MARRIAGE, FERTILITY, AND LABOR MARKET PROSPECTS IN THE UNITED STATES, 1960-2000

A Dissertation

by

YU-CHEN KUO

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2005

Major Subject: Economics

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ABSTRACT

Marriage, Fertility, and Labor Market Prospects in the United States, 1960-2000.

(August 2005)

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Over the past forty years a tremendous number of women have entered the labor market, removing stay-home motherhood as the most dominant female occupation. The linkage between the change in the labor market and change in family structure has drawn a lot of attention from social scientists, and it is on this linkage that this analysis is focused.

An essential dimension of this changing behavior is the sharp rise in out-of-wedlock childbearing. The central issue of non-married motherhood is more related to the diminishing willingness to marry than a changing attitude toward fertility. In a setting where individuals choose marriage because of the gains from joint production of child quality as well as the division of labor, the declining gains from specialization for men influence potential spouse selection. Men and women with fewer labor market prospects become less desirable, and consequently a marriage market with more positive assortative mating will be observed.

The increase in female labor market participation is larger for highly-educated women but the decrease in marriage rates is more characteristic of less-educated women over this period. What drives these changes can be explained by using a simple

economic theory, the fundamental concept of which is that couples with lower labor market prospects also face lower gains from marriage because of the increases in female-male relative wages in the less-educated and black groups. A narrowing of the gap between male and female wages would reduce the gains from division of labor and lower the incentive to marry. In addition, when the marriage market becomes more positively assorted, low educated men and women are less likely to marry each other.

Our empirical results indicate an increase in the homogeneity of wages between spouses over this period regardless of whether we control for education. In particular, black couples are more positively assorted than white couples although the trend converges by the end of the century. We also show that the marriage market is tilted towards better-educated men and women over the period. These findings are consistent with the theory which explains why single motherhood is more concentrated among less-educated women.

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I dedicate this dissertation to my loving parents and family. Their constant love and unconditional support have made this work possible. I know I will always be indebted to them. Many thanks go to my friends for their emotional support. I appreciate that they are always there for me to share and listen. Finally, I thank my fellow classmates from the Economics Department of Texas A&M University for their wonderful companionship.

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1. INTRODUCTION

In the latter half of the twentieth century, the possibility of getting married was much greater than in the years prior to World War II, with the average age of a first marriage much less than before the 1950s.[1] It was also the time during which the fertility rate was highest and, as a result, has become known as the baby boom period. The experience of this "baby boom" and subsequent "marriage boom" created a general consensus that people should marry in their twenties, form families and have children. In recent decades, however, family-formation behavior in the United States has changed drastically. The concept of family and the role of marriage for current generations are very different from those of older generations. Since that time, a tremendous number of women entered the labor market with the result that stay-home moms are no longer in the majority. The linkage between the changes in the labor market and family structure since the 1960s has drawn a lot of attention from social scientists and it is on this linkage that this analysis is focused. This research primarily concerns the relationship between labor market decisions and family structure choices. Regarding family structure choices, we focus on the decisions of marriage and fertility in particular. Due to the complexity of this question, we plan to explore this topic in two steps.

The first step focuses on the interaction between marriage and fertility decisions. An essential dimension of the changing family structure is the sharp rise in out-of-wedlock childbearing. Figure 1 from the vital statistics report (Ventura 1998) shows

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This dissertation follows the style and format of *The American Economic Review*.

[1] See Rodgers and Thornton (1985) for example.

that the percentage of births to unmarried mothers has increased consistently over the last four decades. Moreover, there persisted substantial discrepancies among racial and ethnic groups. Before 1969, less than 10 percent of births were out-of-wedlock. Thirty years later, approximately one-third of total births were to unmarried mothers. The numbers are even more stunning for African-American women, with more than two-thirds of births to unmarried mothers in 1999.

After peaking in the baby boom period of the 1950s, fertility rates dropped sharply. As shown in Figure 2, the fertility rate remained stable after 1973. Fertility rates, defined as the number of births per 1,000 women aged 15-44, stayed within the interval of 65~71 from 1973 to 1999. Also, an upward trend for the birth rates of unmarried women through the period exists despite the fact that the trend leveled off after 1990. In other words, it is more common today to see women bear a child outside marriage. Marriage does not appear to be a prerequisite for having children.

The central question that needs to be addressed is why couples are less likely to marry. A popular speculation is that women substitute jobs for husbands. Women can now acquire resources from the labor market, and, as a consequence, marriage became less attractive for them. However, many less-educated or black women have children and low-paying jobs. If this hypothesis is correct, the change should work in the opposite direction. On the contrary, a larger proportion of less-educated women are single mothers. Therefore, more financial independence should not be the only reason for not getting married.

In this section, we first address the central issue of out-of-wedlock childbearing, and argue that it is due more to diminishing willingness to marry than to changing attitudes toward fertility. Then we provide a simple theory to interpret the cause of increasing out-of-wedlock childbirth and why single motherhood is consistently more concentrated among either the less-educated or black women. We believe the key to answering these questions is the changing patterns of the marriage market which is more inclined to be positively assorted on economic traits.

The second step of this analysis is more related to the decisions between marriage and labor market participation. Of course, fertility decisions cannot be separated from the marital decision process. In 1960, most women stayed out of the labor force after marriage or after they had children. However, in 2000 approximately 74 percent of women between the ages of 25-54 and 60 percent of women who gave birth in the previous year were in the labor force. The particiation of married women in the labor force is not as different from that of single women as it used to be. With female labor market advances in getting more opportunities, we would expect women to be better off. Yet marriage rates have declined and the relative economic plight of some women is actually worse. The increase in female labor force participation is larger for highly-educated women but the decrease in marriage is more serious for less-educated women over the period. This trend is even more remarkable for women with young children. More recently, cohorts of college women have been more able to maintain both a family and career at the same time, while less-educated women are more likely to stay in single motherhood and remain unemployed. In this section, we investigate the association

between the gains from marriage and from the labor market. We show the marriages of couples both with less education have fewer gains than those of couples both with better education, and, as a result, marriages at lower education level are less likely to happen or more likely to end with a divorce. Put differently, the kind of marriage formed by couples both with fewer labor market prospects is relatively marginal. A marriage market with more positive assortative mating would further lessen the likelihood of two less-educated individuals getting married. The reason is that the benefits from the specialization are even lower and reduce the possibility of forming a marriage.

After discussing the data we used in this dissertation, Section II will document trends in marriage and fertility over the last four decades. Some previous studies related to this analysis are addressed in Section III. Section IV posits a simple theory to interpret the implications of the changes in an increasingly positive sorting marriage market. In Section V, we provide more information regarding female labor force participation and participation-related behaviors. We then examine the association between the marriage and labor market on the basis of the model from Section IV. In Section VI, we attempt to show evidence of increasingly positively correlated educational backgrounds and wages between spouses over the period. With this result, we reach our conclusions about the potential importance of assortative mating in the marriage market in explaining the unmarried childbearing changes observed over the period. Section VII concludes.

2. BACKGROUND

2.1. Data

This study uses data from the June Current Population Survey (CPS) from 1971, the earliest available year, to 2000. The June files contain the core questions included in every CPS as well as a special series of questions which investigate the issues of marriage and childbearing. The interviews were not conducted every year and questions about complete marriage and fertility history were only asked every five years. Before 1980, most of the questions about fertility history were presented solely to ever-married women. In 1975, for example, the CPS only collected information about birth history from ever-married women. After 1980, all women aged 18-44 were asked to answer questions related to their marriage and fertility history. In 2000, however, only information about first marriage and last birth are available.

For the years prior to 1971, we use another source from the Census Integrated Public Use Microdata Series (IPUMS). The census is a representative sample that collects some basic information related to marriage and fertility issues. All respondents were asked to report their current marital status and female respondents were asked their total births. Respondents were not asked about history of marital status and fertility.

Due to changes in IPUMS survey questions over time, we are not able to produce exactly the same measures of hours of work and hourly wage rates over the entire period. In this regard, we use the March CPS to provide some extra information. The March CPS contains the data on labor force participation and is useful in computing wage-related variables such as weeks worked in the previous year and usual work hours

per week. We also utilize this dataset to report some companion information from a cohort perspective.

We rely more on the CPS data for analyzing trends in marriage, fertility and out-of-wedlock childbearing. We use the 1/100 Samples of the IPUMS from 1960-2000 for the discussion related to assortative mating. More details about further restriction of data are addressed in the text.

2.2. Documentation of the Trends in Marriage, Fertility and Out-of-wedlock Childbearing

Trends in marriage

The proportion of men and women ever married in the U.S. has declined across all demographic and social groups since 1960. Table 1 summarizes the percentage of men and women who have ever been married by several categories over time. In 1960, 74.8 percent of men and 84.5 percent of women aged 18-44 had ever been married. By the turn of the millennium, the numbers dropped to 58.8 percent and 66.3 percent, respectively. One may suspect that a change in demographic composition is causing the decrease. In fact, relative to 1970, the average level of schooling has increased, there are more Hispanics, and the general population aged 18-44 has a higher average age. As a result, the proportion of the ever-married population is even lower compared to 1970 after the change in demographic composition is adjusted as seen in Table 1.[2] An even

[2] In 2000, if the same educational and demographic composition in 1970 is imposed, 52.5 percent of men and 61.3 percent of women were ever married; six and five percentage points lower compared to the original figures.

more pronounced downward trend is observed when we focus on those currently married instead of those ever married. The likelihood of being ever married is positively associated with educational level. College graduates were more likely than high school dropouts to marry regardless of the compositional changes within education as shown in the bottom panel in the table. Blacks are the ethnic group with the least likelihood to get married, while the whites are the most likely to get married. A relative smaller portion of the population of the northeast is never married, which has something to do with the average higher schooling in this region. Men and women at higher education levels tend to marry at later ages.

One explanation for the smaller fraction of the married population is the postponement of the first marriage. Table 2 confirms this statement. In the early 1960s, the median age of women at their first marriage was 20.1 years old. In 1990-1994, this number rose by 4.9 to 25 years. A more pronounced delay in first marriage was observed for highly-educated women. The mean age for college graduates increased from 21.9 in 1960-1964 to 27.2 in 1990-1994. Across racial and ethnic group, black women are increasingly less likely to be married, and inclined to marry at older ages. Across regions, the average age at first marriage is greater in the northeast; again, this is associated with the average higher education. The majority of people consider the possibility of marriage after completing their education.

Despite the fact that the postponement of first marriage increases the proportion of single adults, it is not the whole story. For many women, delaying marriage often means never marrying. Figure 3 shows the percentage of men and women who were ever

married by age relative to 1970. For women over age 30 and men over age 35, the lines for 1960 and 1970 almost overlap. That suggests that the disparities in the ever-married proportion of the population among the two census years are minuscule after a certain age. By age 30 for women and age 35 for men, ninety percent of individuals had already married. After 1970, however, there is an increased tendency of delayed first marriage for both men and women as demonstrated by the wider gap in the early twenties in the graph as well as the postponement of convergence to the 1970's line. The 1980's data converges at age 38 for women and 36 for men. The lines for 1990 and 2000 never fully converge with 1970 but the gap lessens over time. This implies not only that people have their first marriage much later in life but also that fewer people choose to ever marry.

Presumably, if single individuals spend more time searching for a partner and therefore postpone marriage, it is reasonable to think the quality of the match they find would be better. However, the time series findings seem inconsistent with such a prediction. First marriages are more likely to dissolve and the overall average first marriage length is shorter over time as seen in Table 3. In 1995, for women aged 18-54, 33 percent of first marriages ended, a 13 percentage point increase compared to 1971,[3] and the average first marriage length is almost fourteen months shorter;[4] it implies the shorter expected duration of a marriage. In addition, the remarriage rate conditional on

[3] The number is listed in the column of proportion of complete spell.

[4] We select sample with the women who had ever been married and separate them into two groups. One is women with a first marriage dissolution and the other is women still currently married by the date of survey. The simple average of their length of first marriage by their fractions to the total sample size gives us the overall average first marriage spell.

first marriage dissolution is not higher in 1995 than in 1971.[5] We can draw the conclusion that more people stay single longer and spend less of their lifetimes in marriage.

Trends in fertility

After the baby boom, birth rates dropped sharply in the 1960s and early 1970s. As seen in Figure 2, the total fertility rate is consistently stable between 1973 and 1999 except for a slight peak in 1990. Table 4 tabulated from the CPS shows a similar pattern. After 1977, the birth rate was roughly 66~71 births per 1,000 women aged 18-44. High school dropouts and Hispanic females aged 25-34 have higher fertility rates than the population average. The table also shows that women with a college degree or in the older age group are more likely to have a birth in a year compared to their counterparts in 1977. Between 1977 and 2000, however, the changes in magnitude are not very dramatic. This seems inconsistent with the prediction from the standard economic fertility model.[6] With improved opportunities in labor market for women, we should observe obvious declines in birth rates if the substitution effect dominated the income effect in the fertility decisions of women.[7] Note that while the total fertility rates haven't dropped dramatically, the changes of the various groups differ over the period: (a) the

[5] Percent of women aged 18-44with first marriage dissolution who have a second marriage is 62 percent in 1975, and 58 percent in 1995.

[6] Following Becker (1965), a standard time allocation and demand for children model gives the prediction that higher income is associated with a higher cost of female time because of increased female wage rates. Income effect could play some role in this case.

[7] The birth rates in the U.S. are relatively higher than other developed countries. In 2000, the birth rate is 14.4 in the U.S., 11.3 in Canada, 13.1 in France, 11.4 in the U.K. and 9.5 in Japan. Birth rates are calculated by dividing the number of live births in a population in a year by the midyear resident population of women ages 18-44.

fertility rate for women at older group has increased. (b) Black women's fertility rate has declined since the 1970s. (c) More importantly, the fertility rate for never-married women is almost doubled in 2000 compared to 1977 in contrast to the slightly decreasing rate for currently married women.

Following the postponement of first marriage, the mother's age at first birth is five years later in the 1990s than in the 1960s as reported in Table 5. Instead of initial childbearing occurring in the early twenties, most women had their first births in their middle or late twenties. The delay in the timing of birth is more pronounced for college graduates and whites. Examining the mean age at first marriage, we see the mean difference of age at first marriage and first birth is narrower in the 1990s than in the late 1970s. This occurs despite the fact that women who are childless at the time of marriage wait the same amount of time before their first birth as did similar women in the late 1970s. The lag between the time of women's first marriage and the time they had their first children has been consistently about two years since 1975-1979.[8] The narrowing gap is driven by the increasing number of women who are already mothers at the time of first marriage. These mothers' first birth was an out-of-wedlock birth, and this trend drives down the gap between age at first marriage and age at time of first birth.

Another view from the comparison across the ten-year cohorts is reported in Table 6. As indicated by the diagonal dashed line in the top panel of the table, the fertility patterns of ever-married women are similar among cohorts born in 1955-1964

[8] Using the mean age at first birth with marriage as shown in the last column in Table 5 and mean age at first marriage in Table 2, the difference between the two ranges from 1.9 to 2.0 years among the period 1975~1979 to 1990~1994.

(ages 15-24 in 1970), 1965-1974 (ages 15-24 in 1980) and 1975-1984 (ages 15-24 in 1990). In contrast, there is a noticeable increase in the average number of children born to single women for all age groups since 1970. From panel B, we see the average number of children for women aged 18-44 rose from 0.12 in 1970 to 0.42 in 2000. The increase is also observed across cohorts. This result is in line with the findings in Figure 2.

Unlike the fertility pattern, the marriage pattern differs across cohorts over the same time period, 1970-2000. Cohorts born after 1955-1964 tend to stay single longer, and are more likely to end their marriage. The differential between the fraction of women ever married and fraction currently married for women aged 15-44 increased from 0.04 in 1960 to 0.09 in 2000, and implying a growing divorce rate over the period.

Trends in out-of-wedlock childbearing

While the vast majority of people still choose to get married first and then have children, the percentage of births to unmarried women has increased steadily over the past fifty years. Table 7 and Figure 1 both demonstrate this trend. In 1971, only 7 percent of the births belonged to currently unmarried women. In 2000, the percentage rises to more than one-fourth. Panel B in Table 7 shows non-married motherhood to be much more common among less-educated or black women. Of those women who reported that they had given birth in the previous year, 60 percent of black women and 41 percent of high school dropouts were not currently married. This number understates the out-of-wedlock birth ratio if we consider that some women gave birth in the previous year and got married before the time of survey. Table 8 adds to this analysis, providing

information about the proportion of never-married women who reported that they had at least one child at the time of survey between 1971 and 2000. The percentage of births to unmarried women rose between 1971 and 2000 regardless of the demographic characteristics of the women. It is worth noting that the increasing trend occurs within every educational group. The bottom panel in Table 8 confirms the same upward trend after the compositional change is taken into consideration within each educational group.[9]

Table 9 demonstrates the fraction of women aged 18-44 with marriage experience who had not had any children at the time of survey. As the table shows, the percentage fluctuates between 18 and 19 after 1977. Within racial and ethnic group, the numbers are also quite stable. The changes in demographic composition within education do not affect the constant trend. When the demographic weight was adopted in 1977,[10] the fraction of childless ever-married women classified by education has remained pretty constant. However, we do observe an increase over time in the percentage of women in the oldest age group choosing not to have any children. Figure 4 provides a similar picture. Married women delayed their first birth due to postponement of first marriage and slightly fewer women did not have children by the end of reproductive age in 1990 and 2000 as compared to 1970.[11] The result is generally consistent with Figure 2 from the Vital Statistics Report and verifies that the fertility rate

[9] Within the educational group, the percentages in 2000 are all larger relative to 1971 or 1977. After adjusting for compositional change, the result still holds although the numbers are smaller except for high school dropouts.

[10] We use the demographic weight in 1977 as base year because the question of Hispanic ethnicity was not asked before 1973.

[11] The reproductive age is referred as 15-44 years of age.

of married women is slightly lower, while the fertility pattern has not differed dramatically over time.

In the past, a shotgun wedding was a normal occurrence in the event of a premarital pregnancy. The declining practice of marriage after premarital pregnancy accounts for a certain part of the increase in single-mother families in modern society. Table 10 shows the proportion of women who entered a marriage following a premarital first birth. It also provides data on length of time from first premarital birth to marriage. The percentage of women aged 18-44 with a premarital first birth increased 22.1 points between 1971 and 1995. Using simple weighted methods,[12] the overall average premarital spell length (the average months between the time of first premarital birth to the date of first marriage) is more than two years longer in 1971 than in 1995. There is no doubt that on average women stayed longer in single motherhood.

