Essays on Income Distribution and Marriage

by

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Abstract

This thesis explores the causes of the increase in male earnings dispersion in the U.S. in the 1980s, the effect of this increase in earnings dispersion on the relative marriage rates of men with different education levels, and the overall effect of aggregate earnings and unemployment on men's aggregate marriage rates over time.

Chapter One shows that the relative decline of less educated men's marriage rates in the 1980s is strongly related to earnings. Less educated men have seen real and relative earnings decline since the late 1970s. Additionally beginning in the 1980s for the first time marriage rates of older men by education level began to diverge. I investigate the extent to which less educated men's 'devaluation' in the labor market causes their lower marriage rates. I use a group estimation scheme, where SMSA is the group, over 1980 and 1990. This allows me to control for region specific effects, to address the omitted variable problem and to control for the relevant shifts in women's earnings. I find that I can explain approximately 3-5 percentage points of the relative decline between white less than high school educated and college educated men's marriage rates by their relative earnings changes. This is over 50% of the divergence in marriage rates of college and less than high school educated men.

Chapter Two explores the relationship between aggregate business conditions and aggregate marriage rates in the U.S. over the 20th century. Using two Census datasets and the March and Outgoing Rotations of the CPS, I construct a synthetic panel of aggregate exit rates from the state of being single for cohorts born from 1898 to 1960. I find that current business conditions (unemployment and earnings) are related to exit rates from the state of being single into first marriage. Additionally, the conditions one experienced as a child are shown to affect the overall rate of marriage that a cohort experiences. Lastly, while current economic conditions change the timing of marriage when a cohort is in its 20s, the economic effects a cohort faces in its 20s do not cause persistent differences between cohort's ultimate marriage rates.

Chapter Three tests the role of small firms in the falling wages of high school educated men between 1979 and 1993. Using three May supplements to the Current Population Survey we are able to characterize the employment and wage changes by education and firm size over the

1980s. We find a large extent of downsizing in the manufacturing sector concentrated on less skilled employees, but little evidence of major downsizing in the services sector. In a shift share analysis we show that the return to education opened up at the same rate in large and small firms, and that this within firm-size wage differential is the largest contributor to the overall cross education wage differences that we observe in the 1980s.

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"it will not be simple, it will not be long
it will take little time, it will take all your thought
it will take all your heart, it will take all your breath
it will be short, it will not be simple

it will touch through your ribs, it will take all your heart
it will not be long, it will occupy your thought
as a city is occupied, as a bed is occupied
it will take all your flesh, it will not be simple

You are coming into us who cannot withstand you
you are coming into us who never wanted to withstand you
you are taking parts of us into places never planned
you are going far away with pieces of our lives

it will be short, it will take all your breath
it will not be simple, it will become your will"

-Adrienne Rich, 1991

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Chapter 1

Declining Marriage Rates of Less Educated Men: An Earnings Story?

1.1 Introduction

It is a popularized fact that people in general are marrying later in the 1980s and 1990s than in the 1950s-1970s, and that divorce has become a major part of American life. What is not popularly understood is that from the 1980s through the early 1990s, for the first time, marriage rates by education level for men began to diverge. In 1990, white men with less than a high school education were on average 5 percentage points less likely to be married at all age levels than college men, and high school educated men were 4 percentage points less likely. The divergence is even more severe for blacks between 1980 and 1990. This brings to mind a natural question: to what extent has less educated men's 'devaluation' in the labor market caused their lower marriage rates?

The declining labor market position of less educated men in the United States is a well studied phenomena. Since the 1970s, less educated men have seen earnings decline relative to college educated men. Not only has this decline been relative, but less educated men have actually experienced real life cycle earnings stagnation and decline. A forty year old less than high school educated man in 1990 will earn less than what a 30 year old less than high school educated man earned in 1980. A large literature has exhaustively studied the causes of this relative and real wage decline. The two most supported explanations have been skill-biased technological change and increased international trade. Both of these explanations operate through declines in the demand for labor of less educated men. Many of the welfare

implications of this 'devaluation' are obvious—increasing income inequality, disappointed earnings expectations, real standards of living lower than one's parents. But there may be another welfare effect that is not as well known: the declining probability of marrying and or remaining in a marriage.

