Ratio			X	
Cascade Sex Ratio				X

Notes: Robust standard errors in parentheses. † indicates p-values.*** p<0.01, ** p<0.05, * p<0.1.

All regressions include a constant, age, age^2, and their interactions with education.

Columns 2-4 include exogenous covariates and their interactions with education. All sex ratios included in log form.

Sources: NLSY79 1979-2004, US Decennial Census 1980-2000.

coefficients on the marriage market interactions become more difficult to interpret. They are the difference in marriage probability for an average 25 year old dropout or high school graduate facing a sex ratio of 1[22] from a college educated woman. If the simple sex ratio is one then there are an even number of men and women at each education level. However, if the cascading sex ratio is one, it means something different for women of each education level, so it is a bit more difficult to interpret. However, this specification can still I've us insight into the effects of these marriage market measures for women of each education level. Column 3 says that the simple sex ratio has positive and significant effects on the odds of marriage for both dropouts and college educated women, but it's effects on dropouts are not significantly different from zero. Column 4 shows evidence that the cascading sex ratio has essentially no effect on college educated women, a larger but insignificant effect for high school women, and a positive and significant effect for dropout women. This is just as the model predicts, a shortage of men will have larger effects for women of lower quality.

[22] ln(SR)=0

5 Evaluating the Role of Competition Using a Flexible Specification

I adopt a flexible specification that includes sex ratios for both employed and not employed men of each education level to women of education level e and ratios of the number of women of each education level relative to women of education level e. This specification allows tests of restrictions that give the following:

1. the simple sex ratio
2. the cascading sex ratio
3. Wilson's hypothesis (this requires an extension of the framework that separates men into employed and not employed)

This specifications also allows us to observe which types of men are most relevant in a woman of education e's marriage decision and also which women she is competing with the most.

For individual i, with education level e, in state s, at time t:

$$\begin{aligned} ln(\frac{P(marry_{iest})}{1-P(marry_{iest})}) &= \alpha_0 + \beta^E_{eC} * \frac{M^E_{Cst}}{W_{est}} + \beta^E_{eH} * \frac{M^E_{Hst}}{W_{est}} + \beta^E_{eD} * \frac{M^E_{Dst}}{W_{est}} \\ &+ \beta^{\overline{E}}_{eC} * \frac{M^{\overline{E}}_{Cst}}{W_{est}} + \beta^{\overline{E}}_{eH} * \frac{M^{\overline{E}}_{Hst}}{W_{est}} + \beta^{\overline{E}}_{eD} * \frac{M^{\overline{E}}_{Dst}}{W_{est}} \\ &+ \gamma_{eC} * \frac{W_{Cst}}{W_{est}} + \gamma_{eH} * \frac{W_{Hst}}{W_{est}} + \gamma_{eD} * \frac{W_{Dst}}{W_{est}} \\ &+ \theta * X_{it} + \tau * age + \tau_2 * age^2 \end{aligned} \tag{7}$$

here E is for employed men and $\overline{E}$ is for non-employed men. The vector X_{it} includes variables that capture family background and family values that we think might influence a woman's likelihood of marriage[23] and $\gamma_{ee'} = 0$ when $e = e'$ since $\frac{W_{est}}{W_{est}} = 1$.

For each education level, the test of the Wilson hypothesis is $\beta^{\overline{E}}_{eC} = \beta^{\overline{E}}_{eH} = \beta^{\overline{E}}_{eD} = 0$. And imposing this restriction gives:

[23] I have also run the regressions including $ln(income)$, a dummy for having a child before 18, county population density, and a dummy for being enrolled in school. These variables are most likely endogenous and their inclusion does not change the main results

$$
\begin{aligned}
ln(\frac{P(marry_{iest})}{1-P(marry_{iest})}) &= \alpha_0 + \beta^E_{eC} * \frac{M^E_{Cst}}{W_{est}} + \beta^E_{eH} * \frac{M^E_{Hst}}{W_{est}} + \beta^E_{eD} * \frac{M^E_{Dst}}{W_{est}} \\
&+ \gamma_{eC} * \frac{W_{Cst}}{W_{est}} + \gamma_{eH} * \frac{W_{Hst}}{W_{est}} + \gamma_{eD} * \frac{W_{Dst}}{W_{est}} \\
&+ \theta * X_{it} + \tau * age + \tau_2 * age^2 \qquad (8)
\end{aligned}
$$