In short, the core of rising out-of-wedlock childbearing is mainly caused by the marriage decision, not a change in fertility rates. In the old days, women would wait to have children until they found a husband, or would get married in the event of pregnancy. Today the majority of women still make their fertility decisions based on marital status. However, an increasing number of women make their fertility decision in the absence of marriage and may or may not choose marriage after becoming mothers. If we think the proportion of women choosing to have children is very close today to 1970 levels, then the major change over the last thirty years is that more women with children are choosing to have those children outside of marriage.

[12] A similar method to Table 3.

3. LITERATURE REVIEW

Becker (1973, 1981) defined the concept of marriage from an economic point of view as a union of joint production and consumption. Most economic studies follow this line and view decreasing marriage rates as a result of a decline in gains from specialization and trading. Blackburn and Korenman (1994) showed that the marriage premium has greatly declined in the CPS data, and Gray (1997) found similar results. A few studies addressed issues about the relationship between the marriage market and female labor force participation decisions. For instance, Grossbard-Shechtman (1984), and Grossbard-Shechtman and Neuman (1988) observed that a marriage market that favors women would cause a decrease female labor participation rates. Blau, Kahn and Waldfogel (2000) also found that better female labor markets are associated with lower marriage rates. Some researchers argued the sex ratio, i.e., relative number of men and women, is fundamental to rates of marriage and female labor force participation. Angrist (2002) suggested that high sex ratios had a large positive effect on the likelihood of female marriage, and a large negative effect on female labor force participation.

There is an abundant literature on family fertility decisions. Hotz, Klerman and Willis (1997) provided a thorough survey of theoretical models and empirical approaches in analyzing fertility decisions. Most of the models view marriage as a presumption and then discuss the time allocation and fertility decisions inside the household. This assumption leads to the problem that the growing number of single-head households do not fit the models very well, and that a different specification is needed to target out-of-wedlock childbearing decisions.

For a long time social scientists have observed a significant change in childbearing behavior. In the seventies some economists started to be aware of and contributed to the issue. Non-marital birth rates have risen since 1940 with a more drastic rise taking place after the 1960s. A long line of research has attempted to understand whether the availability and generosity of social welfare assistance affects fertility and marriage decisions. In particular, the linkage between Aid to Families with Dependent Children (AFDC) and non-marital fertility is at the center of the debate. The effect of welfare benefits, however, is not clear. Moffitt (1992) provided a comprehensive review of the literature. Among nineteen studies that control for state fixed effects, eleven found higher AFDC benefits increase fertility, six found an insignificant effect, and two reported a mixed effect. Moffit concluded: "Welfare policy influences fertility, but the evidence is very weak to give a definitive policy suggestion."

Some research has looked at the differences among racial and social groups. The popular book, *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy* by Wilson (1987), found that "marriageable" men were relatively scarce in the underclass due to higher rates of unemployment and incarceration. Consequently, out-of-wedlock childbearing was more likely to happen in the lower portion of the income distribution. The higher the percentage of employed men in a community, the lower the proportion of nonmarital births should be. This underclass phenomenon is also included in Willis' (1999) model. There have been some empirical studies of Wilson's theory. Wood (1995), for example, used 1970 and 1980 Standard-Metropolitan-Statistical-Area (SMSA) level census data to estimate a fixed-effect model of the black marriage rate. He

found that the shrinking pool of "marriageable" black men could explain 3 to 4 percent of the decline in the black marriage rate.

The majority of married couples will have children sooner or later. People may make their marital decision in conjunction with their reproductive decisions. In other words, a couple may decide to get married at the time they plan to have children together. Building on Weiss and Willis (1985), Willis (1999) assumed children are collective goods for parents and parents care about their children's welfare. An efficient provision of collective goods requires each beneficiary to share its cost. A marriage is a pareto improvement for men and women as it reduces costs for children. Children also gain from marriage because more resources are spent on them. Given an equal population of men and women, if both the father and mother value their children's welfare, it is best for them to form a union, i.e., marriage. Willis called this the "Traditional Marriage Equilibrium". A traditional equilibrium may not hold if: (a) most women have incomes exceeding the threshold incomes to rear children; (b) Men in the lower portion of income distribution have relatively low incomes; (c) Women are more numerous than men. Willis also developed an "Underclass Equilibrium" in which he showed that it is possible that a man could find it advantageous to father children at zero cost by multiple women in a world where women outnumber men. According to this model, higher male incomes tend to strengthen traditional marriage but higher female incomes will weaken traditional marriage because it reduces women's dependency on men's resources. Thus, better economic opportunities for women in the labor market will encourage out-of-wedlock childbearing.

Edlund and Pande (2000), and Edlund (1998) derived a model by assuming that women are vested with custodial rights to their children. Marriage is considered a trade in custody from the mother to the father and men acquire these rights by compensating women. They suggested that the rise in non-marital fertility is mainly due to the increase in female earnings relative to men, which discourages female demand for marriage.

Akerlof, Yellen and Katz (1996) adopted a quite different point of view to address the question. They considered a technological shock, the innovation and prevalence of abortion and contraception, as the major reason for a higher out-of-wedlock birth rate after 1970. A cost-saving innovation or a new technology often harm some people and benefit others. After the advent of abortion, women who chose not to have an abortion became worse off than women who adopted the new technology (abortion). This is because fewer women now ask for a promise of marriage due to increasing competition in the marriage market. Akerlof, Yellen and Katz also showed that higher female incomes reduce the cost of an out-of-wedlock child. Therefore women will tend not to require a marital commitment before sex, which causes a higher chance of an out-of-wedlock birth because some women may not choose an abortion in the event of a pregnancy. The problem with this hypothesis is that it is hard to discern why there are significant differences in out-of-wedlock childbearing among different nationalities, despite the fact that most industrialized countries also faced the same technological shock during the period, and that many have cultural backgrounds very

similar to those of Americans.[13] The generic application of the theory to other countries seems to be problematic.

[13] For example, in 1999, the percentage of births to unwed mothers was less than 10 percent in Switzerland and Italy. It was less than 5 percent in Greece and Japan. See Wu and Wolfe (2001).

4. A THEORY OF OUT-OF-WEDLOCK CHILDBEARING AND LABOR MARKET PROSPECTS

The results implied by the stylized facts boil down the issue of out-of-wedlock childbearing to the decrease in the practice of marriage. It is interesting to explore to what extent we observe women who "choose" to move from marital to out-of-wedlock childbearing. The first question we have to ask is why two single people would choose to marry and whether the declining gains from such a union would result in fewer marriages. In general, female labor market participation rates rose by 23 percentage points between 1970 and 1995. During the same period, the female-male weekly wage ratio for full-time workers increased from 0.56 to 0.72.[14] Table 11 shows that over time a larger fraction of women who gave birth in the previous year were in the labor force at the time of the survey regardless of demographic characteristics. It was more common to observe women going back to the work force after having a baby in 2000 than in 1970. Moreover, the more schooling a woman attains, the higher the chance she will return to work or be actively looking for a job. Both Willis' and Edlund's theories imply that women obtain financial support from marriage in the presence of children, and absolutely or relatively increasing female wages discourage women from marrying. However, better labor market opportunities cannot be the only explanation for the higher out-of-wedlock ratio because we observe that out-of-wedlock childbearing is still more concentrated among lower-income and poorly-educated women.

[14] See Blau (1998)

Willis pointed out that the rise of wage inequality for men during the past two decades also increased the shortage of available men, especially for the low income group. Less skilled male labors earn relatively meager wages and the lack of eligible men is a key factor in interpreting the drastic decline in marriage in the less educated group. Additionally, the changing selection criterion for men in choice of spouse also plays an essential role in strengthening the effect of the shrinking pool for low income women. A more positively assorted marriage market on economic success increases the likelihood of being single for economically disadvantaged women. The purpose of this section is to show the connection between the assortative mating marriage market and potential spouses' labor market prospects. In a marriage market where men and women with fewer labor market prospects become less desirable, increased homogeneity of wages between spouses should be observed.

The simple model introduced here is adapted from Lam (1988) and Neal (2004), and is closely related to Willis (1999). We assume every woman has three alternatives: They can choose to be single without children, single with children, or married with children. Married without children is not considered here.[15] Women with income greater than a threshold will be able to have a child using their own resources. Without marriage, a woman's (*f*) fertility choice can be illustrated by the following optimization problem.

[15] The majority of married couples will have children sooner or later. In Table 9, we show that the percentage of women aged 18-44 yet to have a child has been consistently between 16~19 percent over the last three decades.

$$
\begin{aligned}
V_f &= Max_{q,c} U_f = A(q)c_f + B_f(q) \\
s.t.\ \ & w_f(T - l_f) + k_f = p_g G + c_f \\
& q = F(l_f, 0, G)
\end{aligned}
\tag{1}
$$

where q is the collective good-child service, T is total available hours, l_f is woman's time spent in home production, l_m is man's time spent in home production and is zero here, w_f is the wage rate, k_f is nonlabor income when single (including public assistance), G is units of a good purchased in the market to produce the collective good, and c is individual f's consumption of the private good. $F(\cdot)$ is the household production function for quality of children.

Here individuals have the transferable utility function form suggested by Bergstom and Cornes (1983) to avoid problems of distribution. Throughout this section, we assume the production function of child quality, $F(l_f, l_m, G)$, exhibits constant returns to scale with convex technology. Given input prices, cost minimization implies a set of input coefficients, t_f, t_m, and g, that give the minimum cost way to produce one unit of the collective good. t_f, t_m, and g represent the input coefficients of using wife's time, husband's time and the good purchased from the market respectively. Therefore, a well-defined shadow price of the collective good, $\pi = w_f t_f + w_m t_m + p_g g$, is implied. In a single-headed family, l_m is restricted to be zero. If l_m=0, $\pi = w_f t_f + p_g g$. The budget constraint can then be expressed as $\pi q + c_f = w_f T + k_f$.

In the case that q is a normal good, women with a wage, w, greater than a threshold wage, w^*, will choose $q>0$, where

$$w^* = \frac{A(0)\pi - B_f'(0)}{A'(0)T} - \frac{k_f}{T} \tag{2}$$

If k_f is considered to be public assistance, like AFDC, then an increase in welfare benefits will decrease the threshold wage rate and increase the likelihood of having children. For a single woman, the fertility decision depends on whether her wage rate exceeds the threshold wage.

Now consider the possibility of forming a combined household through marriage. The gains from marriage are based on both joint production of the collective good, and specialization and exchange. Women, *f*, and men, *m*, face the following joint utility maximization problem:

$$\begin{aligned} & V_h = Max\ Z_{fm} = U_f + U_m = A(q)(c_f + c_m) + B_f(q) + B_m(q) \\ & s.t.\ \ w_f(T - l_f) + w_m(T - l_m) - n = p_g G + c_f + c_m \\ & \quad q = F(l_f, l_m, G) \\ & \quad A(q)c_m + B_m(q) \geq Tw_m A(0) \end{aligned} \tag{3}$$

where V_h represents the joint indirect utility function, and n represents the fixed cost of forming a marriage. Without marriage costs, individuals are always better off if paternity is established.[16] The last constraint indicates the minimum utility level to attract her partner to have children with her. Since $F(\cdot)$ is convex in inputs, this implies the well-defined shadow price of child quality in the intact family, $\pi' = w_f t_f' + w_m t_m' + p_g g'$, is not

[16] It is a pareto-improvement when paternity is established and children enjoy more resources. See Willis (1999) for details.

larger than the price, $\pi = w_f t_f + p_g g$, in the single-headed family. t_f', t_m' and g' are the input coefficients to produce one unit of q in the intact family.

The utility maximization problem can also be expressed as the following:

$$\begin{aligned} & V_f^h = Max_{q,c_f,c_m} U_f = A(q)c_f + B_f(q) \\ & s.t.\ \ T(w_f + w_m) - n = \pi' q + c_f + c_m \\ & A(q)c_m + B_m(q) \geq Tw_m A(0) \end{aligned} \tag{4}$$

where V_f^h is the indirect utility function for the wife.

Lam (1988) shows the following results:

$$\frac{\partial V_h}{\partial w_f} = A(T - l_f) = AS_f > 0 \tag{5}$$

where S_f is the wife's market labor hours.

$$\frac{\partial^2 V_h}{\partial w_f \partial w_m} = \frac{\partial q}{\partial w_m}\frac{\partial q}{\partial w_f}(-D) - Aq\frac{\partial t_f'}{\partial w_m}$$

$$= \text{collective good effect} + \text{specialization effect} \tag{6}$$

$$(?) \qquad\qquad (-)$$

D is a combination of terms and is strictly negative by second order condition.

Becker (1973) shows that $\frac{\partial^2 V_h}{\partial w_f \partial w_m}$ indicates positive or negative assortative mating if potential spouses differ only in wages. If the first term in equation (6), the collective good effect, is positive and dominating, positive assortative mating on wages will be observed. If we observe more women are interested in developing their careers,

,in other words, there is less substitution between spouses' time in the production of the collective good (the second term in equation (6) is smaller), then we should observe more positive assortative mating on wages in the marriage market. Furthermore, the gains from an increase in female wages for those women in a two-person family should exceed the gains for those women in a single family provided that the spouse's wage is not too low. Equivalently,

$\frac{\partial V_h}{\partial w_f} = A(T - l_f) = A(q^h)S_f > \frac{\partial V_f}{\partial w_f} = A(q_f)S_f$, conditional on equation (6) being positive and women acquiring the total gains from the increase in female wages.[17]

When female labor market participation is improved and average wages are increased, it is more likely that *w*>*w**. More women meet the wage threshold and can raise children on their own.

---

[17] <pf> If $\frac{\partial^2 V_h}{\partial w_i \partial w_j} \geq 0$, then $\int_0^{w_j^*} \frac{\partial^2 V_h}{\partial w_i \partial w_j} dw_j \geq 0$

$\int_0^{w_j^*} \frac{\partial^2 V_h}{\partial w_i \partial w_j} dw_j = \frac{\partial V_h}{\partial w_i}|_0^{w_j^*} => \frac{\partial V_h(w_i, w_j^*)}{\partial w_i} - \frac{\partial V_h(w_i, 0)}{\partial w_i} \geq 0$ for $w_j^* > 0$

or $\frac{\partial V_h(w_i, w_j^*)}{\partial w_i} \geq \frac{\partial V_h(w_i, 0)}{\partial w_i}$

Suppose there exists a $\hat{w}_j$ such that $\frac{\partial V_h(w_i, \hat{w}_j)}{\partial w_i} = \frac{\partial V^f(w_i)}{\partial w_i}$ then we have

$\frac{\partial V_h(w_i, w_j)}{\partial w_i} \geq \frac{\partial V^f(w_i)}{\partial w_i}$ when $w_j \geq \hat{w}_j$ and $\hat{w}_j$ depends on the cost of forming a marriage.

There are also more potential gains from marriage when the income inflow from the husband is greater than the cost of forming a marriage. An increase in the cost of forming a marriage will discourage marriage. In other words, even though a woman may be able to raise children solely using her own resources, she may still desire marriage if marriage will raise her utility. As shown in Willis (1999) and Neal (2004), the model also predicts that public assistance to unwed mothers fosters out-of-wedlock childbearing.

Equation (6) can also be applied to men and implies that men's decision of who to marry depends on the gains from division of labor and joint production of the collective good. A low degree of substitution between the husband and the wife enhances the possibility of positive assortative mating and implies the gains from specialization are of less consideration. If the marriage market exhibits more positive assortative mating on wages – high-wage men tend to marry high-wage women – it is more difficult for women with relatively low wages to marry with a high wage-earning man. Women with relatively low wages have a disadvantage in competing with women with high labor market prospects. Lower-wage women are less desirable and can only attract lower-wage men. Over the last four decades, the labor force participation rate of less-educated men and the proportion of those who were full-time and full-year workers both declined. Equation (3) demonstrates that if women's share of the cost of marriage exceeds the potential income inflow due to no/low male wages or no/low participation in the labor market, and men increasingly select their spouses based on female labor market prospects, we will see more unwed childbearing in the lower part of the wage

distribution. To some extent, this is similar to what Wilson (1987) described as the predicament of the shortage of eligible men in the underclass. The lack of eligible men is already a serious problem for less-educated women and black society. A changing attitude that places more emphasis on economic success would further deteriorate the marriage market for women in this group. Men and women at lower education levels would fare worse and be less likely to get married. As a result, out-of-wedlock childbearing behavior will become more common among lower-wage women.

5. MARITAL DECISIONS AND THE CHANGES IN THE LABOR MARKET

5.1. Female Labor Force Participation and Participation-related Behaviors

In this section we provide an overview of the important trends and patterns in female labor force participation or participation-related behaviors over the period 1960 to 2000. Regardless of the measure used, there is no doubt that the United States has experienced a substantial rise in the female labor force participation. 74 percent of women ages 25-54 were in the labor force and 70 percent were employed during the last week at the turn of the century. Table 12 presents trends in female labor force participation rates by social and demographic groups. The level of female participation in the labor force is positively related to education level, which is consistent with standard human capital theory. Participation rates have risen over the period across different education, race, age and region groups. While participation rose for all, the increase is more pronounced for higher-educated women and remains robust after the change in the demographic distribution is considered. The pace of the change has slowed since 1990.

Figures 5a and 5b provide companion information to the tables by showing the overall trends in participation from a cohort perspective. The more recent cohorts have shown a sharp rise in labor force attachment relative to the older cohorts. Note that participation in general increases with age within specific cohorts, except maybe women in their childbearing years. The "fertility dip", however, has disappeared gradually across younger cohorts. For cohorts born after 1950, the decline in employment during the childbearing years is not obvious relative to their predecessors. For working women,

the lifecycle work weeks in the previous year are also higher among more recent cohorts. Women in their childbearing years are less a factor for fewer work weeks for more recent cohorts.