In this paper I will give a historical description of marriage rates for men and women by education level. I show that the divergence of marriage rates by education for white men was not present until after 1980 (when being less than high school educated became synonymous with having very low relative earnings). The focus then will be on measuring to what degree the declining earnings of less educated men have caused their lower marriage rates. I use a group estimation scheme, where SMSA is the group, over 1980 and 1990. This allows me to control for region specific effects, individual and group heterogeneity and relevant shifts in women's earnings. I find that a 10% increase in average earnings is associated with a 1.3 percentage point increase in marriage rates for white men with less than a high school education. Given the earnings changes over the 1980s, this earnings effect can explain at least 50% of the divergence in marriage rates of college and less than high school educated men by their changing earnings.

1.2 Data

I will use the Public Use Micro Samples from the U.S. Census from 1940 through 1990 in order to characterize the historical marriage patterns by education. The focus will then be on the 1980 and 1990 Census data 5% samples. Both datasets are large enough to identify people by relatively small geographical region, and to accommodate a synthetic panel approach. Additionally, they are rich in the information about individuals. Also, the 1980 and 1990 Census

allow matching of husbands and wives, which is necessary for the part of the data construction, as will be mentioned in section VI.

1.3 Marriage Rates by Education Level, Historical

Men's marriage rates by education level had a relatively stable relationship before the 1990s.[1] Figure 1 shows the percent of men married by age for different education groups from 1940 to 1990 using the Census. The most obvious variation in marriage rates for all men over time is through age of marriage. It is commonly known that people married young in the 1950s and 1960s and early 1970s, and that this began to change in the 1980s. What is a probably less well known fact is that the low marriage rates of young people in 1980 and 1990 are not unprecedented. In the 1940 census, young men's marriage rates are similar to those in 1980 and 1990. The year 1940 is actually the tail end of a long decline in age at first marriage (Haines, 1996). The late marriage rates seen in the 1940 census do not seem to persist to non-marriage at older ages though, as older men in the 1950s and 1960s have very high marriage rates. The 1980s show the start of the increase in age of first marriage that we have experienced over the past 25 years. In the 1990 census data it is even more evident.

While the age distribution of marriage for all men has changed over time, there is a consistent pattern in the age distribution by education level. Less educated men marry earlier than more educated men (and this has been true since the 1940s). Even though the timing of first marriage is different across education levels, the final rate of marriage does not vary across education level until 1990. Figure 1 shows that once men were past 30 years old their marriage

[1] The education question changed in the 1990 census from a linear years of schooling to a grouped question. See the Data Appendix for my approach to constructing comparable schooling groups in 1980 and 1990.

rates were similar across education level until 1990. In 1990, less than high school educated men are less likely to be married relative to other education groups. Figure 2 shows the history of the percentage point difference between 30-39 year old college educated and less than high school educated men's marriage rates. It is evident from this graph that there has been an unprecedented change in behavior in marriage rates by education group from 1980 to 1990.

To be clear, all men have significantly lower marriage rates in 1990 then in the past. For white men of all education levels, the lower marriage rates at older ages is comprised mostly of higher proportions of men being in the state of divorce (the proportions never marrying have not greatly changed). For blacks both divorce and never marrying contribute to higher levels of non-married older men in 1990. Some potential explanations of the average marriage decline for men of all education levels are changing divorce laws, women's growing financial independence, cultural changes in the attitude toward marriage, and welfare generosity changes.

The focus of this paper is not on the overall decline of men's marriage rates between 1980 and 1990, but rather on explaining why the decline has been more acute for less educated men. Less educated men over 30 are far less likely to be married than more educated men in 1990. And while younger less educated men are still generally more likely to be married than young college educated men, this is less the case in 1990 than in the past.

While I concentrate on men's marriage rates by education, I present a similar figure for women's marriage rates for completeness. Figure 3 shows women's marriage rates from 1940 through 1990 by education level. The age of marriage has changed similarly to men's in that young women are less likely to be married in 1980 and 1990 than in the 1950-1970 era. The education story is quite different for women though. There has been a convergence of marriage

rates by education which is due largely to the increasing probability of college women becoming married (Goldin, 1995). By 1960 marriage rates for women were the same by education. In 1990 it appears that less than high school women may be slightly less likely to be married than other women, but this difference is not nearly as acute for women as for men.

1.4 1980 to 1990-What happened?

1.4.1 Marriage rates by education and race

Figures 4a and 4b show the marriage rates for college and less than high school educated white men and black men respectively, in 1980 and 1990.[2] The fact that black men currently have lower marriage rates than whites has been well documented (Bennett, Bloom and Craig, 1989; Schoen and Kluegel, 1988) and is evident in these figures. By all education levels, blacks are less likely to be married than whites in 1980 and 1990. The relative decline in marriage rates for less than high school educated men is not merely a race issue though. Figures 4a and 4b show that for both whites and blacks the gap in marriage rates split open by education, though the split was more evident for blacks.