From equation (7) I can also test to see if the effects of the number of employed and non-employed men are the same by testing $\beta^{\overline{E}}_{eC} = \beta E_{eC}$ $\beta^{\overline{E}}_{eH} = \beta^E_{eH}$ $\beta^{\overline{E}}_{eD} = \beta^E_{eD}$. Imposing these restrictions gives the following:

$$
\begin{aligned}
ln(\frac{P(marry_{iest})}{1-P(marry_{iest})}) &= \alpha_0 + \beta_{eC} * \frac{M_{Cst}}{W_{est}} + \beta_{eH} * \frac{M_{Hst}}{W_{est}} + \beta_{eD} * \frac{M_{Dst}}{W_{est}} \\
&+ \gamma_{eC} * \frac{W_{Cst}}{W_{est}} + \gamma_{eH} * \frac{W_{Hst}}{W_{est}} + \gamma_{eD} * \frac{W_{Dst}}{W_{est}} \\
&+ \theta * X_{it} + \tau * age + \tau_2 * age^2 \qquad (9)
\end{aligned}
$$

In this framework, the $\beta_{ee'}$ can be interpreted as the effect of an increase in the number of men of education level e' relative to women of education e on these women's odds of marriage holding the relative numbers of other men and women constant. These parameters are expected to be greater than zero, with the effects of men at adjacent levels of education expected to be larger than the effects of men at non-adjacent education levels. The $\gamma_{ee'}$ can be interpreted as the effect of the number of women of education level e' relative to women of education level e holding the relative numbers of other women and men constant. These parameters are expected to be less than zero with women at adjacent levels of education expected to have a larger effect than women at more different education level on the odds of marriage for women of education level e. More specifically, this means:

1. For dropout women, $\beta_{DD} > \beta_{DH} > \beta_{DC}$ and $\gamma_{DH} > \gamma_{DC}$
2. For college educated women, $\beta_{CC} > \beta_{CH} > \beta_{CD}$ and $\gamma_{CH} > \gamma_{CD}$
3. For high school women, the expectations are less clear, $\beta_{HH} > \beta_{HC} \gtreqless \beta_{HD}$ and $\gamma_{HC} \gtreqless \gamma_{HD}$

5.1 Testing the Simple Sex Ratio Restrictions

Within this framework, for $e \neq e'$, restricting $\beta_{ee'} = 0$ and $\gamma_{ee'} = 0$ allows only the simple education-specific sex ratios to matter. If constraining marriage markets by education level, i.e. the simple sex ratio, captures a women's relevant marriage market, and if the competition a woman faces from women of other education levels is irrelevant, then $\beta_{ee'} > 0$ if $e = e'$ and we should fail to reject a joint test of $\beta_{ee'} = 0$ and $\gamma_{ee'} = 0$, if $e \neq e'$. I expect to reject this test.

5.2 Testing the Cascading Sex Ratio Restrictions

Imposing the following restrictions would give the sex ratios in equation (3).

(a) For college educated women, $\beta_{CC} = \beta_{CH} = \beta_{CD}$ and $\gamma_{CH} = \gamma_{CD} = 0$

(b) For high school graduate women, $\beta_{HC} = \beta_{HH} = \beta_{HD} = -\gamma_{HC}$ and $\gamma_{HD} = 0$

(c) For dropout women, $\beta^M_{DC} = \beta_{DH} = \beta_{DD} = -\gamma_{DC} = -\gamma_{DH}$

These are extremely strong restrictions, and when testing these restrictions, I expect to reject them.

