EEB--UNDERGRADUATE ECONOMICS JOURNAL

EMPIRICAL ECONOMIC BULLETIN

THE CENTER FOR GLOBAL AND REGIONAL ECONOMIC STUDIES BRYANT UNIVERSITY

Are Educated Women Less Likely to Get Married?

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Abstract:

In the past, there are some research indicate that highly educated women marry less. Because women tend to face the success penalty, however, a new analysis of U.S. census data indicates that--despite cultural messages to the contrary--the success gap, in which better educated women marry less, is actually shrinking. Using 2008 Current Population Survey, this paper utilized Probit regression to analyze how increase of women's educational attainment can influenced marriage and other aspects such as financial well-being. In addition, this study tries to estimate the best levels of education for women to be more likely to married.

JEL Classification: J1, I21

Keywords: Marriage; Women; Education

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I. Introduction

Today, more people realize the importance of good education. Over the years, social views have changed; the role of women have transformed in the labor market as well as in the family. Nowadays, women are encouraged to attain higher levels of education and enjoy a successful career instead of marrying young and becoming housewives. Evidence suggests that, up to a point, an additional year of schooling is likely to raise an individual's earnings about 10 percent (Krueger, 2005). However, several studies show that women face a conflict between their roles in the two worlds. Many research suggested that there is the "success penalty" or the disadvantage to women in the marriage market (Rose, 2003).

While male are more likely to find a wife or have a family if he is successful, women seems to be the opposite. According to Matsui (2004), highly educated women, working full time/ part time or students, and living in a larger city tend to delay marriage. Also, Rose's (2003) study pointed out several source of the penalty such as the "female hypergamy" and other psychological behaviors of male chauvinistic.

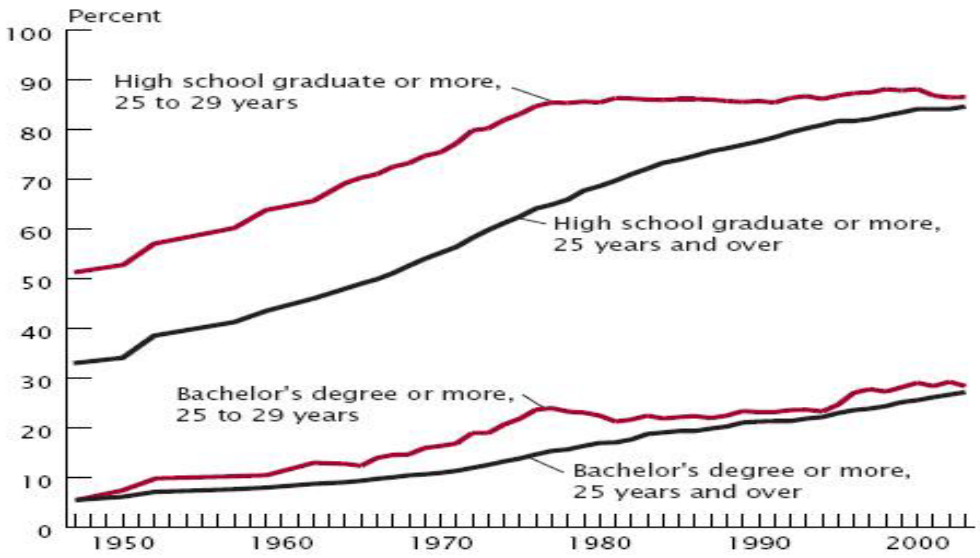
The aim of this paper is to examine whether higher education level would disadvantage women in marriage. If education does disadvantage women in marriage, would different racial background disadvantage women at a different level?. This study using econometric examination predict the "magic number" years of education that is best for marriage.

The structure of this study is as follows. Section two introduces marriage trends in the US. Section three provides literature reviews that are related to this topic. In section four data and empirical methodology used in this study are presented. Section five includes empirical results, followed by conclusion.