Alongside the increase in participation, the marriage rate has declined and a growing number of women are single. Table 13 provides the detailed information on labor force attachment by current marital status. Note that the intensity of female labor supply has increased both in intensive and extensive margin. In particular, the increase mostly came from currently married women. The fraction of working women, conditional on currently married, accelerated throughout the period and married women tended to work more weeks once they entered the labor market. For married women who were employed, they worked almost as much as single women in 2000. The working patterns for single women vary little over the period. It is no longer normal for women to stay out of the labor force after marriage. The notable leap in average annual hours of work among working women from 1980 to 1990 is mainly caused by the increase in the average weeks of work in the previous year.[18]

Table 14 traces the average work weeks of current married participants and non-participants by education separately for men and women. The percentage of women and men worked full-year is also included in the table. This table indicates that the currently married men and women display disparate working behaviors over time. Married women's labor supply has increased drastically, but the male labor supply has dropped

[18] Due to changes in survey questions over time, we are not able to compute measures of hours of work based on one single common question for the entire period. Since hours of work last week is an essential piece of information to impute the usual hours of work prior to 1970, we include women who worked both in the previous year and in the previous week to make a consistent comparison across year.

slightly and shows no sign of change for college men. The increase in female employment has been greatest for higher-educated women, while the decline in male employment has been largest for less-educated men. This is consistent with Juhn and Murphy (1997), in which they found no evidence of the speculation that married women have increased their labor supply to compensate for the loss in their husbands' earnings.

Although, in general, women with young children are less likely to work relative to women without children, the proportion of working mothers has increased and the average weeks they worked has also increased across cohorts. Figures 6a and 6b compare the participation rates and average weeks of work between women with children and women without children under age 6. The ratios are negatively related to the age given any cohort since higher-educated women tend to have children at older ages and they are more likely to stay in the labor force and work more. The ratios are expected to be greatest in the childbearing years within specific cohorts, yet the difference between women with and without young children is getting smaller across cohorts and the ratios are relatively constant for younger cohorts as they aged.

The number of children is anticipated to have a negative impact on female participation. Table 15 reports the trends in average number of children ever had for women aged 25-44 and the percentage who were childless separately by two age groups. After peaking in 1970, the average number of children began to fall until l990. The average number of children in 1990 doesn't deviate from the number in 2000. Women with high education are associated with higher opportunity cost of rearing children. It is no surprise that the more educated the women, the fewer children they have as shown in

the table. The number of children ever born for women age 35-44 has shifted to fewer children or no children. The fraction of high school dropout women without children remains stable and fluctuates around 10 percent. College graduates are most likely to have no children. 28 percent of college women aged 35-44 had no children and only 5 percent of them had more than four children in 2000.

Figures 7a and 7b plot the percentage of women aged 35-44 in the labor force and percentage of them who worked last week respectively by number of children and education. For women, the number of children is negatively associated with the likelihood of working as expected. Generally women without children tend to be currently working except for high school dropout women. Childless women without a high school degree appear less likely to work than women with one or two children especially for post-1980 period. Conditional on the number of children women ever had, participation rates have increased throughout most of the period and slowed after 1990. The fraction of women who worked presents similar patterns despite the fact that the trend shows signs of a reverse for college women in 2000.[19]

While the number of children is positively related to the likelihood of being currently married, the likelihood for women with two children is essentially not that different from those with more than two children, as indicated in Figure 8a and 8b. The probability of being married has declined conditional on the number of children across education over time. However, the slopes of the decline given the number of children

[19] Due to various data sources; numbers in 2000 from June CPS and the rest of figures from Census, we are cautious about the implication.

become flatter as the education level increases regardless of race, and the slopes even turn positive for white college graduates after 1980. An implication of these changes is either college graduates are more likely to marry or less likely to divorce in the presence of children over time. A noticeable difference is observed between white and black women. Black women are significantly less likely to be currently married relative to whites given the same number of children.

Figures 9a and 9b juxtapose the trends in the labor market and marriage market for women separately by the presence of children under age 5 in the family. The figures show that the increase in female labor market participation is larger for higher-educated women and the decrease in marriage is more serious for less-educated women over the period. The trend is even more remarkable for women with young children in the family. While younger college women seem to be able to achieve both family and career at the same time, which is consistent with Goldin's (2004) finding, less-educated women are more likely to stay single and not employed relative to college graduates. To some extent, this corresponds to Wilson's (1987) popular book. Economically disadvantaged groups are "truly disadvantaged" in all aspects.

Tables 16a and 16b report the supporting information to Figure 9. It outlines the result using logit regression in order to control for the changes in the demographic distribution jointly. We obtain the values by first running separate logit regression using samples from 1960 and 2000 to get the estimated coefficients and predicted values. Then we apply the data from 2000 using the coefficients estimating from the 1960's sample and compute the imputed predicted values. After taking the difference between the

imputed predicted values and actual predicted values using the sample from 2000, we sum up separately each of the four education groups and report the final results in the first column in Table 16a. Specifically, we first compute the difference for each individual *i* in the education *j*: $d_{ij} = \Lambda(x_{i,2000}\hat{\beta}_{2000}) - \Lambda(x_{i,2000}\hat{\beta}_{1960})$. $\hat{\beta}_{2000}$ is the vector of estimated coefficients using the sample from 2000, x_i is the vector of individual *i's* characteristics, and $\Lambda(x_{i,2000}\hat{\beta}_{2000})$ is the predicted probability of being currently married for individual *i* in 2000. Likewise, $\hat{\beta}_{1960}$ and $\Lambda(x_{i,1960}\hat{\beta}_{1960})$ represent the vector of estimated coefficients and predicted probability using data from 1960. Applying the data from 2000 and using the coefficients estimated from the 1960's sample would get the predicted values $:\Lambda(x_{i,2000}\hat{\beta}_{1960})$. After computing the differences, we then add up the differences separately with respect to the four education groups and obtain the values: $\sum_i d_{ij}$. Similarly, we could work in the opposite direction: use the sample in 2000 as a baseline model and predict the propensity to marry using the data in 1960. That is, we compute these values: $d_{ij}' = \Lambda(x_{i,1960}\hat{\beta}_{2000}) - \Lambda(x_{i,1960}\hat{\beta}_{1960})$ and then sum up separately by the four education levels. Results are reported in the second column. Comparing 1960 to 2000, the table demonstrates that with the overall drop in the marriage rate, college women is the group with the closest values between the imputed predicted probabilities of being currently married and actual predicted ones. This implies that college women with similar demographic characteristics are most likely to be currently married both in 1960 and 2000. In contrast, women with less education are more likely to marry in 1960

than their counterparts in 2000. Instead of current marital status, the same approach could be utilized again in terms of current working status and the main results are shown in Table 16b. Interestingly, alongside the overall rise in the participation rate, women with less than a high school degree is the group with the closest values between the imputed predicted probabilities of being in the labor force and actual predicted ones. This indicates that with the overall rise in female labor force participation, less-educated women participated less increasingly relative to women with at least a high school degree. In a nutshell, less-educated women contribute more to the decline in marriage and contribute less to the increase in participation, which is consistent with the visual conception from Figure 9.

The wage rate is an important indicator of potential gain to market employment and affects a series of decisions ranging from marriage and fertility to bargaining power within the family (Blau 1998). Figure 10a and 10b present trends in real average and median weekly wages across education groups as well as providing information on the education-premium as we make a comparison on the basis of one specific education group. The changes in real weekly wages for high school dropouts or high school graduates are quite limited relative to the increases for college graduates. College graduate workers have enjoyed a substantial growth in real wages over the period. Taken together, the education premium has increased since 1960 (even with a small dip in 1980) regardless of gender (Deere and Vesovic 2006). As a result, the economic prospects for college graduates are further improved relative to individuals without college degrees. It is worth noting that together with a considerable growth in

participation, women with a college education have experienced faster growth in real wages. This implies that the increase in female labor supply at higher education levels comes hand-in-hand with improving opportunities in the labor market.

The female-male wage ratio is a prominent factor in interpreting the decisions between the marriage and labor market. A higher wage ratio represents more returns from the labor market and higher opportunity cost of time for non-market activities. Weekly gender wage ratios for the at least 'part-time' and 'part-year' workers by education and separately by two age categories are reported in Table 17.[20] Despite a widening difference in weekly wage rates between men and women from 1960 to 1980, the overall gender wage difference has shrunk from 1960 to 2000. Women at younger ages 25-34 narrow the gap additionally with their male counterpart. The trends in female-male relative wage ratios are somewhat different for various education and race groups. For the younger age group in most cases, college graduates have the smallest gender wage gap and the gap is smaller among blacks. As a matter of fact, the wage disparity between black male and female college graduates is quite minor relative to that of whites. For all women, due to the fact that the increase in wage growth is smaller for older women, the pattern is less transparent for whites but remains true for blacks. Regarding the change of pace over time, the difference in wages is narrower as a whole. The growth rates in the gender wage ratios are negatively correlated with education level, and female high school dropouts have the most substantial growth. In contrast, we observe that the female-male wage ratios decrease slightly for black college graduates

[20] For the full description of the definition, see footnote in Table 6.

and only increase slightly for whites. The variation in gender wage ratios over the period is crucial in explaining the change in the recent marriage market.

5.2. The Declining Gain from Marriage and Gender Wage Gap

In Becker's (1973) classic paper, the gains from marriage come solely from specialization and marriage will be of greatest advantage for couples with the largest wage difference. An increase in female wages relative to male wages should decrease the gains from marriage if the female wage rate is less than the male wage rate. Using Lam's setup as we introduced previously, we should reach similar results. A rise in female or male wages has a positive effect on marital utility as seen in equation (5). The impact on marital utility of a rise in female and male wage rates by the same proportion, however, is ambiguous. The total marital income increases as well as the shadow price of child service, and thus the joint utility in the family may increase or decrease depending on the change of magnitude in wages and production technology.

A rise in the female wage rate along with the amount of drop in male wage rate which keeps the full income in the family unchanged will increase the shadow price of the child service when men spend more time in the market than women. Thus, the total marital utility falls and the incentive for women to marry decreases. It is less clear for men since the single utility is lower in the meantime. The logic behind this can be derived from the simple model we used. Recall that marital indirect utility V_h is a function of the shadow price of child service, $\pi(w_m, w_f, p_g)$, and full income, $I = T(w_m + w_f)$. The shadow price of child service is the average cost function to

produce one unit of child service owing to the assumption that production function of child service is constant returns to scale. The price of the private good is set to one as numeraire. The effect on the unit cost function $\pi(w_m, w_f, p_g)$ of the change in w_f and w_m holding p_g constant is equal to

$$d\pi = \frac{\partial \pi}{\partial w_f} dw_f + \frac{\partial \pi}{\partial w_m} dw_m$$

By Shephard's Lemma,

$$\frac{\partial \pi(w_m, w_f, p_g)}{\partial w_f} = l_f ; \frac{\partial \pi(w_m, w_f, p_g)}{\partial w_m} = l_m$$

Thus $d\pi = l_f dw_f + l_m dw_f$. A set of wage changes from a rise in w_f with a drop in w_m holding marital income fixed can be expressed as:

$$dw_m (T - l_m) + dw_f (T - l_f) = 0 ; \; dw_f > 0 \text{ and } dw_m < 0$$

$$\text{or } \frac{dw_m}{dw_f} = -\frac{(T - l_f)}{(T - l_m)} = -\frac{S_f}{S_m} \tag{7}$$

Moving terms from equation (2) and substitute them into equation (1), we get

$$d\pi = l_f dw_f - l_m \frac{S_f}{S_m} dw_f = dw_f (l_f - l_m \frac{S_f}{S_m})$$

$$d\pi > 0 \text{ iif } l_f > l_m \frac{S_f}{S_m} \text{ or } l_f > l_m$$

If men spend more hours in the market than women, the unit cost or the shadow price of child service is higher for the change in wages with total marital income fixed. In other words, marital utility will decrease with regard to the change. For females, marriage becomes less attractive because the expected marital utility is lower and single utility (the reservation price to marry) is greater. Note that the total gain from marriage is the difference between marital utility and combined utility of two individuals. That is,

$$G = V_h - (V_s^m + V_s^f)$$

where V_s^m and V_s^f are the male and female utility if each are single.

Recall that $\frac{\partial V_h}{\partial w_m} = A(q_s^m)(T - l_m) = A(q_s^m)S_m$ and $\frac{\partial V_h}{\partial w_f} = A(q_s^f)(T - l_f) = A(q_s^f)S_f$. q_s^f and q_s^m are the optimal amount of child service that single woman and man would choose. With the change in wages holding marital income constant, the change of combined single utility of a man and woman is:

$$\begin{aligned} &\frac{\partial V_s^m}{\partial w_m} dw_m + \frac{\partial V_s^f}{\partial w_f} dw_f = A(q_s^m)S_m dw_m + A(q_s^f)S_f dw_f \\ &= A(q_s^m)S_m(-\frac{S_f}{S_m})dw_f + A(q_s^f)S_f dw_f \\ &= S_f dw_f[A(q_s^f) - A(q_s^m)] \end{aligned} \tag{8}$$

The change in the combined single utility would be equal to zero if the man and woman choose the same amount of the child service in the single state. It implies that the total

gains from marriage decline. Furthermore, it is more plausible that $q_s^f > q_s^m$ or even $q_s^m = 0$ when the man is single, and hence the gains from marriage would further decline. Fewer marriages should be formed in the entire marriage market.

Ceteris paribus, a narrower wage gap between the man and woman reduces the total utility from marriage if the husband's wage rate is higher than the wife's and the husband spends more labor hours in the market than the wife. The intuition is that the increase in marital utility arising out of an increase in the wife's wages is smaller than the reduction in marital utility arising from the reduction in the husband's wages if the husband works at least as much as the wife. When there is a smaller disparity between male and female wage rate before the change, the change in the relative wage ratio causes modest potential losses from marriage. In a case where female wages are the same as male wages, male and female time are perfect substitutes and there is no gain from specialization in marriage; the loss would minimal. In addition, if women work as much as men, there is no effect on marital utility from the change in their relative wages.

We use a simple framework similar to Freiden's (1974) to explain the change in the marriage market. A rational individual decides to marry when the gains from marriage exceed the gains from not marrying. That is, individual m_i will marry f_i if $V_h^{mi} \geq V_s^{mi}$ and $V_h^{fi} \geq V_s^{fi}$. By ordering various male single utilities, V_s^{mi}, the supply curve of men in the marriage market is essentially the cumulative distribution of men with respect to V_s^{mi}. Likewise, the supply curve of women is the cumulative distribution of the V_s^{fi}. Recall that $V_h = V_h^m + V_h^w$ or $V_h^m = V_h - V_h^w$. The supply of women is

negatively related to the male marital utility, V_h^{mi}, and can be considered as the derived demand for husbands by women. Therefore, the demand curve has an intercept, $V_h - \min(V_{fi})$, and is negatively sloped.[21] In Figure 11 in equilibrium E, the proportion of women $N_h^f / \overline{N}^f$ marry to the proportion of men $N_h^m / \overline{N}^m$ and acquire the utilities $V_h^f = V_h - V_h^m$. Here $\overline{N}^f$ is the total number of women which is set initially equal to the total number of men $\overline{N}^m$. A rise in w_f relative to w_m reduces the gains from marriage and shifts the demand curve for husbands to the left. In Figure 11, the demand curve shifts from D0 to D1 and the market reaches the new equilibrium E1. The number of marriages in equilibrium declines and the proportion of men and women married will be lower and equal $N_h^f{}' / \overline{N}^f = N_h^m{}' / \overline{N}^m$. The rise in female wages without significant increase in martial incomes is more prevalent in the marriage market at lower education levels where male wages are relatively low and sluggish to grow. What's more, when growing unemployment rates dampen the average quality of potential men in the pool, the derived demand for husbands will be even lower and the demand curve will move further to the left.

The cost of forming a marriage is another critical factor affecting the marital decision. The larger the cost, the less gain the couple can share and the less incentive to marry for both. It is possible that the changes in cost of marriage either affect one partner or have greater impact on one partner. One of the roles of marriage is that women exchange custodial right of children for financial resources (Edlund 1998). Since 1970,

[21] For details, see Freiden (1974).

the general guide for the court's decision about physical custody has moved from favoring mothers to the parent with whom it is in the children's "best interest" to reside (Buehler and Gerard 1995). Women may be concerned that they are more likely to lose custody of their children in the event of divorce and thus the implicit cost of marriage is higher; this weakens women's demand for marriage and moves the demand curve to the left.

Burdett and Coles (1997) consider a matching model and provide a proof that in rational steady state equilibrium, the marriage market would be sorted into independent classes according to singles' traits. It is optimal for women in one class to select men only from the other class. In the previous section, we showed that both men and women are increasingly inclined to select their spouse based on the spouse's economic potential. Consequently, the marriage market becomes more positively assorted and women with fewer labor market prospects would only select husbands with low economic potential. By construction, the expected average male wages are lower for women at lower education levels when the marriage market is partitioned into smaller units and men and women become more alike.[22] Also in Table 6, we observe that the greatest growth in the female-male wage ratio occurred in the case of less-educated women. Women with college degrees, however, experienced the lowest growth and even negative growth for black women. When female real wages at lower education levels increase relative to those of males at similar education levels, the benefit from marriage declines and the

[22] The interaction between marriage assortative mating and income inequality has been examined in some studies. See Fernandez, Guner and Knowles (2001) for example.

income for women increases. Marriages become less attractive and an increasing number of marriages formed by men and women from the lower part of the education distribution become more marginal. In other words, the marriages between low educated men and women are less likely to happen and more likely to end with a divorce. Marriages at higher education levels, by contrast, are not as shaky as those at low education levels. On one hand, the gains from specialization in marriage may decline, but do not decline as much as marriages at lower education levels. On the other hand, individuals select partners based on their labor market prospects and marriages at high education levels still gain from joint consumption of the collective goods. This explains why we observe the negative association between the fraction of currently married individuals and their education.

As women's current or future position in the labor market has become more important in the marriage market, women would be more willing to invest in education than traditional human capital aiming at domestic production. Women with high education have the tendency to participate in the labor market and work more due to the higher opportunity cost of not working. Recent improvements for women in the working environment should further remove some barriers against working. For married women, the own price effect implies the increase in female wages would decrease the time women spend on non-market activities and increase their labor hours in the market by the basic cost minimization problem in household production. Couples with high education tend to consume less child service and substitute market goods with their time. As a result, we would not expect that college women would leave the labor force or

work less after marriage. Alternatively, women with low education may or may not find a partner and marry, and even when they are married, they are more likely to stay at home because of relatively low wages. It is less costly for them to stay at home and take care of children.