Because the timing of marriage rates varies by education (less educated men marry earlier) comparisons over time are more clear if we focus on men when they are past the age of 30. Table 1 shows the percent married by age and education group for blacks and whites separately. The table confirms what we see in the graphs. White 35-39 year old men with less than a high school education were as likely to be married as college educated men in 1970 (89%

[2] The proportion of men who are in each of these education groups has not changed greatly from 1980 to 1990. Additionally, the bulk of the analysis will compare men who are 30-39 in 1980 and 40-49 in 1990, thus controlling for any changes in educational distribution.

vs. 90%) and in 1980 (83% vs. 84%). In 1990 though, they were 6 percentage points less likely to be married (72% vs. 78%). For blacks the split widened also. In 1970 and 1980, 35-39 year old black men with less than a high school education were 4 percentage points less likely to be married than college educated men. In 1990 this difference grew to 12 percentage points.[3]

A life cycle comparison shows the similarity between blacks and whites relative educational experience though. Comparing 30-34 year olds in 1980 and 40-44 year olds in 1990 gives us panel type information. While whites marriage rates are higher than blacks in all education age groups, the black and white cohorts with less than high school education saw similar marriage declines. For example all less than high school educated men who were 30-34 in 1980 were 3 percentage points less likely to be married in 1990. The cohort experience for college educated men varies by race. The cohort that was 30-34 in 1980 saw a 5 percentage point increase in their marriage rate if they were white, and a 2 percentage point increase if they were black.

Both blacks and whites have seen relative declines in marriage rates for less than high school educated men. But the channel through which this is happening is actually different by race. Figures 5a and 5b show the percent never married for white men and black men respectively, by the two education groups in 1980 and 1990. Figures 6a and 6b show the percent divorced. The proportion of less than high school educated blacks that are never married is much higher than for blacks of other education groups. So less than high school educated black men are less likely to be married in 1990 because they never marry. For whites, the difference is divorce. Less educated men are more likely to be in the state of divorce. Or put another way,

[3] For less educated men, the measured percent married is most likely an overestimate of the percent married in the population. Incarcerated men are far less likely to be married and far more likely to have low levels of education than the rest of the population.

less educated men are less likely to remarry after divorce.

These trends are present in other data sets. Analysis of the yearly CPS samples shows that the divergence between less than high school and college educated men's marriage rates between 1980 and 1990 happened gradually throughout the 1980s. The information in the Census data is not an anomaly of the 1990 Census sample.

What could have caused less than high school educated men's marriage rates to go down relative to college men's? Recall, that all men's marriage rates have declined, but the relative decline is much larger for less educated men.

1.4.2 Possible Causes

Men's earnings and joblessness

A number of studies that have focused on the marriage rates of young black women have touched on the problem of the declining labor market position of young black men. Wilson (1987) explores the causes of the increase in single headed families and low marriage rates of black women. In this book he proposes that the dearth of "marriageable" men is a major cause of declining marriage rates for black females. His definition of a man who is marriageable is one who is employed. Lichter, LecLcere, and McLaughlin (1991) and then later Wood (1993) address this assertion through grouped regression analysis which is the starting point for the analysis I do below. Wood after controlling for SMSA fixed effects still finds some support for the proposal for the "marriageable man" hypothesis when he defines marriageable as being above a certain income cutoff. Most of these analyses have focused on women's marriage rates, but

have addressed the fact that men in a poor labor market situation will not make suitable partners, and thus women will have no one to marry. The analyses have not focused on what directly happens to these men.

It is well known that the wage distribution has widened considerably since the late 1970s. And more so, that wage variation by education level has increased. (Katz and Murphy, 1992; Levy and Murnane, 1992; Murphy and Welch, 1993). Not only have less than high school educated men seen relative wage decline, but they have also experienced real wage decline. Table 2 shows the average yearly earnings for blacks and whites with positive earnings by age and education. Because these are averages of employed men they understate the decline in the average amount earned by less educated men, as their employment rates declined over this time period as well. College educated men in all age groups experienced real earnings growth (e.g. 25-29 year olds made $22893 in 1995 dollars on average in 1980 and $25497 on average in 1990), while less than high school educated men saw real earnings decline.[4] Additionally though, the cohort of working less than high school educated men did not experience wage growth over their lifetimes. If you compare the average earnings of 30-35 year olds in 1980 to the average earnings of 40-45 year olds in 1990 you get a cohort picture. For white men with less than a high school education this earnings growth was negative, while college educated men's earnings grew substantially. So the life cycle path for these men is very different. Blacks experience much the same pattern. The real earnings growth of college educated black men is positive, but less than for white college men. The declines in less than high school educated black men's yearly earnings are more severe than for whites.