II. Trend

The population in the United States is becoming more educated, but significant differences in educational attainment lie within age, sex, race, and origin. In 2003, over four-fifths (85%) of all adults 25 years or older reported they had completed at least high school; over one in four adults (27%) had attained at least a bachelor's degree. Study done by the census bureau also shows that the younger population is more educated than the older population (Census, 2007)

Figure 1: Education Attainment of the Population 1947-2003

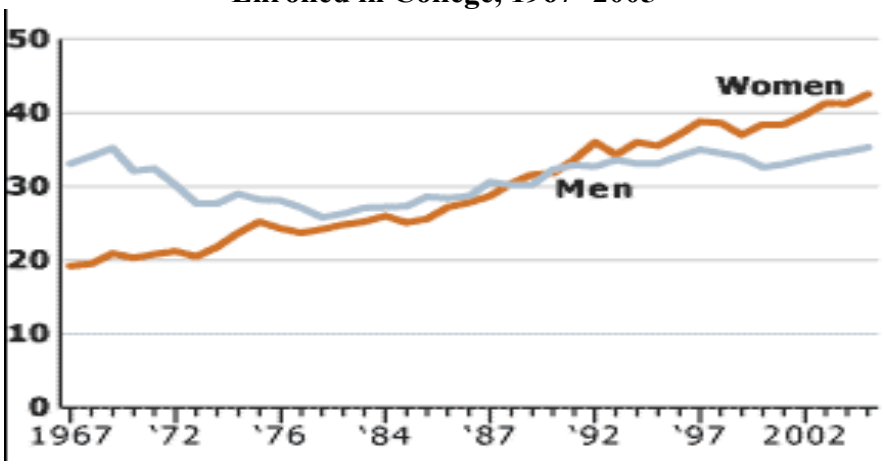


Sources: U.S. Census Bureau. Current Population Suvry

Figure 2 shows that since 1991, the proportion of young women enrolled in college has exceeded the enrollment rate for young men, and the gap has widened over time. In 2005, about 43 percent of women ages 18 to 24 were enrolled in college, compared to 35 percent of young men. This represents a major shift in the gender balance at U.S. colleges and universities. In 2005, women make up the majority (54 percent) of the 10.8 million young adults enrolled in

college. Several reasons have been cited for this crossover: gender differences in academic achievement (girls generally do better in high school than boys), changes in societal values, and a shift in women's expectations for higher education and future employment.

Figure 2: Proportion of 18 to 24 year old Men and Women Enrolled in College, 1967 -2005



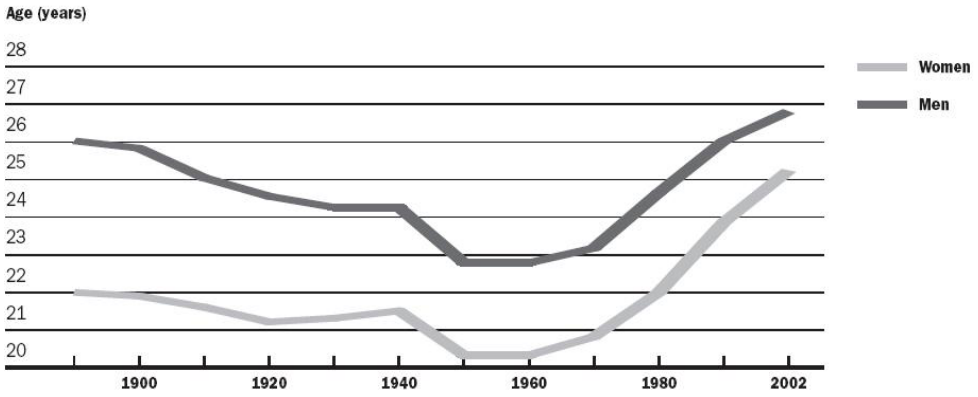
Source: U.S. Census Bureau

Colleges need to balance women's advantage in enrollment rates against their disadvantage in the post-college labor force. Women's earnings, relative to those of men, have not kept up with their gains in educational attainment. In 2005, the median weekly earnings for women working full-time were $585, compared with $722 for men. The tradeoff that women make between education and marriage seems to be going away. In 1980, a woman with three years of graduate school was 13 percent less likely to be married than a woman with only a high-school diploma. By 2000, that gap shrank to less than 5 percent (Rose, 2003).

Besides deferring marriage age, we also see a trend in declining marriage rate. Figure 3 shows the median age at marriage, for men and women from 1890 to 2002. In 1890 the median age was relatively high, about twenty-six for men and twenty two for women. During the first

half of the twentieth century, the typical age at marriage dropped. By the 1950s, it had reached historic lows, roughly twenty three for men and twenty for women. Women today are marrying substantially later than they ever have.