One of the implications of an increased emphasis on women's economic characteristics in the marriage market is the postponement of their marriage until their economic potential is revealed. Due to higher female wages, women with more economic potential tend to search longer in the market to find an acceptable match. For women with low labor market prospects, they have a lower reservation price for marriage and would accept the offer to marry once a marginal man proposes. As a result, marriages at lower education levels will be formed at early ages but with more instability.[23] Moreover, the improvement of women's labor market position decreases the comparative gains from marriage and increases the likelihood to divorce. In particular, if male real wages decrease and the unemployment rate increases, the wives have less to lose and have less incentive to maintain the union. Less educated women are expected to marry at younger ages, but since these marriages are relatively marginal, they are less likely to be currently married after a certain age. The theory implies college women are still more likely to marry despite the fact that they get married at a later age.

Another implication of the theory concerns local marriage market differences. Gender wage gaps should be negatively associated with the degree of positive

[23] Some studies from United States have shown that an inverse association between spouses' levels of education and the risk of divorce. Most studies also found the older the couples were at the time of first marriage, the less likely they are to divorce. See Tzeng (1992) for example.

assortative mating in the local marriage market. The more prevalence of intereducational or heterogamous marriages will be observed in regions with a wider gender wage gap. In areas where men and women have more equal positions, we would observe higher similarity of economic success between spouses.

Following Becker's (1965) pioneering work, most of the studies in the literature illustrating the relationship between fertility and female labor supply in the intact family use the household production and time allocation model.[24] According to the previous discussion, there is a strong negative correlation between the presence of young children in the family and female labor supply regardless of the measures used. The impact of an increase in female wage rates on fertility depends on the substitution and income effect. The mainstream view is the substitution effect, which is associated with a higher cost of female time, dominates the income effect given the assumption that childrearing is relatively time intensive.[25] Women tend to have fewer children when market labor is more rewarding. In Lam's model, the change of female wages with respect to child service in the household can be decomposed as:

$$\frac{\partial q}{\partial w_f} = \frac{-At_f}{-D} + S_f \frac{\partial q}{\partial I} \tag{9}$$

where $I = T(w_f + w_m)$ is the couple's full income. The first term on the right side is the substitution effect and is negative. The second term is the pure income effect and is positive if child service is a normal good. We should observe a stronger substitution

[24] A thorough survey is provided by Hotz, Klerman and Willis (1997).
[25] See Schultz (1994, 1997)

when child service is more time intensive, i.e. t_f is larger. Be aware that here the child service is not necessarily equivalent to the number of children. It is out of the scope of this paper to discuss the relationship between child service and number of children even though we believe they should be positively correlated.

6. EMPIRICAL RESULTS: POSITIVE ASSORTATIVE MARRIAGE MARKET AND ITS IMPACT

6.1. Are Couples More Positively Assorted than Before?

In most of the literature, the concept of positive assortative mating on a specific characteristic means that individuals tend to match or marry someone with that same characteristic. Most studies related to assortative mating patterns have focused on educational attainment. Mare (1991) found the association between spouses' schooling increased between 1930 and 1970. Adjusting the data for the length of time between leaving school and marriage, some evidence of increased homogamy (couples in the same educational category) remained from the 1930s to the 1980s. Kalmijn (1991) used a set of different data sources covering the period from 1955 to 1989 to show that marriages have become increasingly homogamous with respect to education using a multivariate loglinear analysis. Pencavel (1998) separated white women aged 25-34 and their spouses into five schooling levels and showed that spouses become more similar in their schooling background between 1960 and 1990. Expanding Pencavel's analysis with census data for 2000, and using the same target group, the trend of increased homogamy is sustained. The odds ratio of the wife and husband having the same educational level increased from 1.0 in 1990 to 1.1 in 2000.[26] The odds of being married to someone whose schooling differs by at most one level has also risen from 7.2 in 1990 to 8.3 in 2000.[27] Details are given in Table 18.

[26] Pencavel (1998) reports the odds ratio is 1.03 in 1990.
[27] Pencavel's number is 8.62 in 1990.

If one thinks schooling level is a good indicator of wages, then there is some evidence of positive assortative mating over the period. However, if one considers education too coarse to accurately represent wages, or if couples with more similar schooling backgrounds only represent preferences for similar life styles as opposed to income levels, then we have to examine wages per se. The problem with wages is that we do not observe the actual wage rate for individuals who did not work in the market. This problem is more serious for women. Examining only the correlation of wages for couples who both work creates a selection bias since we tend to sample those women with higher wages. Becker (1973) argued this bias is the reason we observe positive association of wages between spouses. To circumvent the problem, we follow the standard Heckman two-step approach to impute the wages for those who did not report their wages, or reported their hourly wage rate as lower than half of the minimum hourly wage rate in that year.[28] The analysis is based on the 1/100 Samples of the U.S. Census from 1960 to 2000. The data are restricted to individuals who are white or black and currently married with spouse present. The sample is further restricted to individuals with potential experience between 1 and 40 years to predict wages. Students, the self-employed and unpaid family workers are excluded from the sample. We run separate regressions for white and black individuals. Specifically, we do this by first estimating a

[28] We don't use the wages that are lower than half of the minimum hourly wage rate in order to lessen the effect of measurement errors. The hourly wage rate is defined as total wage and salary income last year divided by the product of the weeks worked last year and usual hours worked per week. Weeks worked in the previous year were also imputed from the relationship by race, sex, potential experience and education between detailed and interval measures of weeks worked in the previous year in 1980.The usual hours worked per week were imputed for years prior to 1970 using CPS March data with regard to additional information about part-time or full time workers last year.

probit regression over the full sample of wives, considering their labor force participation choice with a set of variables that affect the decision. The regressors include age, its quadratic to quartic, schooling level, region dummies, the presence of children under 5, and nonwife income. Nonwife income is equal to the sum of a husband's earnings and a wife's earnings, minus the wife's labor income. We use the computed inverse Mills' ratio to correct the wage equation with the logarithm of wages for the working wives in the second step. The explanatory variables in the wage equation include age, its quadratic to quartic, schooling level and region dummies. The estimated coefficients are then used to predict wages for nonworking or very low-wage wives. Similarly, we also impute the logarithm of hourly wage rates for men with zero or low wages.[29]

With the full sample of spouse-present couples with actual or imputed logarithm of hourly wages, we are able to analyze the association of wages between the spouses. In order to make consistent comparisons among different years, the disturbances sampling with replacement from the actual residual wages with the same educational level, age and geographic region are added to the predicted wages for nonworking or very low-wage husbands and wives. The sample is limited to spouses where the husband is not more than fifteen years older or more than ten years younger than his wife to prevent the occurrence of mismatch in the census data. To avoid the selection bias of choosing couples married at early ages across time, different age ranges are selected in the sample

[29] We use husband's nonlabor income in the husband's participation choice estimation. We leave out wife's nonlabor income.

for different census years. Women aged 25-50 in 1960, 26-51 in 1970, 27-52 in 1980, 28-53 in 1990 and analogously 29-54 in 2000 are selected for the sample. Summary statistics are provided in Table 19. The years of schooling increased across race and gender over time. The percentage of couples with children under 5 years old declined partly because married women's fertility rates decreased and partly because of the sample selection scheme we adopted. The decreasing proportion of imputed female wages over time is due to growing female labor market participation. The relatively high proportion of imputed male wages in 1960 and 1970 results from the higher fraction of men who earned less than half of the hourly minimum wage in the earlier years. The mean black wives' logarithmic hourly wages are quite close to those of white wives' after 1980, which is an indication of the selection bias of black women with high wages.

Since individuals are likely to choose a partner with a similar age in a similar geographic region, a contaminated result may be obtained if one simply examines the correlation of wages between the spouses. To obtain a partial correlation between spouses' wage while controlling for other traits, the following regressions are considered:

$$\log wage_m = \alpha + \beta_1 age_m + \beta_2 age_m^2 + \beta_3 age_f + \beta_4 age_f^2 + d_m * regional\ dummies + \varepsilon_m$$
$$\log wage_f = \alpha + \beta_1 age_m + \beta_2 age_m^2 + \beta_3 age_f + \beta_4 age_f^2 + d_f * regional\ dummies + \varepsilon_f$$

where subscripts m , f denote men (husband) and women (wife) respectively. We introduce the quadratic age term in the equation to take into account the idea that individuals may select their spouses based on spouses' position on the age

profile.[30]

The correlation between the residual wages is the main focus for our analysis. As addressed in the beginning of this section, if schooling level is considered as an indicator of similar life style or taste, then education should be included in the regression. However, suppose that years of schooling is a strong indicator of an individual's potential in the labor market, and then any control for education is not appropriate and should not be included in the regression as it would bias the results. The results of both specifications with and without the control for education are reported in Table 20. Both husbands' and wives' schooling level dummies are included in the regression in the case of control for education.

Table 20 reports the coefficients of correlation between spouses' wages, controlling for other traits. The coefficients are positive across all years and races. This implies that husbands' wages are positively related to wives' wages in all years. Our finding is consistent with most of the literature and suggests that there is positive assortative mating on wages in the U.S. over the period in question. Notice that even though the coefficients are smaller, the positive association does not change after we control for education levels. On top of that, the coefficients for blacks are larger than

[30] Bergstrom and Bagnoli (1993) argue that the reason for the consistent age gap between spouses in most countries and across time is because women select their partners according to their prospects or potential in the labor market. So women are more inclined to choose a partner when his future economic success is revealed. If men searching for partners also place more emphasis on economic potential, then it is foreseeable that women will delay their marriage until their economic desirability is revealed. This implies that the age difference at first marriage between men and women should narrow. From 1960 to 2000 for couples aged 25-54, the age difference is reduced by almost one year for whites and by one and half years for blacks.

those for whites for 1960-1970. This is in line with Smith's (1979) analysis that black couples were already more positively assorted than whites in the 1960s. It is well known that eligible men are relatively scarce in the black marriage market. As a result, black men are allowed to be more selective in choosing among potential wives and a more positively assorted marriage market is expected.

The coefficients of correlation in 2000 are higher than those in 1960 across races and regardless of whether education is controlled for or not. This demonstrates that wages between spouses are more positively related in 2000 than they were in 1960. For whites, it is clear that there is an upward trend in positive assortative mating on wages. The coefficient in 2000 is more than double without education control and more than triple with education control compared to 1960. Although the trend of the assortative process for blacks is less clear, all the coefficients in 2000 are greater than those in 1960, and there persists an upward trend over the period, although the trend seems to reverse after 1990. To some extent, this is related to the fact that the growth of never-married motherhood among black women seems to be mitigated in the 1990s (see Table 7). The coefficients for blacks, however, are greater than those for whites in most cases and are quite close in 2000. Overall black couples are more positively assorted than whites even though the two trends converge at the end of the last century.

The usage of female imputed wages may be problematic due to the relatively smaller fraction of women working in the early years of the sample. Instead of the correlation between spouses' wages, we can examine the relationship of wives' education on husbands' wages over time. If there is an increasing association between

male wages and women's education, we should observe a larger estimated coefficient of wives' education level on husbands' wages. Table 21 shows selected results of estimated coefficients of wives' schooling level on husbands' wages controlling for wives' age, its square, husbands' age, its square, and geographic region. Both white and black men whose spouse is a college graduate have a greater wage premium relative to their counterpart whose wife is a high school dropout. The difference between the high school dropout wives and wives with at least a college degree increased from 0.29 in 1960 to 0.52 in 2000 for whites, and 0.32 in 1960 to 0.43 in 2000 for blacks. This increase in the difference indicates more positive assortative mating in 2000 than in 1960, and is consistent with our previous results.

To sum up, our result shows increased homogeneity of wages between the wife and husband since 1960 regardless of whether schooling is controlled for or not. In particular, we observe that there is larger positive correlation in the wages of black spouses than in white spouses in the early years. Women with higher wages seem to be more favorable for men with higher wages in the marriage market.

6.2. The Impact of a More Positively Assorted Marriage Market

After the availability of effective birth control and improved female labor market prospects, a sizable proportion of women increased their interest in developing their career.[31] As a result, we expect less substitution between the spouses' time. The

[31] Goldin and Katz (2002) explored the relationship between the diffusion of the birth control pill and the increase of college women entering professional programs. They found that the pill lowers the costs of long-duration professional education for women and women were more likely to have careers.

incentive for a man to select a woman with labor market potential is also stronger, and, hence, more homogeneity of wages between spouses will be observed. Both men and women are looking for someone with high actual or potential wages. During the same period, an increasing fraction of women worked for pay while labor demand for less-skilled workers was weaker than in the 1960s. In 1960, among high school dropouts aged 25-34, 95 percent of white men and 90 percent of black men with the same education level worked in the previous year. In 2000, only 83 percent of white men and 59 percent of black men worked in the previous year. The fraction of full-time and full-year working men has decreased even further.[32] For a less-educated woman searching for a husband, the problem of a lack of employed or eligible men becomes more serious due to a more selective marriage market. Given that some women prefer single motherhood over childlessness and more working women are capable of raising a child independently, non-married motherhood should increase, especially among women with less schooling. It is expected that men and women with fewer labor market prospects would also fare worse over time in the marriage market. The trend in Table 22 confirms this statement. Each entry in the table represents the ratio of the actual proportion of the currently married population relative to the general population categorized by schooling level and age. Or:

[32] Detailed numbers are illustrated in Appendix B.

$$\text{ratio}=\frac{x_{i,j}}{y_{i,j}}$$

$$=\frac{(Of\ those\ currently\ married\ and\ in\ age\ group\ j,\ the\ percent\ with\ education\ i)}{(Of\ those\ in\ age\ group\ j,\ the\ percent\ with\ education\ i)}$$

where i is : >12, 12, 13-15, or ≥ 16 years of schooling, and j is age 25-34, 35-44 or 45-54. Notice that $\sum_i x_{i,j}=1$ and $\sum_i y_{i,j}=1$. If everyone is currently married, then the ratio is equal to 1. Of those in the same age group, a ratio larger than 1 implies the population at this schooling level is doing relatively well in marriage compared with other educational groups.

The table indicates that the marriage market is tilted towards more-educated men and women over the period. The trend is much more pronounced for blacks. Consider black male high school dropouts aged 25-34, the ratio decreases from 0.99 in 1960 to 0.48 in 2000, a greater than 50 percentage point drop. The ratio for black college graduates increased from 1.02 in 1960 to 1.28 in 2000. In contrast, the ratio for white male high school dropouts only declined from 0.99 to 0.90. Black high school dropouts are increasingly unlikely to be currently married. The less-educated whites fared better than their black counterparts mostly because their employment rate was higher. Some white women were still willing to marry as long as the cost of forming a marriage was not too high.

In a marriage market where individuals with better labor market prospects are more favorable than others, we expect those with less economic success to have more

difficulty in finding a match. As a result, a growing positive correlation of wages between married spouses should follow. Along with increasing financial independence and deteriorating pools of less-educated men, less-educated women with children or wanting children are more likely to be single despite the fact that they may prefer to be married. Recall that fertility choice (having children or not) is quite constant over the period. This explains why single motherhood is still more concentrated among less-educated and black women. The changing attitude of greater emphasis on labor market prospects worsens those women in some sense. A less-educated woman is more likely to become a single mother today than her counterpart of forty years ago.

7. CONCLUSIONS

In the first part of this dissertation, we have attempted to disentangle several patterns related to the rise in out-of-wedlock childbearing. Women are not only more likely to be single with children but are also more likely to stay single in the event of a premarital birth. The decision of non-marrying is strongly associated with labor market prospects. Unwed motherhood is still relatively rare among college graduates. The introduction of effective birth control pills lowers the cost of investment in education for women and increases the likelihood of working in the labor market. This causes the gains from specialization and exchange in the family to decline and affects spousal selection. Men and women increasingly opt to choose someone with better labor market prospects.

The narrowing gender wage gap reduces the gains from division of labor in the household. The effect is more pronounced in lower education groups because of the higher growth in the female-male wage ratio. We describe the impact of decreasing gains from specialization in marriage and the increasing stress on labor market prospects on female labor market participation choices in the second part of this dissertation. College women are inclined to develop their careers when they are young, and better economic success is advantageous to them in the marriage market as well. This implies a plan: “career then marriage” or “career and marriage”. In contrast, we find women at lower education levels are at greater risk of single-motherhood and have less labor force attachment.

The data supports the idea that couples are increasingly positively assorted from

1960 to 2000. Our results find evidence of an increase over time in the association of husbands' wages with wives' wages or education. The declining fraction of employed and working full-time, full-year men, especially for less-educated and black men, reinforces the worsening plight of women with less schooling. Women perhaps are not any less willing to marry than forty years ago, but they stay single because they can't find a qualified partner. For those women who prefer to be single mothers rather than childless or who are more concerned about the costs associated with the dissolution of marriage, they are more likely to have kids and stay single or wait for an eligible partner to marry.

From a policy perspective, our findings may point out why most studies about welfare benefits have found either no effect or a very small effect on single motherhood. Welfare benefits may lower the threshold for women while single. Nonetheless, the main reason for single motherhood results from the disadvantage of competitive position in the marriage market for those women with lower wages and the shrinking pool of potential partners. Stricter requirements on welfare or less public assistance would make those single mothers worse off. More recently, Joyce, Kaestner and Koreman (2002) examined the influence of the welfare reform of 1996, Personal Responsibility Work Opportunity Reconciliation Act (PRWORA), on non-marital fertility. They found very little evidence for an effect on out-of-wedlock childbearing. This suggests that the policymakers should be careful about the causes of out-of-wedlock childbearing and the reasons for welfare reform.

We leave the possibility of cohabitation out of the picture in this analysis.

Cohabiting unions are an alternative living arrangement to marriage and a growing proportion of the population are currently or ever cohabitated. Cohabitation can also offer the benefits of specialization in the household. This union accounts for some of the decrease in marriages in recent decades.[33] Conventional models are unable to make the distinction between marriage and living together. The legal role of marriage is fundamental to distinguish both. Thus, a model incorporating cohabitation is essential and will shed some light on future analysis of the marriage market.

[33] In 1995, 7 percent of women 15-44 years of age were currently cohabitating. 10 percent of never married women aged 15-44 were ever cohabitated. See Bramlett and Mosher (2002).