[4] The data has been adjusted for topcoding.

The joblessness rate has increased for less than high school educated men relative to college men also. This is true for both blacks and whites, but is more pronounced for blacks. Older less than high school educated whites have seen their employment decline by 4-5 percentage points relative to college educated men. For blacks, this number looks more like 9-10 percentage points. Without attempting to imply causality one must note that the relationship between joblessness and lower marriage rates is strong and steady over time. Unmarried men are 10% less likely to be working than married men, and this has been true from 1970 through 1990. Another way to say this is jobless men are more likely to be single than employed men.

The bulk of the evidence in the labor literature points to an exogenous decline in the demand for unskilled labor in the U.S. as the cause of the wage and employment decline for less educated men. This means that the men have not changed as people per se, but that the labor market values them less than before. In the face of the decline in less educated men's marriage rates, it is a natural question to ask if this 'devaluing' is affecting their probabilities of marrying and remaining married. There are many ways that economists model the marriage decision, but most models would propose that, everything else equal, one has a better chance of marrying or remaining married when one has higher earnings or is employed. (Mare and Winship, 1991; Hoffman and Duncan, 1993, Ellwood and Rodda, 1991).

Sorting by Education

It is true that the average level of education of men in the U.S. has increased over time. These large changes in the fraction of the population that is in each education group over time suggests that the pool of individuals in each group may have changed. Imagine that selection

into education groups has become more meritocratic over time. It is arguable then that the pool of men who receive higher levels of education have become increasingly more likely to exhibit qualities that would be rewarded in the marriage market (eg. dependability). While this is a possible story, it does not seem to match the data. The declining relative marriage rates for less than high school educated men are a phenomena of the 1980s. The increases in men's average education levels (and thus changes in possible sorting) have been happening since the 1940s.

Women's financial independence

Theory would also suggest that increased opportunity outside the home reduces women's incentives to marry. Increases in women's labor supply and higher women's earnings are a well documented trend since the 1970s. The main increases in women's labor supply came from married women. The proportion of single women who were working has not changed greatly since 1950 (for 35-40 year olds, it went from 72% in 1950 to 78% in 1990). Married women now work at almost that rate (for 35-40 year olds it went from 26% in 1950 to 70% in 1990). Women's earnings also have risen steadily over this time. As women find increasing support in the labor market and invest more in human capital development, the costs to remaining single may decrease. This could negatively affect men's marriage rates (or positively affect divorce rates).

Welfare generosity

Welfare generosity may play a role in non-marriage (Schultz, 1993; Ellwood and Bane, 1985). Many types of welfare are awarded conditional on being single (e.g. AFDC). For

individuals at the part of the income distribution where this would be relevant, this might be a major disincentive to marry. On average this disincentive would be declining over time as the real value of welfare has declined over time.

Culture

The declines in marriage for all men could be due to the fact that there may be less social and legal pressure to marry now than in the past. Additionally, men and women could have increasingly divergent preferences of public good expenditure in the household. It may be the case as well that these changes are different across education or social groups. And lastly, it is possible that men with less than a high school education are relatively less interested in marrying than in the past for reasons that are not economic, but rather due to taste.

1.5 Matching Model as a Guide to Estimation

It is pervasive in the empirical literature on marriage to see assertions that higher men's earnings should bring higher marriage rates, and that higher women's earnings and welfare opportunities should bring lower marriage rates. While these effects seem intuitively obvious, they are not without debate. Why would higher women's earnings bring lower marriage rates or higher divorce rates? In terms of Becker's (1991) framework, increases in women's outside opportunities would decrease the complementarity inherent in the marriage arrangement. It is true that a woman's outside opportunity is more valuable IF the marriage is a choice is between working and not working. But as we saw above, this is not nearly as often the case given that the majority of married women work. If we modeled marriage as a more symmetric arrangement,

then a woman who has higher earnings should be in a similar position to a high earnings man. She will be more sought after and thus will be more likely to be married.