Table **??** presents the results from the estimation of equations (7) and (8). In columns 1, 3, and 5 I include both ratios for employed and non-employed men. In each instance, we fail to reject the hypothesis that the effects of the non-employed men are zero, which seems to lend support to the Wilson hypothesis, however, we also fail to reject that the effects of all men are zero. Columns 2, 4, and 6 impose the restriction that the effects on non-employed men are zero and include only the ratios for employed men. Here we see significant negative effects of high school graduate women on both dropout and college educated women suggesting that there is both competition coming from above and below. For high school graduate women the results are unclear, but for both dropouts and college educated women we see the strongest positive effects of men of the same education level and the effects decrease as the education level becomes more dissimilar.

Table 12 presents the results of equation 9 for women at each education level in an effort to examine the effects of the availability of men and the role of competition from other women on women's odds of marriage. Including these ratios allows us to test the restrictions implied by the simple sex ratio and the cascading sex ratios.

The results for women who drop out of high school are presented in column 1. The relative number of high school graduate and dropout men have positive effects, and the relative

Table 11: Logit Regression Coefficients for First Marriages of Black Women Ages 18-40

	Dropout Women		HSGrad Women		College Women	
Employed College Men	0.871	-1.578	1.873	1.309	1.648	1.670*
	(3.730)	(2.794)	(1.143)	(0.984)	(1.146)	(0.972)
Employed HSGrad Men	2.225	2.725	-0.525	-0.370	0.745	0.816
	(5.988)	(5.831)	(2.012)	(1.780)	(1.562)	(1.614)
Employed Dropout Men	7.315	4.752	-0.187	0.865	-0.261	-1.201
	(5.041)	(4.775)	(2.215)	(1.652)	(1.426)	(1.170)
Not Employed College Men	-9.121		-4.022		0.195	
	(7.631)		(3.848)		(2.240)	
Not Employed HSGrad Men	10.76		0.816		2.871	
	(9.641)		(3.969)		(2.341)	
Not Employed Dropout Men	1.807		0.000600		-0.449	
	(5.206)		(1.855)		(1.502)	
College Women	1.189	2.277	-0.0503	-0.375		
	(1.880)	(1.771)	(0.949)	(0.731)		
HSGrad Women	-6.840**	-5.024**			-1.509*	-1.117
	(2.881)	(2.305)			(0.892)	(0.812)
Dropout Women			0.981	0.360	0.513	0.632
			(1.370)	(0.667)	(1.018)	(0.427)
Test Restrictions:						
Simple Sex Ratio		$0.0242^{\dagger}$		$0.0595^{\dagger}$		$0.350^{\dagger}$
Cascade Sex Ratio		$0.0262^{\dagger}$		$0.332^{\dagger}$		$0.0391^{\dagger}$
Wilson Hypothesis	$0.333^{\dagger}$		$0.742^{\dagger}$		$0.516^{\dagger}$	
Effects of All Ratios Zero	$0.00672^{\dagger}$	$0.0114^{\dagger}$	$0.0569^{\dagger}$	$0.0891^{\dagger}$	$0.140^{\dagger}$	$0.0536^{\dagger}$
Observations	2,356	2,356	3,693	3,693	6,279	6,279
Psuedo R-squared	0.0714	0.0650	0.0401	0.0392	0.0298	0.0292

Notes: Robust standard errors in parentheses. † indicates p-values.*** p<0.01, ** p<0.05, * p<0.1.

All regressions include a constant, exogenous covariates, age, age^2, and their interacts with education.

Sources: NLSY79 1979-2004, US Decennial Census 1980-2000.

number of high school graduate women has a negative effect on dropout women's odds of marriage. The effects of the relative number of college educated men and women are the opposite of what one would expect, but these effects are not statistically different from zero.

For women who are high school graduates, column 2 shows that all of the effects have the expected sign except the effect of an increase of high school educated men, which is negative. However, none of these effects are significant, and we fail to reject the hypothesis that none of these ratios has an effect on the marriage probability of high school graduate women.