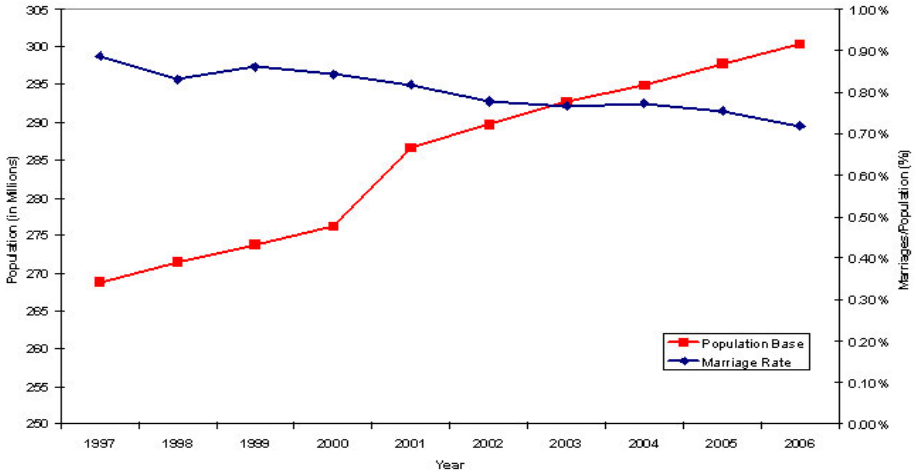
Figure 3: Median Age at Marriage, 1890-2002



Source: U.S. Bureau of the Census

About half of young adults live with a partner before marriage. Cohabitation is far more common today than it was in the early or mid-twentieth century. Cohabitation today is a diverse, evolving phenomenon. For some people, it is a prelude to marriage or a trial marriage. For others, a series of cohabiting relationships may be a long-term substitute for marriage which would in terms decrease the marriage rate (Cherlin, 2005). In addition to change in marriage age, we also see a trend in changes in demographic. Figure 4 shows that since 1997, U.S. marriage rate has been declining while the population base increased.

Figure 4: U.S. Population and Marriage Rates 1997 to 2006



Source: U.S. Bureau of the Census

III. Literature Review

There are many reasons to believe that education can improve women's well being, even for women with very limited labor force participation. In particular, evidence suggests that education reduces mortality (Lleras-Muney, 2002), increases the cognitive ability of women's children (Murnane, 1981), reduces the incidence of criminal activity (Lochner and Moretti, 2001), aids in overcoming addiction (Sander, 1995), and improves the health of women's children (Thomas, Strauss, and Henriques, 1991 and Currie and Moretti, 2002). Goldin (1992) presents evidence that attending college may have improved the marriage outcomes of women who attended school in the 1960's and 1970's.

Rose (2003) discussed the source of women's success penalty, i.e. female hypergamy, where women tend to marry up, thus lack of suitable husbands for women in a higher social class. On the contrary, men tends to "go down a step to take a wife" because "a woman from a more distinguished family than her husband may consider herself superior and act haughtily toward him". Hypergamy with respect to education can lead to a success penalty as it tends to disadvantage women at the top of the distribution. Similar to this idea was Becker's positive

assortative mating theory. He suggests that people with similar traits tend to marry. Which means if one is a college graduate, his/her spouse would be more likely to be a college graduate as well. Juhn and Murphy (1997) revealed that men with high wages tend to marry women with favorable labor market prospects, because marrying a college educated spouse is associated with significantly higher family income. Also, women who attended college were much more likely to marry college educated husbands.

According to Rose (2003), there is indeed a tradeoff between motherhood and marriage for women with more than a college degree. Around 81.5 percent of women with 16 years of education were mothers at age 40-44, while only 63.4 percent of women with a professional degree or doctorate had children. The difference in black and white marriage rates lies primarily at the lower end of the education distribution. Lefgren and McIntyre (2006) found that beyond high school, education is associated with reductions in the probability of ever having been married. Beyond college completion, additional education is associated with fewer and less stable marriages.

IV. Data and Methodology

This study used data from the 2008 Current Population Survey. The data set contains information on marital status, race, education attainment, metro level, as well as total personal income. Using 29,904 sample size, this research explore the relationship between education attainment and marriage outcomes for women between the ages of 35-45 who are currently residing in the U.S. Table 1 shows summary statistics.

Nearly 87.85% (26,273 women) have been married at least once, only 12.14% (3631 women) have never been married. 77.48% of women are in the labor force and 22.52% of

women are not. The average income for women in our sample is $23,479.83. Education in this study is reported in categories as opposed to years. For our analysis, we combine all individuals who complete less than or equal to 12th grade (receive no diploma). We also group together all individuals who are high school graduate or attended college but did not earn a bachelor or received associate degree. Finally, we combined masters and professional degrees.