1.5.1 Marriage Matching and the Distribution of Men's and Women's Earnings

It is with these concerns in mind that I present a simple model to describe how the changing distribution of men' earnings and employment could be affecting their marriage rates. This will additionally guide the estimation of the effect of men's earnings or employment on their probability of marrying. Generally economic theory on marriage falls into one of three categories (Weiss, 1992): the economic reasons for any individual to ever enter a marriage, the marriage market-decision (who marries who and who stays single give a distribution of possible partners), and the decision to marry as the outcome of a search process. In my example I focus on the marriage market decision. This is not in order to deeply model the gains to individuals marrying, but more to illuminate how people would match given changes in the income distribution.

The most simple matching model has the gains to marriage simply as the opportunity to enjoy public goods. Each partner brings his or her earnings to the marriage, and the earnings are not changed by the fact of the marriage. If all the goods in the family are public then the utility of each partner is determined by the sum of the incomes of the two partners. Thus marriage is always beneficial, and the matching algorithm works solely to determine who marries whom. The Gale-Shapely algorithm proves that a stable equilibrium always exists, and that in this case the equilibrium would be perfectly positive assortative mating on income. The man with the highest income marries the woman with the highest income, the man with the second highest

income marries the woman with the second highest and so on (Roth and Sotomayor, 1990).

Model

Augmenting this simple matching framework can help us to consider the recent events in the U.S.. Suppose that all income once married is not public, but rather only some proportion of the combined income in a marriage is public. Additionally, assume that marriage in this example does not have the same gains for each partner. There are a number of reasons this could be true. There is generally less specialization in the home now, as is evidenced from the preceding discussion of women's labor force participation. Also, studies have shown that while women and men may both be employed outside the home that women are still responsible for the majority of the household duties. (Fuchs, 1988; Schor, 1991). So in line with the simple matching model above, we could assume that the couple fully shares income but that they do not share fully in the household duties. Also, women forego possible welfare benefits if they are with children already (there has been much attention on this fact when trying to explain low marriage rates of black women). This could be another cost to a woman of marrying that is not present for a man.

Given these costs, assume that since people are marrying later that they generally already have labor force attachment and thus earnings are observable. Unemployment could be considered earnings of zero. Assume that each partner brings these earnings (or potential earnings) to the marriage, and that they do not change.

Then the decision for woman i making income Yw_i between staying single or marrying man j (with income Ym_j) is between

$$Yw_i \quad \text{or} \quad (\alpha/2)*(Yw_i + Ym_j) + (1-\alpha)(Yw_i + Ym_j) - c$$

and thus the woman finds gains to marriage when

$$Yw_i < ((2-\alpha)/\alpha) * Ym_j - (2/\alpha)*c$$

and for man j and woman i it is between

$$Ym_j \quad \text{or} \quad (\alpha/2)*(Yw_i + Ym_j) + (1-\alpha)(Yw_i + Ym_j) + c$$

and thus the man finds gains to marriage when

$$Ym_j < ((2-\alpha)/\alpha) * Yw_i + (2/\alpha)*c$$

where c is the cost to women of marrying (if c is foregone welfare benefits then c would not be added to the man's utility, if c is the cost of taking on a larger part of household duties then we add c to the man's gain). α is the proportion of total income that is not public, and thus it is split

between the two partners. (1- α) is the proportion of income that is public and thus both enjoy the gains of this income.

This model does not allow bargaining over c before a proposal of marriage is accepted or rejected. We can just assume that this bargaining is non-contractible, and thus does not happen. This leads us to a simple conclusion in terms of any specific match opportunity. Both women and men have a cutoff: a proposed spouse's income must be above the cutoff for there to be a gain to marriage. For a given level of own income, this cutoff is higher for women than for men. This cutoff does not fully determine who marries whom in equilibrium, it just determines who definitely will not marry whom in equilibrium.

Examples

In equilibrium there will still be perfectly assortative mating, but depending on the relative distribution of men's and women's earnings, different pockets of people may remain single. Two examples will make this clear. Assume we have the same number of women and men in the population.

Example 1:

If the women's and men's earnings distributions were exactly the same, you would see perfectly assortative mating and everyone would marry (as long as (1-α) is large enough that the gains to the public good aspect of marriage for women outweigh c). In this case it would be just like the simple total public income story.

Example 2:

Assume men's earnings were bipolar, at Y_{high} and Y_{low}. Additionally, suppose that women's earnings were all tightly distributed around Y_{med}, where $Y_{low} < Y_{med} < Y_{high}$. Additionally assume that Y_{med} was above the cutoff for Y_{high} men to find gains marriage, but Y_{low} was not above the cutoff for Y_{med} women to find gains to marriage. In equilibrium all of the Y_{high} men would marry the women on the top end of the distribution of Y_{med}, and all other men and women would remain single.