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APPENDIX A

Tables and Figures

TABLE 1—Percent Ever Married by Gender and Demographic Group, Aged 18-44, 1960-2000

	Men					Women				
	1960	**1970**	**1980**	**1990**	**2000**	**1960**	**1970**	**1980**	**1990**	**2000**
I. All	74.8	70.2	63.7	60.6	58.8	84.5	78.9	72.6	69.2	66.3
Weighted by 1970[1]			64.2	55.9	52.5			73.5	66.2	61.3
II. By Education										
Education<12 years	76.1	71.3	59.7	52.6	51.7	87.7	82.6	74.4	66.3	60.9
Education=12 years	73.8	70.9	63.6	59.8	57.8	84.4	81.0	75.9	72.7	67.9
Education 13-15 years	66.5	58.0	59.1	58.6	57.3	75.3	66.6	64.5	65.7	64.1
Education ≥ 16 years	81.1	80.9	73.7	70.1	67.5	80.0	77.8	72.7	71.3	70.5
III. By Race and Ethnicity										
Black	70.5	64.2	53.1	47.2	48.7	80.7	73.2	58.9	51.2	47.6
White[2]	75.4	70.9	65.3	63.3	61.5	85.0	79.7	74.8	72.5	70.1
Hispanic	.	72.9	64.6	57.6	57.3	.	80.6	73.3	68.5	67.3
Others	61.8	60.4	59.9	55.4	53.8	79.7	74.9	73.0	68.9	64.5
IV. By Age										
18~24	35.4	33.4	24.3	16.2	17.1	59.6	51.8	39.7	28.0	25.0
25~34	83.8	84.5	76.1	64.9	61.1	91.4	90.0	83.8	75.3	70.3
35~44	91.8	92.2	92.1	87.3	82.1	94.1	94.4	94.0	90.2	86.6
V. By Region										
Midwest	75.9	71.5	64.6	62.0	59.0	84.9	79.0	72.8	69.7	66.4
Northeast	72.8	67.4	59.0	55.7	54.8	80.7	74.8	67.0	63.4	61.5
South	75.0	71.7	66.7	63.4	61.5	85.7	81.3	75.5	71.8	68.7
West	75.4	69.4	62.7	59.3	57.5	87.7	80.2	73.6	70.3	66.6

TABLE 1—Continued

Adjusted within education (the demographic population weight in 1970 is used)[3]:

Education<12 years	71.3	66.4	56.4	52.9	82.6	77.4	67.5	60.8
Education=12 years	70.9	65.0	56.6	51.9	81.0	76.1	69.6	64.0
Education 13-15 years	58.0	52.1	46.0	45.4	66.6	60.5	55.3	53.7
Education ≥ 16 years	80.9	72.5	64.8	61.7	77.8	70.5	64.4	62.6

1. The weight of population composition in 1970 is used. Population is divided into 4 educational levels, 4 races/ethnicities, 4 regions and 3 age groups. There are totally 192 cells.
2. Nonhispanic white after 1970
3. Within education, demographic distribution is fixed in 1970 based on 4 races/ethnicities, 4 regions and 3 age groups.

Source: Tabulations from IPUMS

TABLE 2—Mean Age at First Marriage for Women, Aged 18-44, 1971-1995

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94
All	20.1 (3.0) [1]	20.5 (3.1)	20.7 (3.2)	21.5 (3.5)	22.7 (4.0)	24.0 (4.6)	25.0 (5.0)
All (Median)	19.6	20	20.2	20.9	22.1	23.3	24.2
I. By Education							
Education<12 years	19.1	19.4	19.5	20.0	20.9	22.2	22.4
Education=12 years	19.9	20.2	20.2	20.8	21.8	23.0	24.2
Education 13-15 years	20.4	20.6	20.8	21.6	22.7	23.7	24.6
Education ≥ 16 years	21.9	22.2	22.5	23.7	25.0	26.2	27.2
II. By Race and Ethnicity							
Black	20.2	20.6	21.1	22.4	23.6	25.0	26.3
White (nonhispanic)	19.8	20.4	20.8	21.5	22.6	24.0	24.1
Hispanic	20.0	20.4	20.6	21.2	22.3	23.0	23.8
III. By Region							
Northeast	20.8	21.2	21.4	22.3	23.7	25.1	26.3
Midwest	20.1	20.5	20.6	21.3	22.5	23.9	24.9
South	19.6	20.1	20.3	21.0	22.0	23.3	24.3
West	20.0	20.5	20.8	21.6	22.7	23.9	24.7

1. Standard deviations are in parentheses.

Source: Tabulations from the June Current C PS

TABLE 3—First Marriage Spell (in Months) for Female Population, Aged 18-54, 1971-1995

Year	Percent Ever Married (%)	Overall Average Spell Length	Complete Spell[1]	Right Censored Spell[2]	Proportion of complete Spell (%)	Proportion of ongoing Spell (%)
1971	79.55	166.55	112.08 (94.58)[3]	180.07 (117.84)	19.89	80.11
1975	75.1	162.55	108.56 (90.76)	178.39 (119.69)	22.69	77.31
1980	73.12	159.27	107.35 (87.37)	177.79 (118.98)	26.29	73.71
1985	71.7	152.87	103.39 (82.65)	173.58 (118.78)	29.51	70.49
1990	70.18	151.17	102.65 (81.39)	173.84 (117.24)	31.84	68.16
1995	68.17	152.89	104.36 (77.42)	176.84 (117.71)	33.05	66.95

1. After the first marriage, the average months to the end of the first marriage.
2. After the first marriage, the average months to the date of survey for those currently married women.
3. Standard deviations are in parentheses.

Source: Tabulations from the June CPS

TABLE 4—Fertility Rate[1] Per 1,000 Women, Aged 18-44, 1971-2000

	1971	1977	1980	1985	1990	1995	2000
All	83.4	70.1	71.1	68.6	70.8	65.4	66.4
I. By Education							
Education<12 years	98.2	84.7	95.5	104.7	95.1	83.3	88.7
Education=12 years	82.9	73	73.5	69	75.7	68	70.1
Education 13-15 years	67.3	58.8	58.2	57.8	57.4	56.2	54.2
Education ≥ 16 years	79.4	60	58.7	57.6	65	63.8	65.6
II. By Race and Ethnicity							
Black	99.3	82.5	83.9	75.2	83	74.3	63.5
White[2]	81.0	64.8	65.5	63.3	65.3	60.9	61.7
Hispanic		104.5	106.7	107.3	100	83.1	99.1
III. By Age							
18~24	115	93.8	96.5	95.4	99.2	93.9	87.5
25~34	105.5	88	88.6	90.2	95.4	90.8	97.5
35~44	24.2	17.6	19.1	17.4	23.7	24.1	27.8
IV. By Current Martial Status							
Currently Married	105.5	92.6	95.1	91.7	92.5	85.4	88.5
Divorced/ Widowed	31.5	28.9	27.4	27.5	26	28.2	30.4
Single	16.5	22.6	28.4	33.4	43	41.5	41.6

Adjusted fertility rate within education (the demographic population weight in 1977 is used)[3]:

Education<12 years	84.7	89.3	91.4	87.6	67.2	73.4
Education=12 years	73	73.8	71.9	81.7	82.4	81.2
Education 13-15 years	58.8	58.8	59.5	59.4	62.1	60.9
Education ≥ 16 years	60	58.9	59.9	71.3	68.6	70.1

1. Rates are the number of live births in previous year per 1,000 women, aged 18-44.
2. Nonhispanic white after 1975
3. There are 48 cells based on 4 education levels, 3 age and 4 race/ethnicity groups.

Source: Tabulations from the June CPS

TABLE 5—Mean Age at First Birth for Women, Aged 18-44, 1971-1994

	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94
All	21.1 (3.4)[1]	21.2 (3.5)	21.6 (3.6)	22.6 (4.1)	23.7 (4.6)	24.6 (5.1)	25.3 (5.5)
All (Median)	20.6	20.7	21.1	22.1	23.2	24.3	24.8
Diff. to mean at first marriage[2]	1.0	0.7	0.9	1.1	1.0	0.7	0.3
I. By Education							
Education<12 years	19.8	19.8	19.7	20.1	20.6	21.2	21.1
Education=12 years	21.1	21.1	21.3	21.9	22.7	23.5	23.9
Education 13-15 years	21.6	21.6	21.9	23.0	24.1	25.0	25.2
Education ≥ 16 years	23.2	23.6	24.3	26.0	27.3	28.6	29.8
II. By Race and Ethnicity							
Black	19.7	19.5	19.9	20.6	21.5	22.3	22.7
White (nonhispanic)	20.9	21.4	22.1	23.2	24.3	25.4	26.0
Hispanic	20.5	20.7	21.1	21.6	22.1	23.0	23.3
III. By Region							
Northeast	21.8	21.8	22.1	23.3	24.5	25.6	26.7
Midwest	21.1	21.3	21.5	22.5	23.6	24.5	25.0
South	20.6	20.8	21.1	22.0	23.0	24.0	24.6
West	21.0	21.3	21.7	22.7	23.7	24.7	25.1
IV. Premarital/Marital birth							
Premarital	18.7	18.8	19.1	19.6	20.3	21.0	21.2
Marital	21.4	21.7	22.2	23.4	24.7	26.0	27.0

1. Standard deviations are in parentheses.
2. The difference between the mean age at first birth and mean age at first marriage.

Source: Tabulations from the June CPS

TABLE 6—Fertility and Marriage Indicators by Cohort, 1940-2000

	1940	1950	1960	1970	1980	1990	2000
A. The average number of children born to ever-married women, aged 15-44							
15-44	1.90	1.84	2.31	2.36	1.92	1.76	1.80
By Age							
15~24	.95	1.04	1.29	.99	.85	.93	.95
25~34	1.71	1.86	2.45	2.37	1.69	1.59	1.59
35~44	2.56	2.23	2.62	3.14	2.76	2.10	2.06
B. The average number of children born to never-married women, aged 15-44							
15-44				.12	.17	.29	.42
By Age							
15~24				.06	.09	.14	.22
25~34				.40	.40	.54	.73
35~44				.50	.63	.66	.86
C. Fraction of women, aged 15-44, ever married							
15-44	.653	.756	.755	.689	.647	.637	.604
By Age							
15~24	.321	.448	.414	.366	.292	.213	.181
25~34	.815	.890	.914	.900	.839	.754	.703
35~44	.898	.920	.941	.943	.940	.902	.866
D. Fraction of women, aged 15-44, currently married[1]							
15-44	.611	.713	.716	.638	.566	.540	.512
By Age							
15~24	.311	.433	.401	.348	.267	.195	.167
25~34	.773	.850	.876	.839	.732	.653	.613
35~44	.813	.845	.873	.857	.806	.733	.709

1. Married, spouse present or not, or separated.

Source: Tabulations from IPUMS, except for the fertility indicators in 2000 from the CPS June.

TABLE 7—Out-of-wedlock Childbearing Indicators, 1971-2000

	1971	1977	1980	1985	1990	1995	2000
A. Percent of births in the previous year to women by marital status, aged 18-44							
By Marital Status:							
Currently Married	93.4	89.7	86.8	84.4	78.4	72.3	73.9
Divorced	2.3	2.7	3.5	3.9	3.8	4.9	3.5
Never Married	4.3	7.6	9.6	11.7	17.9	22.9	22.7
B. Percent of women who gave birth in the previous year, aged 18-44, were currently unmarried							
I. All	6.6	10.3	13.2	15.6	21.6	27.7	26.1
II. By Education							
Education<12 years	10.9	18.2	23.6	27.1	38.3	47.4	41.3
Education=12 years	6.5	10.3	12.5	16.3	24.9	32.8	32.8
Education 13-15 years	2.9	6.1	11.6	12.3	16.3	24.3	26.5
Education ≥ 16 years	1.2	1.9	2.5	4.9	6.3	5	4.9
III. By Race and Ethnicity							
Black	23.1	36.6	49.2	50.6	56.3	62.8	60.4
White[1]	4.0	5.7	6.8	9.4	13.8	18.5	17.9
Hispanic	.	11.7	14.4	10.5	20.9	26.7	29.5
IV. By Age							
18~24	9.8	18.1	20.4	26.6	41.3	51.8	51.4
25~34	4.1	4.4	8.3	9.3	13.3	17	14.7
35~44	2.1	11.5	5.9	10	10.7	13	12.2
Adjusted within education (the demographic population weight in 1977 is used)[2]:							
Education<12 years		18.2	22.2	27.8	36.9	48.0	41.0
Education=12 years		10.3	11.5	15.7	23.9	33.9	32.7
Education 13-15 years		6.1	11.0	12.9	16.4	21.2	26.8
Education ≥ 16 years		1.9	2.4	3.4	6.1	5.1	4.3

1. Nonhispanic white after 1975
2. There are 48 cells based on 4 education levels, 3 age and 4 race/ethnicity groups.

Source: Tabulations from the June CPS

TABLE 8—Percent of Never-married Women, Aged 18-44, Who Have at Least One Child, 1971-2000

	1971	1977	1980	1985	1990	1995	2000
I. All	8.1	12.4	14.1	16.8	22.6	26.0	28.6
II. By Education							
Education<12 years	28.3	38.3	43	46.9	53.2	44	42.9
Education=12 years	8.4	14	16.2	21.6	29.3	38.2	41.5
Education 13-15 years	1.6	5.6	7	9.8	14.5	18.1	23
Education ≥ 16 years	1	1.8	3.1	4	6.8	6.9	8.2
III. By Race and Ethnicity							
Black	34	45.9	47.4	49	55.6	56.7	52.6
White[1]	2.9	4	5.4	7.4	11	14	18
Hispanic	.	19.3	20.7	19.9	33.9	33.8	41.6
IV. By Age							
18~24	6	9.3	10.8	12.4	15.6	18.5	20.6
25~34	17.7	20.3	22.6	23.2	30.7	33.3	36.4
35~44	12.4	26.1	20.7	27.6	33.5	37.4	40.5
Adjusted within education (the demographic population weight in 1977 is used)[2]:							
Education<12 years		38.3	42.6	45.7	51.3	44.6	43.8
Education=12 years		14	15.2	17.9	21.8	30.5	33.1
Education 13-15 years		5.6	6.5	7.3	10.3	11.9	15.9
Education ≥ 16 years		1.8	2.7	3.4	4.8	4.9	6.6

1. Nonhispanic, white after 1975
2. There are 48 cells based on 4 education levels, 3 age and 4 race/ethnicity groups.

Source: Tabulations from the June CPS

TABLE 9—Percent of Ever-married Women, Aged 18-44, Yet to Have a Child, 1971-2000

	1971	1977	1980	1985	1990	1995	2000
I. All	15.6	19.4	18.7	20.3	19.3	19.0	18.9
II. By Education							
Education<12 years	8	8.7	8.4	9.1	9.4	9.3	10.1
Education=12 years	15.2	17.4	16.7	17.5	15.2	13.6	13.6
Education 13-15 years	21.8	24.4	21.8	22.3	21.1	20.2	19
Education ≥ 16 years	27.3	34.7	31.9	33	30	30.8	29.2
III. By Race and Ethnicity							
Black	12.2	12.1	11.6	12	12.5	14	14.6
White[1]	16.0	20.6	19.9	22	20.8	20.3	20.3
Hispanic	.	13.9	14.2	14.6	13.2	13.5	12.6
IV. By Age							
18~24	37.7	44.2	41.2	41.9	39.3	37.1	36.3
25~34	11.4	18.3	19.4	23.3	22.4	22.8	23.2
35~44	6.8	7.4	7.3	9.9	11.8	12.8	13.4
Adjusted within education (the demographic population weight in 1977 is used)[2]:							
Education<12 years		8.7	8.0	9.2	9.5	10.0	12.1
Education=12 years		17.4	17.2	19.4	17.9	16.4	17.1
Education 13-15 years		24.4	24.0	26.5	26.2	25.1	24.5
Education ≥ 16 years		34.7	34.6	38.4	36.7	38.4	36.9

1. Nonhispanic, white after 1975
2. There are 48 cells based on 4 education levels, 3 age and 4 race/ethnicity groups.

Source: Tabulations from the June CPS

TABLE 10—Premarital First Birth Spell (in Months) for Female Population, Aged 18-44, 1971-1995

Year	Percent With Premarital Birth (%)	Overall Average Spell Length	Complete Spell[1]	Right Censored Spell[2]	Proportion of complete Spell (%)	Proportion of ongoing Spell (%)
1971	9.37	44.55	36.14 (40.63)[3]	70.61 (66.37)	75.61	24.39
1977	15.08	50.03	37.09 (39.65)	77.26 (70.08)	67.79	32.21
1980	16.58	49.38	35.12 (36.83)	74.48 (63.35)	63.77	36.23
1985	19.88	55.75	38.65 (40.27)	82.98 (70.52)	61.42	38.58
1990	24.04	63.15	42.24 (41.83)	89.52 (71.62)	55.77	44.23
1995	31.42	71.65	51.98 (49.28)	99.42 (78.62)	58.54	41.46

1.After premarital first birth, the average months to first marriage.
2.After premarital first birth, the average months to date of survey.
3.Standard deviations are in parentheses.

Source: Tabulations from the June CPS

TABLE 11—Percent of Women with a Birth in the Previous Year, Aged 18-44, in the Labor Force, 1971-2000

	1971	1977	1980	1985	1990	1995	2000
I. All	26.8	37.0	41.1	49.5	55.9	58.8	60.1
II. By Education							
Education<12 years	22.3	35.8	28	30	32	39.2	39.5
Education=12 years	27.1	38.6	41.9	50.3	55.9	56.7	62.7
Education 13-15 years	31.1	33.8	49.5	56.5	63.4	64.3	65.8
Education ≥ 16 years	31.5	37.9	46.4	61	68.1	72.7	66.7
III. By Race and Ethnicity							
Black	38.4	52.1	53.9	56.9	54.4	62.9	72.5
White[1]	24.8	34	39.2	49.6	58.9	60.9	60.2
Hispanic	.	38.4	37.3	41	43.2	44.7	49.7
IV. By Age							
18~24	31.3	41.6	43.1	47.7	48.7	51.3	57.2
25~34	23	33.9	39.1	50.9	57.9	62.2	62
35~44	23.8	35	44.3	48	63.7	63.3	60.4
V. By Current Marital Status							
Currently Married	25.5	35.3	40.2	49.6	57.5	59.2	57.3
Divorced/ Widowed	43.3	51.1	47.5	60.3	56.3	74.4	70.3
Single	46.8	52.1	47.4	45.4	48.6	54.5	67.7

1. Nonhispanic white after 1975

Source: Tabulations from the June CPS

TABLE 12—Female Labor Force Participation Rate[1], Aged 25-54, 1960-2000

	1960	1970	1980	1990	2000
I. All	0.413	0.490	0.631	0.741	0.735
Weight by 1970			0.598	0.669	0.653
II. By Education					
Education<12 years	0.391	0.446	0.500	0.525	0.490
Education=12 years	0.411	0.498	0.630	0.716	0.691
Education 13-15 years	0.437	0.508	0.686	0.791	0.780
Education ≥ 16 years	0.549	0.609	0.757	0.842	0.824
III. By Race and Ethnicity					
Black	0.534	0.587	0.687	0.752	0.732
White[2]	0.399	0.481	0.627	0.752	0.763
Hispanic	.	0.423	0.566	0.649	0.607
IV. By Age					
25-34	0.350	0.448	0.647	0.739	0.728
35~44	0.427	0.501	0.648	0.765	0.739
45~54	0.467	0.525	0.586	0.710	0.738
V. By Region					
Midwest	0.395	0.479	0.626	0.752	0.770
Northeast	0.423	0.485	0.621	0.742	0.742
South	0.419	0.503	0.635	0.740	0.723
West	0.419	0.494	0.642	0.733	0.714
Adjusted within education (the demographic population weight in 1970 is used)[3]:					
Education<12 years		0.446	0.503	0.530	0.501
Education=12 years		0.498	0.626	0.717	0.707
Education 13-15 years		0.508	0.676	0.789	0.784
Education ≥ 16 years		0.609	0.750	0.843	0.834

1. The rate is defined as percentage of population who were not in the labor force last week.
2. Nonhispanic white after 1970
3. There are 48 cells based on 3 age, 4 race/ethnicity and 4 region groups.