Column 3 shows the results for college educated women. Similar to the results for dropout women, the numbers of college educated and high school graduate men have positive effects of college women's odds of marriage whereas the relative number of dropout men has a

Table 12: Logit Regression Coefficients for First Marriages of Black Women Ages 18-40

	Dropout Women	HSGrad Women	College Women
College Men	-1.412	1.013	1.150
	(1.813)	(0.861)	(0.734)
HSGrad Men	5.397	-0.0894	1.443
	(4.373)	(1.809)	(1.212)
Dropout Men	4.914	0.984	-0.312
	(3.148)	(1.025)	(1.141)
College Women	0.998	-0.575	
	(1.319)	(0.812)	
HSGrad Women	-6.194**		-1.533*
	(2.553)		(0.885)
Dropout Women		-0.315	0.384
		(0.891)	(0.972)
Test Restrictions:			
Simple Sex Ratio	$0.0331^{\dagger}$	$0.220^{\dagger}$	$0.346^{\dagger}$
Cascade Sex Ratio	$0.0296^{\dagger}$	$0.610^{\dagger}$	$0.00440^{\dagger}$
Effects of All Ratios Zero	$0.00740^{\dagger}$	$0.260^{\dagger}$	$0.00668^{\dagger}$
Observations	2,356	3,693	6,279
Psuedo R-squared	0.0665	0.0383	0.0295

Notes: Robust standard errors in parentheses. † indicates p-values.*** p<0.01, ** p<0.05, * p<0.1.

All regressions include a constant, exogenous covariates, age, age^2, and their interacts with education.

Sources: NLSY79 1979-2004, US Decennial Census 1980-2000.

negative and statistically insignificant effect. College educated women face significant competition from high school graduate women, but the effect of dropout women has the opposite sign than expected and is again insignificantly different from zero.

These results suggest that competition is important between women with a college education and women who graduate high school and between high school graduates and dropouts, but that there is not significant competition between the most and least educated women.

5.3 Testing Marriage Market Index Restrictions

This framework also allows us to assess the restrictions imposed by various marriage market measures. Using the simple sex ratio (the number of men of education e divided by the number of women of education level e) essentially assumes the relative numbers of men and women of other education levels have no effect on a women's marriage odds. As detailed in section **??**, testing that the effects of all ratios, save the effect of men of education e to women of education e, are zero tests the assumptions of the simple sex ratio. For dropout women we reject that all of these effects are zero. For high school graduate and college

educated women we fail to reject this hypothesis. However, we have to keep in mind that for high school graduate women we also fail to reject the hypothesis that all of the effects are zero. Thus, it would appear that the simple sex ratio may only be appropriate to explain the marriage patterns of college educated women, but it would be an inaccurate measure for dropouts and high school educated women. Using the cascading sex ratio implied by the simple model of the marriage market, essentially assumes that an increase in the relative number of men, regardless of his education level, or a reduction in the number of more educated woman has the same effect for a woman of education level e. When we test these restrictions, we reject them for both dropouts and college educated women and fail to reject them for high school graduates (but again we fail to reject that all effects for high school graduate women are zero).

Neither of these measures seem to be completely accurate ways of measuring the marriage market; however, we can construct education specific measures of the marriage market to assess the ability of the measures to account for the educational differences in marriage patterns. The simple sex ratio should not be able to account for the educational differences. While the cascading sex ratio may not be a completely accurate measure of the marriage market, using this measure instead of the simple sex ratio is better able to account for the educational differences, and thus lend credence to the idea that the competition between education levels is a part of the story that cannot be ignored.

5.4 Yearly vs. Decennial Population Measures in Constructing Sex Ratios

In order to calculate accurate sex ratios for small geographic area, it is necessary to use the census since it's sample size is unmatched. Census data is, however, only available every ten years. Using census data, variation in the sex ratio variables happens only between 1985 and 1986 and between 1995 and 1996 or if a person moves to a new state. Yearly variation in this variable should provide us with more accurate estimates of the effects of marriage market prospects on the odds of marriage. To obtain yearly variation I try 2 approaches: first, I use yearly CPS data at the state level to compute the sex ratios for each education group, and second, I impute the population levels in non-census years by creating a weighted average of the population levels from Census years. For example, in 1981 the number of dropout women would be made up of 90 percent the 1980 number of dropout women and 10 percent the 1990 number of dropout women. Once I have the weighted population levels I can create imputed yearly measures of the population ratios.