The matching context helps to organize one's thoughts about how changes in relative earnings would affect marriage rates. The implication is that higher income for men will generally imply higher probability of being married, but that the magnitude of this effect is dependent on the shape of both income distributions. Higher income for women may or may not imply less probability of marrying.

1.5.2 1980 and 1990 changes and estimation

How does this model help us to think about the 1980 and 1990 changes? The men's earnings distribution widened: men at the bottom are doing worse, men at the top are doing better. Even if the women's earnings distribution did not move, this would decrease the probability for men at the bottom to marry. But additionally the women's earnings distribution shifted to the right. Women have higher earnings and more labor force participation. The men at the bottom are being hit in two fashions-their earnings are declining relative to other men (which would make them less attractive) precisely at the time that women's outside opportunities are

rising (which again would make marrying them less attractive). Some men may just not be "marriageable" to use Wilson's terminology-these would be the men whose earnings are not above the cutoff for the lowest earnings women. This model additionally describes why you do not see as large of declines in the marriage rates of less than high school educated women (even as less than high school educated men are not marrying). There is an asymmetry in who will marry whom in that women can have an income substantially less than their husbands, while men cannot have an income substantially less than their wives.

What is the implication of this model on estimation of the effect of employment or earnings changes that less than high school educated men experienced on their incidence of marriage? First, in order to estimate the effect of men's earnings changes on their marriage rates one must control for women's earnings in the marriage market. Both distributions are relevant for the effect of men's earnings to be identified. Second, the proportions of potential women partners to men in the marriage market will be relevant. One must control for the number of relevant women available to each man. Third, the effect of men's earnings on the probability of being married is most likely not linear-it depends on where a man lies in the earnings distribution. An example is that for some men at the bottom of the income distribution, a particular level increase in their earnings may put them over the hump of surely not marrying to marrying, while the same increase in earnings for a college educated man may make little difference in his probability of being married. Finally, some groups of men may be in a category where they just are not marriageable (a large change would have to happen for them to see an increase in marriage rates). Perhaps these are our unemployed less than high school educated men.

1.6 Regression Analysis

This section will describe the implications of the model above for estimation, and discuss the difficulties in estimating the effects of earnings on marriage from cross-sectional data. I then present an explanation of the grouping methodology I use, followed by a discussion of the instrumental variables approach. The form of the regression will be laid out, and I will describe the data. The following section will report the results.

1.6.1 Probability of an individual marrying and issues for estimation

Probability of an individual marrying

The implications of the model above (and any matching model for that matter), are that a man's probability of being married is a function of the local labor market he is in, the position he has in it (which part of the distribution), the number of women that are potential partners, and the women's earnings distribution in the marriage market he faces. Therefore, in order to get an estimate of the effect of men's earnings on their probability of being married, it is appropriate to estimate the effect of men's earnings locally (controlling for where they are in the earnings distribution). As a proxy this can be done by estimating earnings effects separately by education group. Additionally we must control for the female earnings men face, and the number of potential women that are available.

Suppose that the probability of a man marrying is a function of

- own earnings and or employment status
- earnings of women that are his potential matches
- number of women that are his potential matches
- welfare generosity
- age
- geographic effects
- time effects
- good guy effect

and that the importance of each of these variables may vary for men in different parts of the income distribution (or as a proxy, for men in different educational groups).

Problems with cross-sectional estimation of marriage on earnings and observables

Estimating a cross-sectional regression of the probability of a man being married on own earnings, earnings of women, welfare generosity, age and region will have a number of problems.

First, we almost surely have an omitted variable problem. There may be a 'good guy' effect that makes men more likely to marry and to have higher earnings, controlling for unobservables. We need to control for this unobservable individual heterogeneity.

Second, region effects may be correlated with earnings and marriage. For example, high earnings areas could have more urban independent types of people who are more comfortable with choosing not to marry as a lifestyle. This would cause underestimation of the marriage-earnings relationship.

Third, there may be relative tastes for marriage by education that are constant (an

example is certainly the timing of first marriage). Since education is correlated with earnings, you will attribute some of this to earnings.