Table1: Summary Statistics for 2008 Current Population Survey

Variable	Mean	Min	Max
Age	40 (3.14)	35	45
Income and Wages	23,479.83 (32,132.28)	0	688,117
In Labor force	0.7748 (0.44)	0	1
Low education (less than12th grade)	0.076 (0.265)	0	1
High school graduates	0.512 (0.499)	0	1
College graduate	0.053 (0.223)	0	1
Master and professional degrees	0.358 (0.479)	0	1
Total observations	29,904		

Using the 2008 CPS data, we begin to analyze the relationship between education and marriage outcomes. As mentioned earlier, education is reported in categories as opposed to years. For this reason, we focus on the marginal change in marriage outcome associated with moving up to the next education category.

Prior studies have largely utilized multiple regression, probit, or logit models to analyze statistical relations between marriage and other explanatory variables (Johns, Yang, & Chen, 2003). Because of the discrete nature of the dependent variable in this study, ordinary least squares regression would be an inappropriate model.

The standard ordered probit model is widely used to analyze discrete data of this variety and is built around a latent regression of the following form:

$$\hat{\mathbf{Y}} = \mathbf{x'\beta} + \boldsymbol{\varepsilon} \qquad (1)$$

where x and β are standard variable and parameter matrices, and ε is an error term. Using the ordered probit model, we included the flowing explanatory variables: metropolitan of residing city ($Metro_i$), race ($Race_i$), education level ($Educ_i$), and income level (Inc_i).

$$\mathbf{Y^*_I = \beta_0 + \beta_1 Metro_i + \beta_2\, Race_i + \beta 3\, Educ_i + \beta 4\, Inc_i + \varepsilon} \qquad (2)$$

where

Y^*_I = unobserved marital status
Y_i = observed marital status
$Y_i = 0$ if $Y^* \leq 0$, indicating the woman is not currently married
$Y_i = 1$ if $0 \leq Y^* < \mu_1$, indicating the woman has at least been married once

One possible difficulty in interpreting the results of parameters estimated using equation (2) involves the use of Metro and Inc as explanatory variables. Nevertheless, we find that Income is an important variable to examine because some studies have shown that income level has close correlation on marriage rate. From a practical standpoint, the primary rationale for placing the income level in the model is that woman with higher income tend to have higher position jobs which require a higher level of education, consequently defering the marriage age. Also, the opportunity cost for women in high level position is much higher than other women; therefore, they are less prompt to leave their high paid job to get married and start a family.

V. Empirical results

Table 2 reports the empirical results of regression (2). The likelihood ratio chi-square of 1279.56 with a p-value of 0.000 shows that our model as a whole is statistically significant, as compared to model with no predictors. However, coefficient in a probit model does not have a

significant meaning, thus we conducted the marginal effect test on regression (2). Marginal effect results are shown in table 3.

Table 2: Regression results

Variable	Coefficient	Standard Error	Z	P >| z|
Metro	.0133361	.0098953	1.35	0.178
Age	.0295089	.0030805	9.58	0.000
Incwage	-2.30e-06	2.80e-07	-8.19	0.000
White	.3655167	.0583832	6.26	0.000
Asian	.2299523	.0725908	3.17	0.002
Black	-.4859689	.061616	-7.89	0.000
MP	.2484719	.0373603	6.65	0.000
CG	.293801	.0545458	5.39	0.000
HS	.2301687	.0353469	6.51	0.000
cons	-.4189307	.1396479	-3.00	0.003

(*) LR chi ^{2}(9) = 1279.56, prob>chi^2 = 0.000

From table 3, we conclude that at 5% significance all variables are significant, except Metropolitan level (Metro). Age, white, Asian, master degree or professional degree (MP), college degree(CG), and high school education (HS) are positively related with marital status, while income level (Incwage) and black has negative relationship. Dy/dx represents the marginal effect of the regression. The probability of a women being married at age 35-45 would increase 0.25% if she move to a metropolitan area and 0.56% higher for every year she gets older. For a white female, chances of getting married at age 35-45 is 7.9% higher, and for an Asian female it is 3.8% higher.Probability of a female who holds a master or professional degree being married at least once at age 35-45 is 4.5% higher, 4.7% higher if she has a bachelor degree, and 4.3% higher if she is a high school graduate. For female ages between 35 and 45, the negative coefficient for income level and for black women suggest that a negative relationship between marriage

outcomes. We can associate income variable with women's opportunity cost to give up high paying jobs and start family. The negative relation for black female could be due to the increase of incarceration rate for black men and an increase in black men dating and marrying outside of their race (Ali, 2009). So it makes even harder for black female to find a husband.