These two approaches should give some insight as to the necessity and appropriateness of using decennial population measures to calculate "yearly" sex ratios.

5.4.1 Using the CPS

The CPS surveys roughly 55,000 households (135,000 individuals) each month of each year, so they have the advantage of more frequent collection; however, once we break the data down by state, race, and education level we are still left with some incredibly small sample sizes for black men and women which could lead to very inaccurate measurement of marriage market prospects.

5.4.2 Imputing Sex Ratios Between Census Years

Since there is no yearly dataset between 1979 and 2004 with a sample size equivalent to that of the census, one way to explore whether the lack of yearly variation poses a great problem is to impute the generalized sex ratios for non-census years.

6 Conclusions

This paper has explored the sizable differences in first marriage rates between black women ages 18-40 who drop out of high school and those who do not in the NLSY79. As expected, education-specific simple sex ratios are unable to account for these educational differences in odds of marriage. Using a very basic model of the marriage market with identical individuals within an education level, I construct a cascading measure of the marriage market that allows a woman's odds of marriage to be based on the ratio of the total number of men less the number of more educated women to the number of women of a particular education level. Controlling for this measure of the marriage market significantly decreases the differences between both dropouts and high school graduates and college educated women.

The framework of this paper also allows for an evaluation of the effects of the number of men and women of different education levels relative to women with education level e. Including these ratios separately does not shed much light on the marriage patterns of high school graduate women, but for college educated women and dropout women, there were positive effects of the number of men at the same education level and at the high

school graduate education level and also significant negative effects of the number of high school educated women that they have to compete against.

These results show the inherent problems associated with assuming independent marriage markets by education level and highlight the importance of accounting for competition across education levels for partners.

This work invites many questions to still be explored. For instance, the experience of GEDs in the marriage market is yet to be addressed. Also, further investigation into what constitutes a person's relevant marriage market is required, especially since we can imagine these changing over time as people become more mobile and connected by technology. Finally, this research can be expanded by including not only the transition to first marriage, but also the transition to first union, where union can be a marriage or a cohabiting relationship. It is not clear whether uneducated women are simply cohabiting on a larger scale or if they are forming fewer stable unions overall.

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Table 13: Summary Statistics: Black Women Ages 18-40, 1979-2004

Covariate	Dropouts	GEDs	HS Graduates	College
AFQT	8.528	13.523	15.87	31.46
Born in South	0.667	0.606	0.687	0.608
Mother's Education	9.185	10.30	10.221	11.482
Urban Area at 14	0.794	0.874	0.751	0.832
Catholic	0.057	0.066	0.062	0.102
Protestant	0.868	0.883	0.898	0.872
Non-Christian	0.004	0.015	0.003	0.002
Non-religious	0.070	0.037	0.036	0.024
Lived with Parents at 14	0.360	0.431	0.496	0.555
Child before 18	0.397	0.540	0.178	0.111
ln(Income) at 25	3.60	4.08	5.93	7.60
Enrolled in School at 25	0.010	0.058	0.011	0.138
County Population Density at 25	3279.24	3848.78	2312.76	3329.75

A GEDs

This appendix will discuss the unique problem posed by GEDs, why I chose to omit them from my analysis, and why they deserve to be considered separately. Marriage patterns for GEDs look almost identical to those for dropouts, yet looking at table 13, we see that in terms of background characteristics they seem to be more similar to high school graduates except that they had a child before 18. In addition, the census data does not distinguish between high school graduates and GEDs. Since it is unclear whether they should be grouped with dropouts or high school graduates or considered as a separate category, I drop them from my analysis.

Table 14: Marriage Statistics by Education: Black Women Ages 18-40, NLSY79 1979-2004

	# in sample Median age of first marriage|gets married Average age of first marriage|gets married Percent married by 40
Dropouts	N=183 21 22.67 46.3%
GEDs	N=108 22 23.96 45.4%
HS Graduates	N= 337 23 24.79 61.1%
College	N=596 24 25 67.1%