And lastly, there may be endogeneity. The observance by economists of the marriage-wage premium has been carefully explored. In cross-section analyses, married men after controlling for other observables have 10-30% higher earnings. (Or in our framework, men with higher earnings, everything else equal, are more likely to be married). The marriage-wage premium literature has attempted to get around the omitted variables problem by estimating the effect of marriage on earnings after controlling for fixed effects. Korenman and Neumark (1990) do a careful job of this analysis, and find that the marriage-wage premium still exists, becomes smaller for any single year, but accumulates over time. In other words, marriage is related with a steeper wage profile. They do not correct for the possibility of endogeneity though, so their results should be read carefully. [5]

1.6.2 Grouping and Instrumental Variables

Why Grouping?

I choose to group the data by SMSA group and use fixed effects estimation in order to address the aforementioned issues in estimation.

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[5] They show that the relationship between increasing wages and marriage exists over time after controlling for individual characteristics. Divorce is associated with lower wages than when married (i.e. wages are declining when in the divorced state), but higher wages than when never married. The question of causality remains. From the Korenman and Neumark paper we can not tell if, everything else equal, men who are married who see wage decline are more likely to divorce (and that the wage decline causes this) or if being divorced causes your wages to fall. They also use firm data (not controlling for unobservable fixed effects) to show that married men are more likely to be in higher paying job grades within the company (but do not make a great deal more when in the same job grade as a single man). This again does not tell us whether they are married because of higher paying jobs, and or have higher paying jobs because they are married.

Group estimation rids us of the individual heterogeneity problems that exist in cross-sectional data, as long as we believe that this individual heterogeneity is distributed evenly across groups. In other words, there may be great heterogeneity across individuals, but not across groups of individuals in SMSAs after we have controlled for the SMSA effect. In this case, the average earnings for the group serves as a proxy for each individual man's earnings in the group, and thus the effect of earnings on marriage will not be identified from the 'good guy' effect. (This is similar to instrumenting, but not identical, because by grouping I have also assigned this earnings to men who are not employed.) Also, the relevant marriage market is not a geographic unit as large as the state or nation. Smaller geographic specific analysis is appropriate. The relevant women's earnings that a man would face would be those of women in his local area.

Taking differences across SMSA groups allows me to control for geographical effects, and thus any local "tastes" for marriage that are correlated with earnings. Additionally, fixed effects over groups allows a synthetic panel approach, which enables control for group heterogeneity that is fixed over time across SMSAs. We should be able to treat a random sample of men who are 30-39 years old in 1980, and a random sample of men who are 40-49 years old in 1990 as the same group of men. First differencing thus takes out any constant characteristics of this group (independent of constant characteristics of the SMSA).[6] This first differencing also addresses the issue of sorting by education group. We are looking at virtually the same people from 1980 to 1990 and thus should not pick up effects of changing rules for sorting into higher levels of education over time.

[6] A concern with this approach is if 30-39 year old men change their educational status between 1980 and 1990. The proportion of 30-39 year old men in 1980 who have less than high school is the same as the proportion of 40-49 year old men in 1990 who have less than a high school education. So the number of less than high school educated men who shift into the high school categorization through taking the GED is minimal. The less than high school men category will not be deeply worsened by selection on education.

Grouping, Immigration and Migration

A possible shortcoming of the group estimation is immigration and migration. It is not a true panel, and the Census years are 10 years apart. Are the people who live in the SMSA group in 1990 actually the same people? If not, and the migration is correlated with earnings and marriage, this could cause a bias in my estimates. The more intuitively reasonable stories would imply underestimation of the effect of earnings on marriage rates due to immigration and migration.

First, in terms of foreign immigration, immigrants are more likely to be married and more likely to have lower earnings. Therefore if an SMSA group has an influx of immigrants from 1980 to 1990 this would dampen any changes that were happening in the SMSA. I include a variable for percent of SMSA that is foreign immigrants in order to control for this.

Second, in terms of migration, a plausible story is that single men are more mobile and thus will generally be able to move towards high earnings areas, while married men find it harder to move. This increases the proportion of married men in the low earnings SMSA groups and decreases the proportion of married men in the high earnings SMSA groups. Of course one can make up a story for the other direction: married men care more about having higher earnings because they are married and thus will be more likely to move to get those higher earnings (even against the difficulties and costs of relocating a whole family).