Table 3: Regression results for Marginal Effect

Variables	Dy/dx	Standard Error	P > |z|
Metro	.0025258	.00187	0.178
Age	.005589 ***	.00058	0.000
Incwage	-4.35e-07 ***	.00000	0.000
White	.0794416 ***	.01433	0.000
Asian	.0381904 ***	.01043	0.000
Black	-.1139563 ***	.01723	0.000
Mp	.045128 ***	.0065	0.000
Cg	.0471297 ***	.00726	0.000
hs	.0437882 ***	.00675	0.000

Note: dy/dx is for discrete change of dummy variable from 0 to 1
*, **, and *** indicates significance at the 10%, 5%, and 1% level, respectively.

Table 4 shows the predicted probabilities when variables are set to specific values. As we see from the table, for a black woman with a master or professional degree, chances of being married at age 35 is 78%, while 82% chance of being married if she only has a college degree, which confirm the success penalty that Rose (2003) suggested in her study. A black woman would have a higher chance of being married at age 35 if she is a college graduate than if she holds a master degree. However, if the same black woman has only a high school degree, her chance of being married at age 35 decreases to 77.4%, which means a low education has negative effect on marriage outcome. If the black woman is 45, her chance of being married is higher than when she was 35, however the probability of being married does not vary much across different levels of education. This is not surprising because women would be more likely

to be married at least once at age 45 than 35. Same trend for both white and Asian women, however with a lower degree.

Table 4: Predicted Probabilities of Marriage and Education

	35	45
Master or Professional Degree		
Black	0.7881	0.8632
White	0.9028	0.9444
Asian	0.9267	0.9597
College Graduate		
Black	0.8209	0.8876
White	0.9217	0.9565
asian	0.9419	0.9690
High School Graduate		
Black	0.7743	0.8527
White	0.8944	0.9389
Asian	0.9199	0.9554

Table 5 illustrates women's financial wellbeing and education in the United States. The incomes reported are the predicted incomes for women of the given education category. The change in incomes is the marginal increase associated with increasing one level of educational category. According to the empirical results, women who have never been married tend to make more money than married women in the job market given similar education background. Moreover, women who have never been married receive greater benefits than married women when educational attainment increases. For married women, on average, income increase by $10,3078 when education level increases from bachelor to master or professional degrees. On the other hand, income for women who never married increases by $19,207, nearly doubles, by going from bachelors to master or a higher degree.

Table5: Women's Financial Wellbeing and Education

	Married Women Income	Change Married Women Income	Never Married Women Income	Change Never Married women Income
Loweduc	7942.083		7156.493	
HS	17544.02	+9601.937	19128.6	+11972.107
CG	23342.11	+5798.09	25519.24	+6390.64
MP	33720.65	+10378.54	44726.49	+19207.25

Table 6 summaries the probability of women married at age 35 and at age 45. We notice that with the same income, women who are older are more likely to be married or at least married once. For a women with master degree or higher, and at age 45 has less chances of being married. However, women with a college degree are more likely to be married at age 45, probably because most women in this sample at 45 are currently married or at least married once. Pursuing education takes time; therefore most women would have to defer their timing on marriage. Also, women with a low educational level (less than twelve years of education) are less likely to be married.

Table 6: Probability of Women Getting Married

	Age 35	**Over Age 45**
Same Income Level	-1.95e-06 (1.05e-06)***	-2.51e-06 (9.08e-07)***
MP	.1547215 (.0665018)*	.0922271 (.0747227)*
CG	-.1347805 (.1323798)	.2649926 (.1653271)
HS	-.0986707 (.0618746)*	.0426073 (.068662)*
Loweduc	-.0289546 (.1149206)	-.5116825 (.1129493)

VI. Conclusion

Using the 2008 CPS data, this paper examines whether higher educational attainment would disadvantage women in the marriage market. Due to different limitations, the paper was not able to conclude on the exact effects of education on marriage outcomes. The result is measure in the likelihood of being married once or never been married. The evidence in this paper suggests that education is correlated with women's well-being in the marriage market. There is little indication that highly educated women are being disadvantage. College graduate seems to have the highest percentage of being married at least once at age 35-45. On the other hand, the more schooling a woman receive; she is more likely to be married at least once. Women who did not receive at least twelve years of school have a higher probability of not married for all races.

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