Source: Tabulations from IPUMS

TABLE 13—Labor Force Participation Indicators for Women Aged 25-54 by Marital Status, 1960-2000

	1960	1970	1980	1990	2000
A. Labor Force Participation Rate					
Currently Married[1]	0.346	0.434	0.579	0.709	0.707
Seperated/Divorced/Widowed	0.696	0.692	0.758	0.805	0.785
Never Married	0.776	0.768	0.796	0.809	0.786
B. Average Weeks Worked Last Year[2]					
Currently Married	36.3	36.9	40.8	43.3	45.0
Seperated/Divorced/Widowed	42.0	42.4	44.0	45.0	45.9
Never Married	45.6	45.1	45.3	45.5	45.7
C. Average Annual Hours Worked[3]					
Currently Married[1]	1547	1573	1590	1726	1724
Seperated/Divorced/Widowed	1727	1761	1795	1904	1857
Never Married	1850	1813	1837	1923	1855

1. Currently Married, spouse present or absent.
2. For women who worked at least one week in previous calendar year.
3. The sample is restricted to the women who worked last week, worked at least one week in previous calendar year, and were not self-employed. Weeks worked in the previous year and usual hours worked prior to 1970 were imputed.

Source: Tabulation IPUMS

TABLE 14—Average Weeks Worked and Percent Worked Full-year for Currently Married Couples Aged 25-54 by Education, 1960-2000

	Men					Women				
	1960	**1970**	**1980**	**1990**	**2000**	**1960**	**1970**	**1980**	**1990**	**2000**
All Women: Weeks Worked										
Education<12 years	46.3	47.1	43.2	40.5	40.2	14.2	17.8	20.6	22.8	22.4
Education=12 years	49.5	49.8	47.7	46.5	46.3	14.8	19.6	25.9	31.7	33.8
Education 13-15 years	49.5	49.7	48.2	47.9	48.0	15.2	19.4	28.0	35.4	37.3
Education ≥ 16 years	49.7	49.6	49.0	48.9	49.1	17.4	21.9	29.7	36.4	38.0
Working Women: Weeks Worked										
Education<12 years	47.3	48.8	47.1	45.7	46.6	35.3	37.5	39.3	39.9	40.9
Education=12 years	48.8	50.3	49.2	48.6	49.1	36.8	38.6	41.2	43.4	45.3
Education 13-15 years	49.9	50.3	49.5	49.3	49.7	35.9	37.6	40.9	43.9	45.8
Education ≥ 16 years	50.0	50.0	49.7	49.7	50.0	34.8	35.8	39.6	43.3	45.1
Percent Worked Full Year[1]										
Education<12 years	68.2	74.4	65.8	59.3	59.7	15.1	20.3	25.9	29.9	30.1
Education=12 years	83.4	85.7	79.3	76.8	78.3	18.2	24.8	35.6	46.4	51.9
Education 13-15 years	85.8	86.8	82.5	81.8	83.3	17.4	23.2	37.9	52.3	58.0
Education ≥ 16 years	84.4	83.4	82.8	83.6	85.2	13.8	17.8	31.1	46.6	53.7

1. Working full-year is defined as the individual who worked more than 50 weeks in the previous year.

Source: Tabulation IPUMS

TABLE 15—Average Children Ever Had and Percent Childless for Women Aged 25-44 by Education and Age, 1960-2000

	1970	1980	1990	2000
Average Children Ever Had:				
All Women	2.6	2.0	1.7	1.6
Education<12 years:				
Age 25-34	2.9	2.3	2.2	2.2
35-44	3.4	3.4	2.8	2.6
Education=12 years:				
Age 25-34	2.1	1.6	1.6	1.6
35-44	2.8	2.6	2.1	2.0
Education 13-15 years:				
Age 25-34	1.8	1.3	1.2	1.3
35-44	2.8	2.4	1.9	1.9
Education ≥ 16 years:				
Age 25-34	1.1	0.8	0.7	0.7
35-44	2.3	1.9	1.5	1.5
Percent Childless:				
All Women	15.9	22.7	27.2	26.9
Education<12 years:				
Age 25-34	12.2	13.7	15.4	16.0
35-44	11.3	8.8	10.8	12.6
Education=12 years:				
Age 25-34	16.3	21.4	24.3	23.5
35-44	11.4	9.9	13.0	15.3
Education 13-15 years:				
Age 25-34	23.7	35.1	35.7	32.7
35-44	12.8	13.1	17.8	18.3
Education ≥ 16 years:				
Age 25-34	42.5	55.7	59.6	57.3
35-44	20.1	22.4	29.6	28.2

Source: Tabulations from IPUMS and CPS June 1998, 2000, 2002.

TABLE 16—Logit Regression Prediction for Women Aged 25-54 by Different Base Year

a. Logit Regression Prediction on Current Marital Status[1]

	Prediction Difference[2] $(\sum_i d_{ij})$	Predication Difference[3] $(\sum_i d_{ij}')$
Education<12 years	-0.229	-.225
Education=12 years	-0.186	-.200
Education 13-15 years	-0.166	-.169
Education ≥ 16 years	-0.071	-.081
Total	-0.154	-.201

b. Logit Regression Prediction on Labor Force Participation Status[4]

	Prediction Difference $(\sum_i d_{ij})$	Predication Difference $(\sum_i d_{ij}')$
Education<12 years	.061	.124
Education=12 years	.207	.292
Education 13-15 years	.280	.350
Education ≥ 16 years	.227	.282
Total	.220	.215

1. The dependent variable is currently married or not. Explanatory variables include age, age square, education, region and race dummies.
2. Specifically, we first compute $\Lambda(x_{i,2000}\hat{\beta}_{2000}) - \Lambda(x_{i,2000}\hat{\beta}_{1960})$. $\hat{\beta}_{2000}$ is the vector of estimated coefficients using sample from 2000, x_i is the vector of individual *i's* characteristics, and $\Lambda(x_{i,2000}\hat{\beta}_{2000})$ is the predicted probability of being currently married for individual *i* in 2000. Likewise, $\hat{\beta}_{1960}$ and $\Lambda(x_{i,1960}\hat{\beta}_{1960})$ represent the vector of estimated coefficients and predicted probability using data from 1960. In addition, we apply the data from 2000 using the coefficients estimating from 1960's sample and get the predicted values: $\Lambda(x_{i,2000}\hat{\beta}_{1960})$. After taking difference between $\Lambda(x_{i,2000}\hat{\beta}_{2000}) - \Lambda(x_{i,2000}\hat{\beta}_{1960})$, we sum up the differences separately by the four education and obtain the final result.
3. Similarly, we compute $\Lambda(x_{i,1960}\hat{\beta}_{2000}) - \Lambda(x_{i,1960}\hat{\beta}_{1960})$ and then sum up with respect to four education levels.
4. The dependent variable is currently in the labor force or not. Explanatory variables include age, age square, education, region race dummies and dummy for children under 5 in the family.

Source: Tabulation IPUMS

TABLE 17—Female-Male Average Weekly Wage Ratios by Race and Education, 1960-2000

	1960	1970	1980	1990	2000	1960-2000 (% change)
All Workers	62	57.6	57.3	64.3	70.5	13.7
White:						
Education<12 years						
All	60.8	58	59	66.3	70.2	15.5
Age 25-34	60.5	58.4	62.8	70.9	74.4	23.0
Education=12 years						
All	59.4	56.6	57.2	64	68.6	15.5
Age 25-34	63.1	59.7	62.1	70.9	72.9	15.5
Education 13-15 years						
All	56.9	54.9	57	64.4	69.4	22.0
Age 25-34	63.9	62.7	66.2	74.3	74.6	16.7
Education ≥ 16 years						
All	63.3	60.6	58.8	63	67.9	7.3
Age 25-34	75.3	72	74.2	78.9	80.2	6.5
Black:						
Education<12 years						
All Women	66.2	68.3	72.7	77	81	22.4
Age 25-34	66.2	69.3	76.9	81.6	88	32.9
Education=12 years						
All	70.3	69.3	70.4	75.6	80.6	14.7
Age 25-34	72.6	70.8	76.5	82.8	84.7	16.7
Education 13-15 years						
All	74.2	71.8	72.2	78.9	81.2	9.4
Age 25-34	69.5	70.7	75.4	83.7	82.3	18.4
Education ≥ 16 years						
All	93.1	86.1	83	82.6	85.6	-8.1
Age 25-34	93.4	89.4	85.1	91.6	88.7	-5.0

Note: The Data are restricted to individuals who are not enrolled in school, are wage and salary employees, worked at least 27 weeks and 35 hours per week in the prior year, and have potential experience of 1-40 years. Equal-weighted average across potential experience is imposed.

Source: Tabulation IPUMS

TABLE 18—Assortative Mating on Years of Schooling, 1960-2000 (Selected Years)

Wife's Schooling	Husband's schooling					
	< 9	**9-11**	**12**	**13-15**	**≥ 16**	**Total**
1960:						
< 9	17.9	4.2	2.4	0.5	0.2	25.2
9-11	8.0	7.6	4.9	1.3	0.6	22.4
12	6.0	7.5	14.5	4.5	3.7	36.2
13-15	1.0	1.1	2.5	2.4	3.1	10.1
≥ 16	0.3	0.4	0.9	0.9	3.8	6.2
Total	33.2	20.8	25.1	9.6	11.4	100.0
1980:						
< 9	4.5	1.5	1.4	0.4	0.2	7.9
9-11	3.2	4.4	4.7	1.3	0.4	13.9
12	3.2	5.7	22.3	8.3	5.5	45.0
13-15	0.5	1.0	4.3	5.5	6.5	17.9
≥ 16	0.2	0.3	1.5	2.3	11.1	15.3
Total	11.6	12.8	34.2	17.7	23.7	100.0
2000:						
< 9	1.2	0.4	0.5	0.2	0.1	2.3
9-11	0.6	1.3	1.9	0.7	0.2	4.6
12	1.0	2.5	15.7	8.0	3.3	30.4
13-15	0.4	1.2	8.7	14.6	8.6	33.4
≥ 16	0.1	0.2	2.9	6.5	19.4	29.2
Total	3.2	5.6	29.7	30.0	31.5	100.0

Note: The sample includes currently married women, aged 25-54, with spouses present.

Source: Tabulations from IPUMS

The Odds Ratio

	Odds 1 (The same education level)	Odds 2 (Differ by at most one education level)
1960	0.86	4.50
1970	0.85	4.75
1980	0.91	5.29
1990	1.00	7.23
2000	1.09	8.32

TABLE 19—Summary Statistics (Means)

		1960	1970	1980	1990	2000
Whites:						
	Variables					
	Age	37.3	38.3	38.4	39.3	41.6
	Percent with kids under 5	36.4	26.8	22.5	23.0	17.8
	Schooling	11.0	11.6	12.4	13.3	13.8
Wives:	Weeks worked last year[1]	41.5	42.7	40.5	43.2	45.4
	Usual hours worked[2]	36.7	35.6	34.1	35.7	36.7
	Log hourly wage rate (imputed wages included)	0.32	0.76	1.51	2.10	2.53
	Percent wages imputed	76.0	66.4	43.5	30.6	27.7
	Age	40.3	41.3	41.0	41.7	43.8
	Schooling	10.9	11.8	12.9	13.5	13.8
	Weeks worked last year	49.4	50.3	49.2	48.9	49.4
Husbands:	Usual hours worked	44.8	44.5	44.4	45.4	46.0
	Log hourly wage rate (imputed wages included)	.89	1.39	2.11	2.60	2.93
	Percent wages imputed	24.3	19.2	14.7	13.5	14.1
	Number of observations	221,402	222,289	229,692	269,476	273,029
	Blacks:					
	Age	36.7	37.8	38.0	39.2	41.2
	Percent with kids under 5	38.3	28.4	24.0	21.6	15.6
	Schooling	9.12	10.5	11.9	13.0	13.4
Wives:	Weeks worked last year	40.8	43.4	43.3	45.0	45.8
	Usual hours worked	35.7	36.9	36.5	38.4	39.0
	Log hourly wage rate (imputed wages included)	-0.20	.54	1.52	2.11	2.51
	Percent wages imputed	72.3	55.9	40.9	21.5	21.8
	Age	40.1	41.0	40.9	41.7	43.5
	Schooling	7.9	9.6	11.3	12.6	13.0
	Weeks worked last year	46.7	48.9	47.4	47.4	47.9
Husbands:	Usual hours worked	41.4	41.4	40.6	42.2	43.1
	Log hourly wage rate (imputed wages included)	.39	.99	1.87	2.39	2.72
	Percent wages imputed	26.9	21.3	16.6	13.0	16.1
	Number of observations	18,376	18,199	18,852	17,582	20,961

Note: The sample includes married women with spouse present aged 25-50 in 1960, 26-51 in 1970, 27-52 in 1980, 28-53 in 1990 and 29-54 in 2000. The sample is also restricted to couples where the wives are no more than 10 years younger than their husbands and husbands are no more than 15 years older than their wives.

1.For individuals who worked both last year and last week in 1960 and 1970, and worked last year after 1980.Values were imputed before 1970.

2. For individuals who worked both last year and last week in 1960 and 1970, and worked last year after 1980. Values were imputed before 1970.

TABLE 20—Estimated Coefficients of Correlation in Residual Log Hourly Wages

	1960	1970	1980	1990	2000
Whites:					
Without education control	0.074	0.093	0.108	0.157	0.175
With education control	0.023	0.029	0.061	0.074	0.082
Blacks:					
Without education control	0.119	0.148	0.170	0.189	0.160
With education control	0.056	0.076	0.129	0.112	0.090

Note: The sample includes women aged 25-50 in 1960, 26-51 in 1970, 27-52 in 1980, 28-53 in 1990 and 29-54 in 2000. The sample is also restricted to couples where the wives are no more than 10 years younger than the husbands and their husbands are no more than 15 years older than their wives. The wife's age, its square, husband's age, its square and region dummies are the explanatory variables in the regression.

TABLE 21—Estimated Coefficients of Wives Education's Dummies on Husband's Log Hourly Wages

	1960	**2000**	
White:			The Marginal Increase
High School Dropout	0.16 (.004)[1]	0. 13 (.011)	
College Graduates	0. 45 (.005)	0. 65 (.009)	
Difference	0.29	0.52	0.22
Black:			
High School Dropout	0. 15 (.012)	0. 01 (.036)	
College Graduates	0. 47 (.023)	0. 44 (.033)	
Difference	0.32	0.43	0.11

Note: The dependent variable is husband's log hourly wage. Independent variables include wife's education dummies, husbands' and wives' age, their squares, and region dummies. The omitted group is wives with schooling less than 9 years. The sample selection is the same to Table 12.

1. Standard errors are in parentheses.

TABLE 22—Trends in Currently Married Status within Education and Age by Gender and Race, 1960-2000

		White Men					Black Men				
Schooling	Age	1960	1970	1980	1990	2000	1960	1970	1980	1990	2000
<12	25-34	0.994	0.971	0.990	0.899	0.898	0.993	0.944	0.837	0.564	0.478
<12	35-44	0.973	0.967	0.958	0.887	0.803	0.991	0.970	0.943	0.775	0.583
<12	45-54	0.983	0.970	0.967	0.939	0.860	0.996	0.985	0.959	0.872	0.727
12	25-34	1.028	1.036	1.043	1.010	0.958	1.018	1.054	1.044	0.970	0.936
12	35-44	1.021	1.018	1.021	0.984	0.941	1.011	1.023	1.016	0.975	0.924
12	45-54	1.025	1.017	1.021	1.007	0.954	1.011	1.017	1.033	1.026	0.949
13-15	25-34	0.973	0.974	0.987	1.030	1.048	1.014	1.054	1.058	1.191	1.226
13-15	35-44	1.025	1.011	0.999	1.002	1.019	1.051	1.073	1.024	1.072	1.152
13-15	45-54	1.026	1.029	1.007	1.006	0.995	0.984	1.050	1.047	1.064	1.079
≥16	25-34	0.982	0.988	0.963	1.004	1.032	1.019	1.059	1.107	1.315	1.276
≥16	35-44	1.029	1.026	1.006	1.052	1.117	1.096	1.144	1.128	1.219	1.372
≥16	45-54	1.034	1.034	1.013	1.025	1.079	1.107	1.159	1.131	1.166	1.285

TABLE 22—Continued

		White Women					Black Women				
Schooling	Age	1960	1970	1980	1990	2000	1960	1970	1980	1990	2000
<12	25-34	0.994	0.970	0.992	0.926	0.941	0.984	0.926	0.781	0.636	0.627
<12	35-44	0.989	0.974	0.964	0.912	0.861	0.979	0.953	0.892	0.734	0.661
<12	45-54	1.007	0.979	0.964	0.933	0.880	0.994	0.965	0.934	0.856	0.771
12	25-34	1.023	1.040	1.058	1.053	1.007	1.039	1.061	1.077	0.942	0.906
12	35-44	1.024	1.027	1.034	1.034	0.991	1.067	1.045	1.065	1.011	0.915
12	45-54	1.016	1.031	1.034	1.053	1.032	1.016	1.073	1.069	1.028	0.975
13-15	25-34	0.991	0.999	0.979	1.009	1.021	1.027	1.085	1.016	1.103	1.104
13-15	35-44	1.004	1.008	0.986	0.991	0.998	1.043	1.091	1.029	1.004	1.063
13-15	45-54	1.003	1.007	1.001	0.988	0.993	0.983	1.117	1.068	1.043	1.027
≥16	25-34	0.918	0.916	0.911	0.946	0.987	0.976	1.104	1.156	1.301	1.213
≥16	35-44	0.924	0.956	0.966	1.002	1.049	1.039	1.185	1.131	1.264	1.288
≥16	45-54	0.871	0.941	0.958	0.962	1.003	1.128	1.153	1.138	1.191	1.190

Note: Ratio= $\frac{x_{i,j}}{y_{i,j}}$ =(Of those currently married and in age group j, the percent with education i) / (Of those in age group j, the percent with education i)

where i is ≤12, 12, 13-15 , ≥16 years of schooling. j is age 25-34, 35-44 or 45-54.

Source: Tabulations from IPUMS

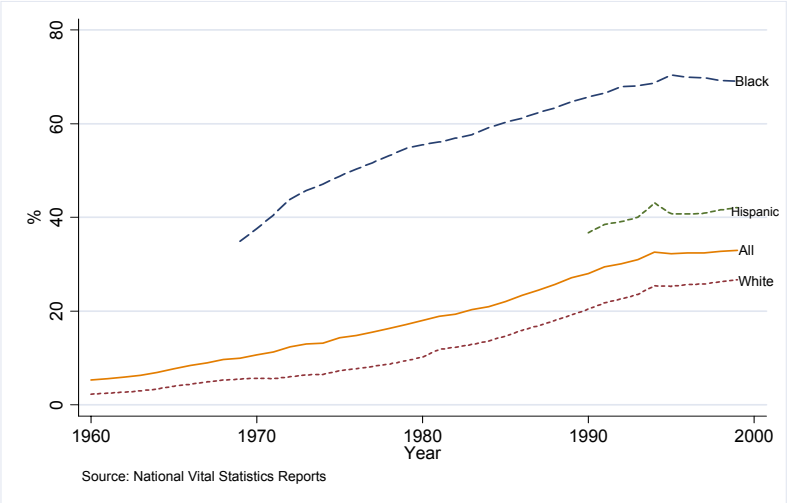


FIGURE 1. Percent of Births to Unmarried Women by Race and Ethnicity, 1960-1999

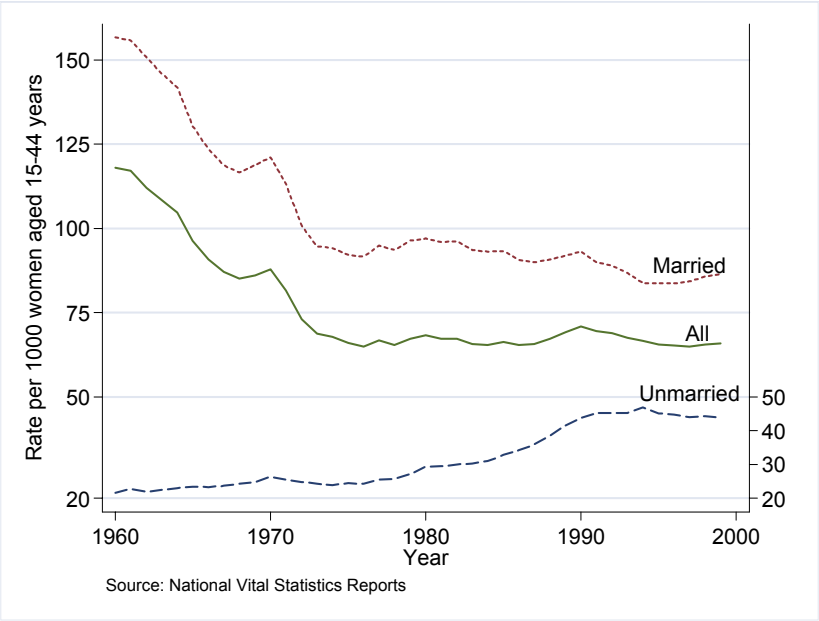
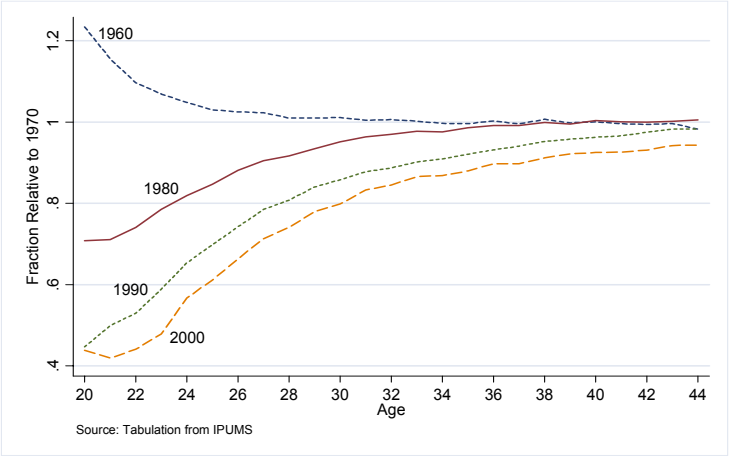


FIGURE 2. Fertility Rate Trends: Fertility Rate per 1,000 Women Aged 15-44 by Marital Status, 1960-1999

(a) For Men



(b) For Women

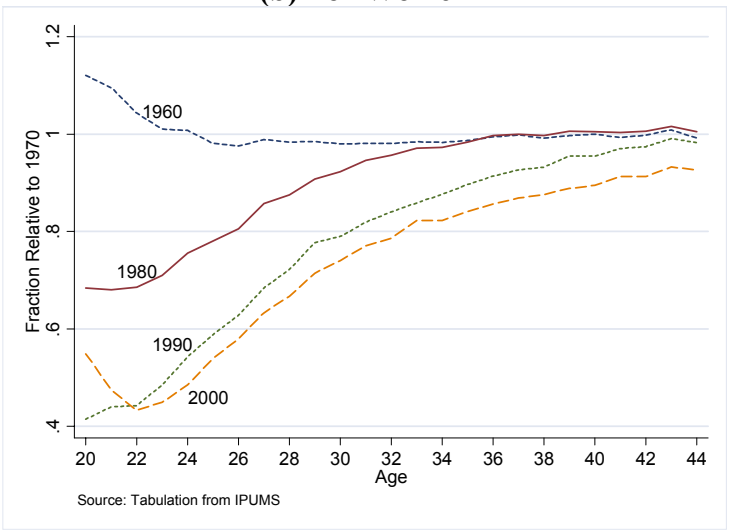


FIGURE 3. Fraction Ever Married Relative to 1970 by Age, 1960-2000

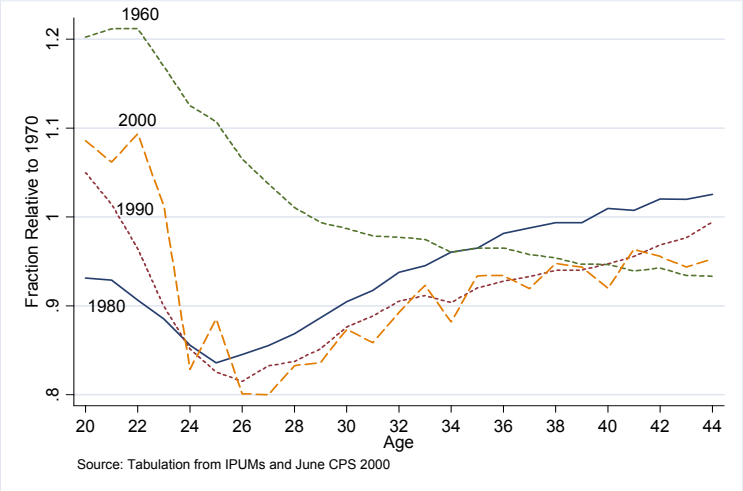
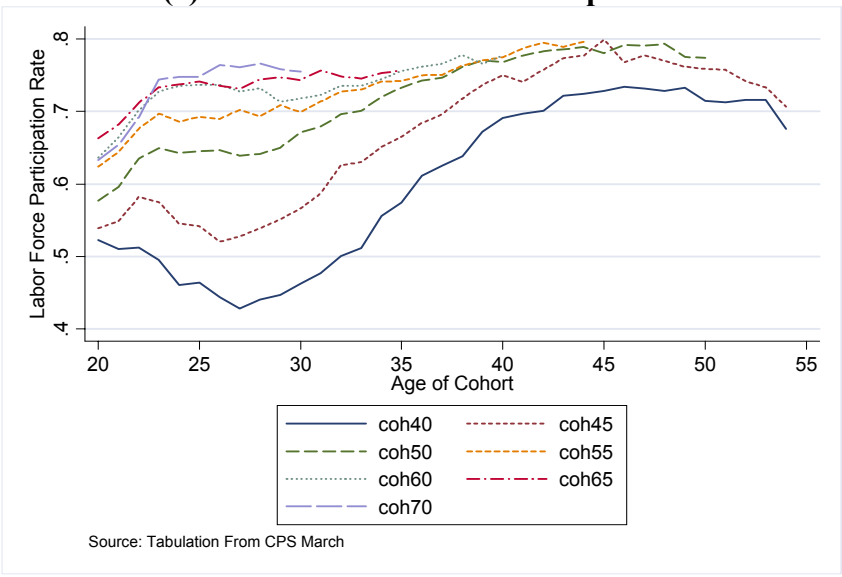


FIGURE 4. Fraction of Ever-married Women Who Had at Least One Child Relative to 1970 by Age, 1960-2000

(a) Female Labor Force Participation Rate



(b) Average Weeks Worked in the Previous Year

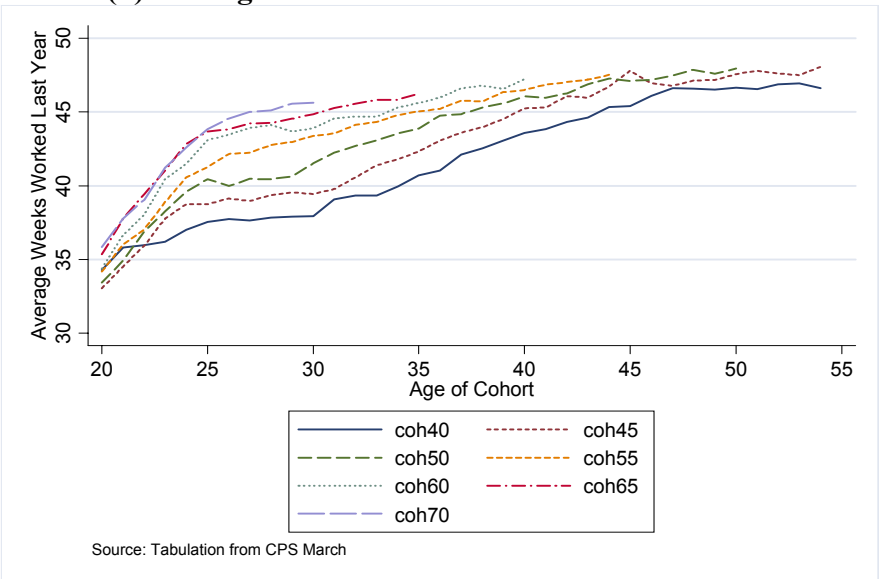
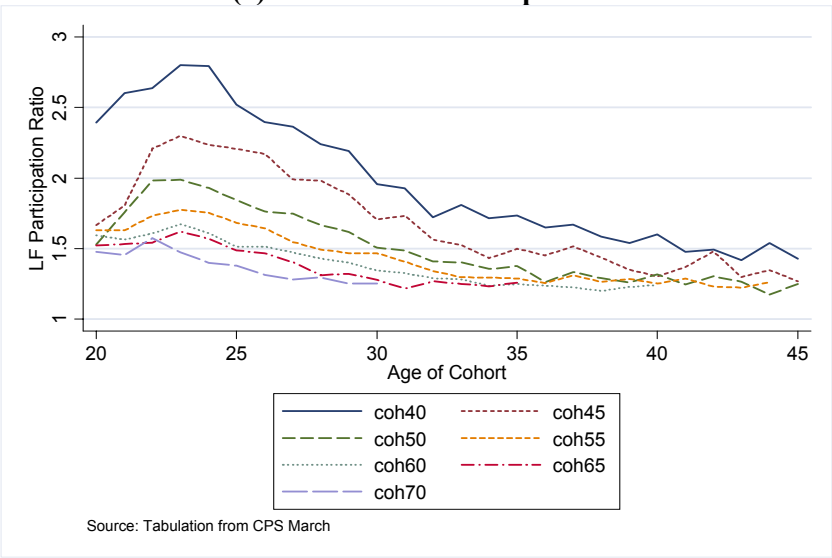


FIGURE 5. Female Labor Market Attachment by Cohort and Age

(a) The Ratio of Participation



(b) The Ratio of Average Weeks Worked in the Previous Year

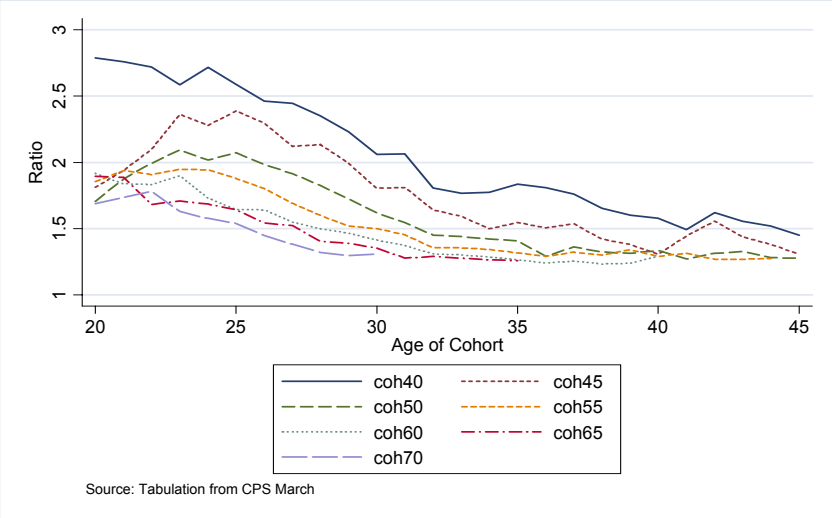
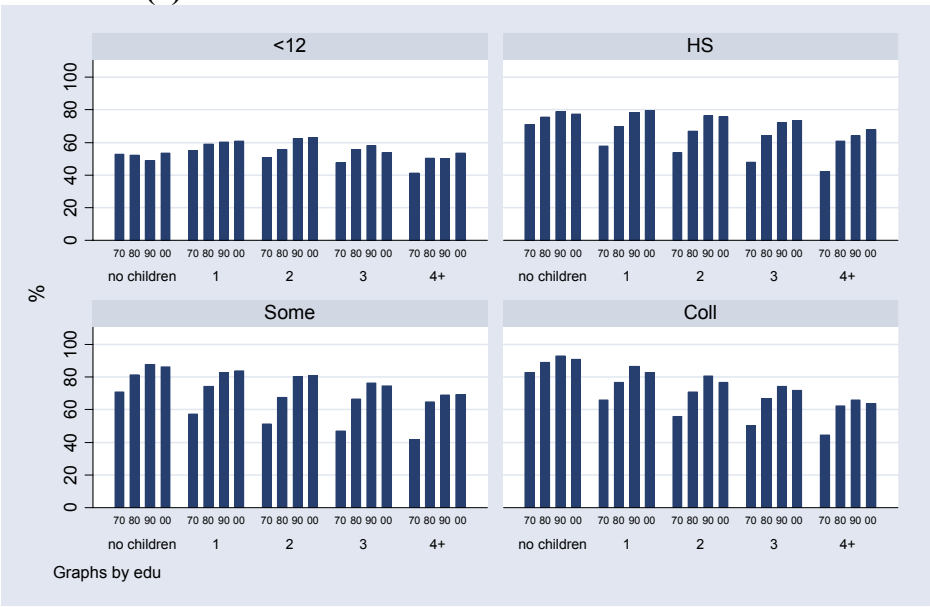
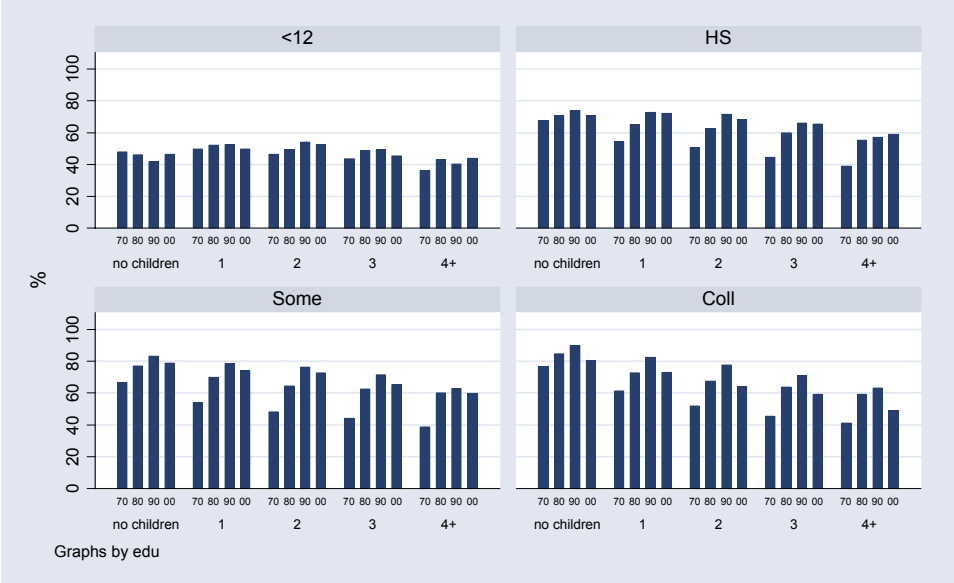


FIGURE 6. The Comparison of Labor Market Attachment for Women Without Children Under Age 6 Relative to Those With Children Under Age 6 by Cohort and Age

(a) Percent in the Labor Force in the Previous Year



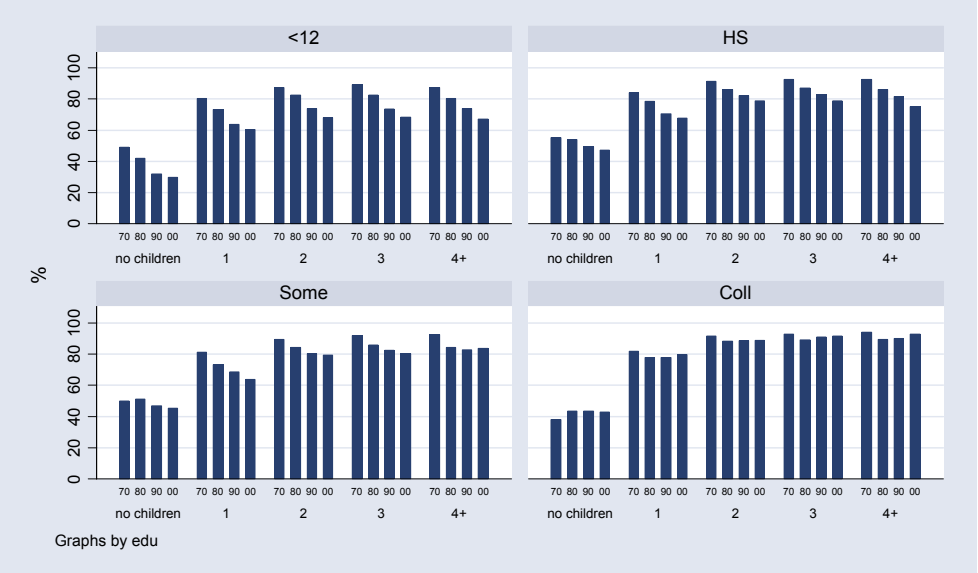
(b) Percent Worked During the Last Week



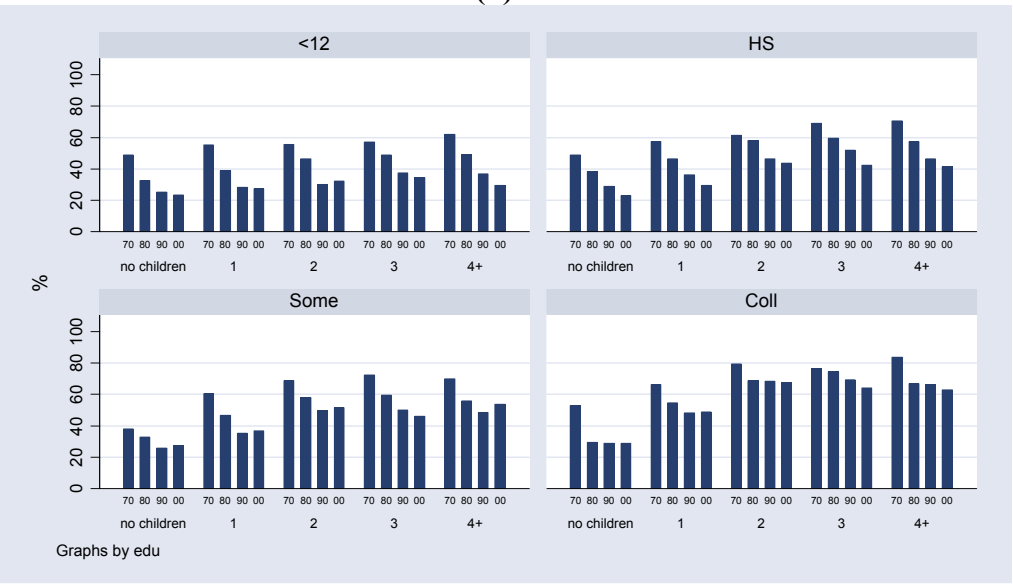
Source: Tabulation from IPUMS and CPS June 1998, 2000, 2002

FIGURE 7. Percent in the Labor Force/Worked for Women Age 35-44 by Number of Children and Education

(a) White



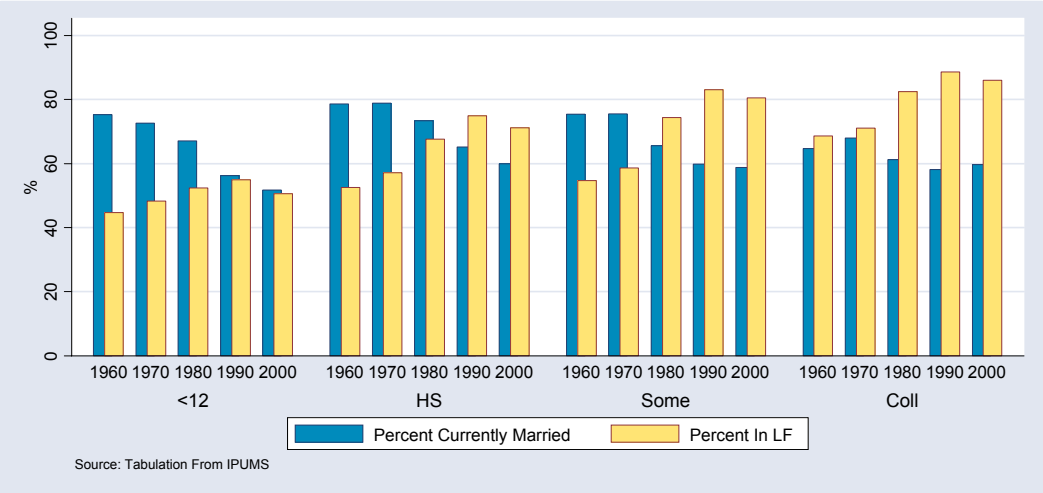
(b) Black



Source: Tabulation from IPUMS and CPS June 1998, 2000, 2002

FIGURE 8. Percent Currently Married for Women Age 35-44 by Number of Children and Education

(a) Women Without Children Under Age 5



(b) Women With Children Under Age 5

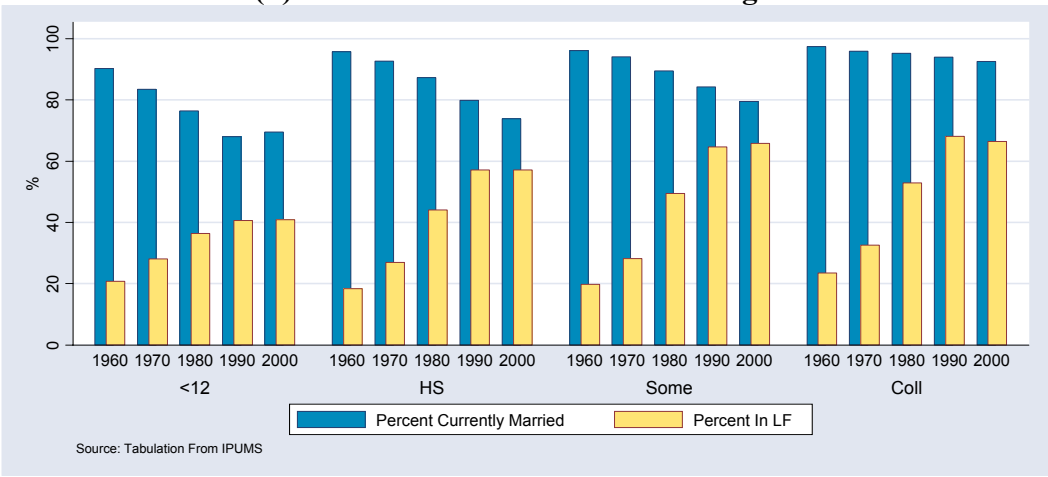
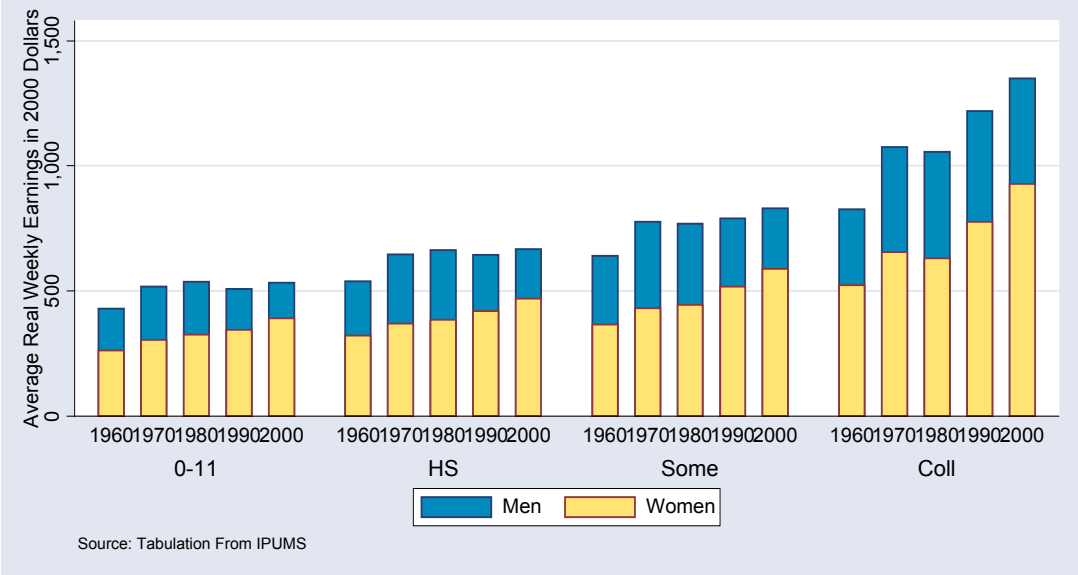


FIGURE 9. Percent Currently Married vs. Percent in the Labor Force for Women Age 25-54

(a) Real Average Weekly Wages



(b) Real Median Weekly Wages

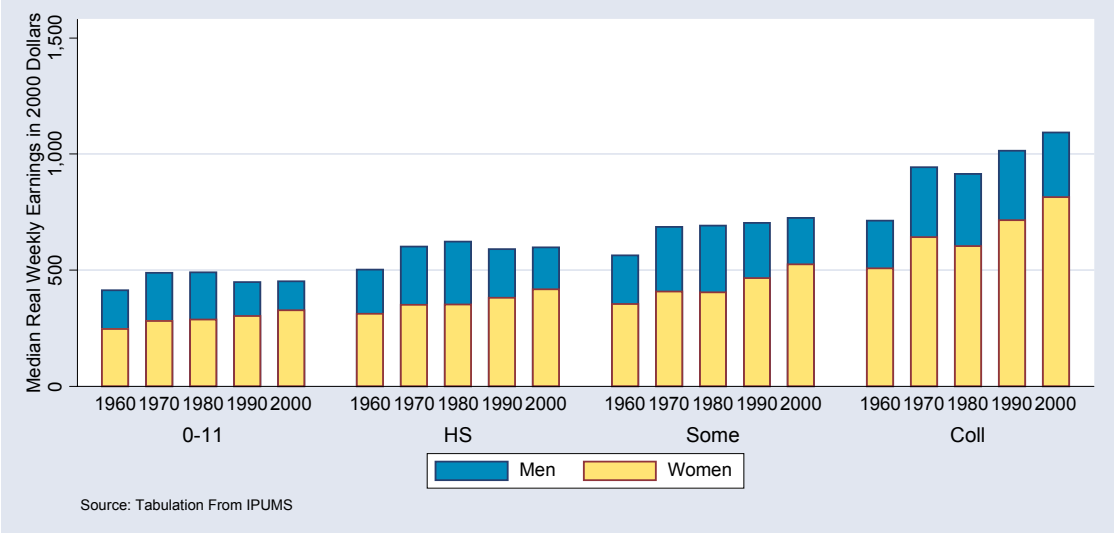


FIGURE 10. Real Weekly Wages (in 2000 Dollars) by Education and Gender, 1960-2000

Note: The Data are restricted to individuals who are not enrolled in school, are wage and salary employees, worked at least 27 weeks and 35 hours per week in the prior year, and have potential experience of 1-40 years. Estimated real earnings are calculated with equal-weighted average across potential experience and adjusted using the 2000 Implict Price Deflator.

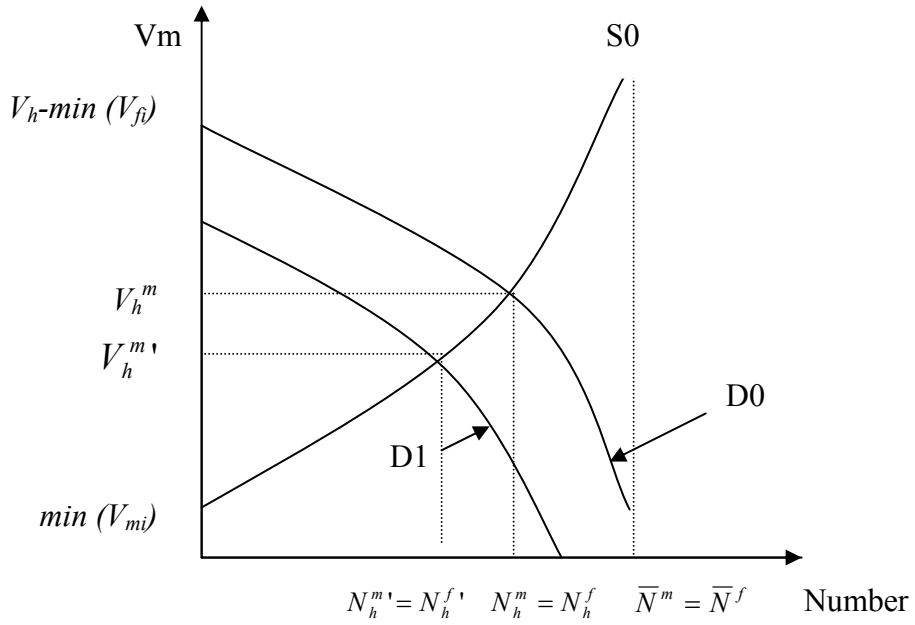


FIGURE 11. The Change in the Marriage Market

APPENDIX B

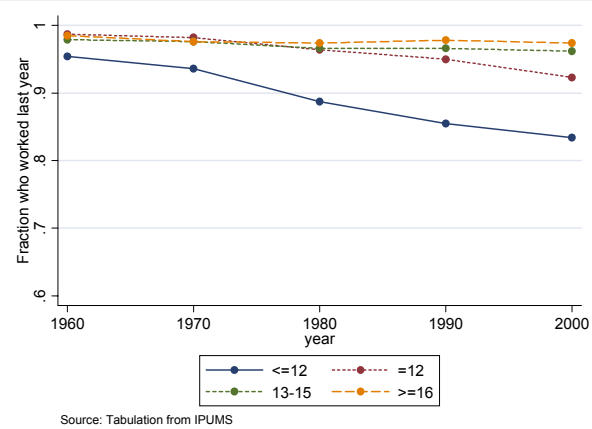


FIGURE 1a. Fraction of white men aged 25-34 who worked last year by education, 1960-2000

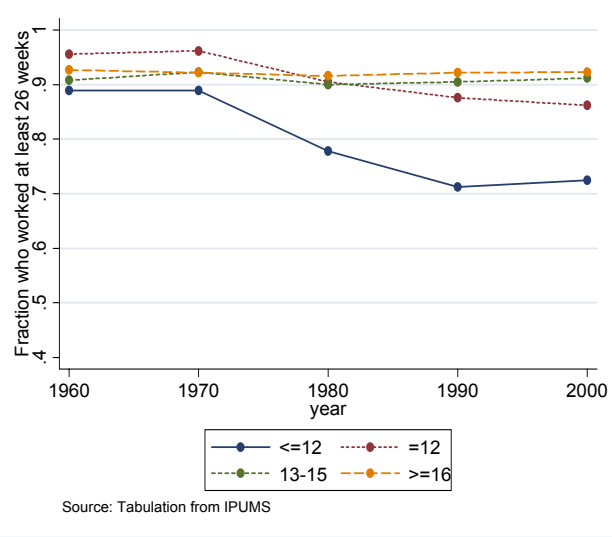


FIGURE 1b. Fraction of white men aged 24-35 who worked at least 26 weeks by education, 1960-2000

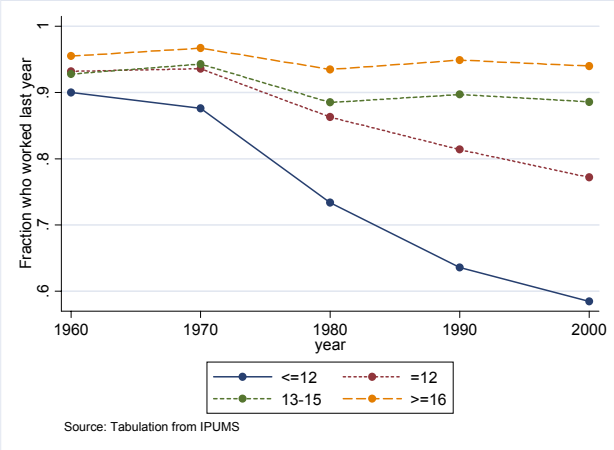


FIGURE 1c. Fraction of black men aged 25-34 who worked last year by education, 1960-2000

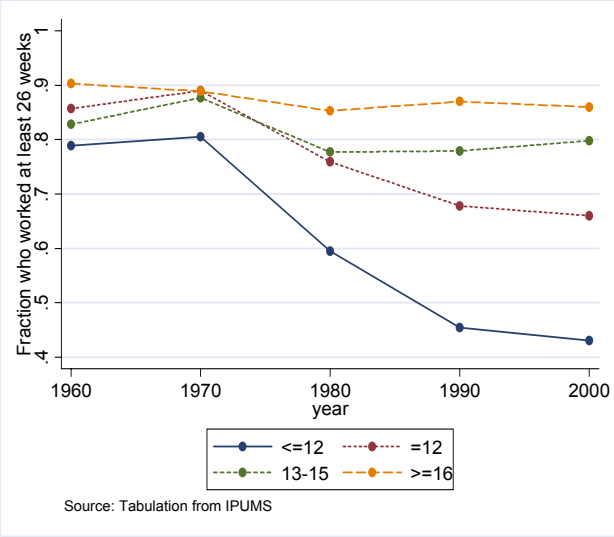


FIGURE 1d. Fraction of black men aged 25-34 who worked at least 26 weeks by education, 1960-2000

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