The Census data has a variable for where one lived 5 years previously. This can be used to characterize the amount of migration and possibly allow interpretations of the more likely sign of the bias. I look at men who where 40-49 years old in 1990 to be consistent with the group

in the regression. Of the white men with less than a high school education, 84% lived in the same county as they did 5 years ago, and 90% lived in the same state as they did 5 years ago. For college men it was slightly different, with 76% living in the same county and 86% in the same state. Blacks are even less mobile, with 90% of less than high school educated blacks living in the same county as they did 5 years ago, as compared with 78% of the college educated blacks. The mobility in numbers is not so large as to cause immediate concern, but one should still characterize the movers relative to the non-movers. The movers are less likely to be married than those who have not moved in the past 5 years. For white less than high school educated men, 78% of those who had not moved in the past five years were currently married vs. 73% of those who had moved within the state or from out of state. For white college educated men the relationship with moving and being less likely to be married is similar, with 84% of those not moving being married, and 77-81% of the movers being married. For blacks there is a similar pattern. This tells us that the moving bias is most likely the one posited above: singles are more likely to move, and thus the earnings coefficients would be biased downwards.

Instrumental Variables

The grouping does not completely address the possible endogeneity issue. If one believes that the across SMSA group earnings growth variation was caused by exogenous changes in taste for marriage across SMSAs, then the regression would be attributing causality from earnings to marriage that is inappropriate. If one believes that the average earnings variation across SMSAs is due to exogenous changes in demand across SMSAs, then the regression is specified correctly. I will report results with the second specification in mind, and then introduce an IV methodology

in order to address the possible endogeneity issue.

As an instrument for the average earnings change for an education group in an SMSA group, I do the following. First, I calculate the industrial and occupational distributions in each SMSA for each education group in 1980 and 1990. I then find the national average earnings by education group for each industry and occupation in 1980. I construct a predicted earnings in 1980 and 1990 given the industrial and occupational distribution for each education/SMSA group and the national average earnings for each industry or occupation in 1980. The change in earnings in an SMSA education group then would be due solely to changes in the industrial and occupational mix in an SMSA. This is a good instrument, as it is difficult to argue that marriage would cause industrial or occupational shifts across SMSAs. The effect of marriage behavior on earnings is taken out by holding earnings in these industry occupation cells at their 1980 levels. This isolates those earnings changes which would not be caused by group marriage behavior. I use this to instrument the actual average earnings changes in an SMSA education cell.

One type of story weakens the strength of this instrument in the context of occupational changes overtime across by education group. Imagine married men are more likely to settle down and thus are more likely to be managers, while single men tend to remain regular employees. The change over time of the share of managerial positions relative to other occupations in an SMSA group could change for exogenous reasons only. But if more educated men marry at a higher rate and thus settle down more over a period of time, they will come to hold a larger share of those existing managerial positions relative to less educated men. I proceed with the understanding that this a possible pitfall of the instrument.

1.6.3 Regression form

A cross-sectional regression attempting to identify the effect of earnings on the probability of being married would look as follows:

For t = 1980, 1990

$$
\begin{aligned}
M_{kt} = {} & b_{0t} + b_{1it}*ED_i \\
& + b_2*earnings_{kt} + b_{2i} * earnings_{kt} * ED_i \\
& + b_3*welfare_{jt} + b_{3i}*welfare_{jt}*ED_i \\
& + b_4*womens\ earnings_{ijt} + b_{4i}*womens\ earnings_{ijt}*ED_i \\
& + b_5*SEXRATIO_{ijt} + b_6*immigrant_{kt} \\
& + SMSA_i \\
& + \alpha_{kt} \\
& + u_{ijkt}
\end{aligned}
$$

where k is the individual effect, i is the education group, and j is the SMSA group. M is a dichotomous variable indicating marital status. M is regressed on own earnings, immigration status, and a number of SMSA and education specific controls. α_{kt} is the unobserved individual 'good guy' effect.

Grouping by SMSA and education group averages the individual 'good guy' effect for each SMSA and education group. The unit of measure is now the SMSA group average by education and time.

For t = 1980, 1990

$$
\begin{aligned}
\%M_{ijt} = \; & b_{0t} \\
& + b_{1it} * ED_i \\
& + b_2 * \overline{earnings}_{ijt} + b_{2i} * \overline{earnings}_{ijt} * ED_i \\
& + b_3 * welfare_{jt} + b_{3i} * welfare_{jt} * ED_i \\
& + b_4 * womens\ earnings_{ijt} + b_{4i} * womens\ earnings_{ijt} * ED_i \\
& + b_5 * SEXRATIO_{ijt} + b_6 * \%immigrants_{ijt} \\
& + SMSA_i \\
& + \bar{\alpha}_{ijt} \\
& + \varepsilon_{ijt}
\end{aligned}
$$

where i equals education groups of less than high school, hs, some college (college plus is the omitted category), and j is the SMSA groups. %Mijt is the percent of men married in education group i, living in SMSA group j in time t, earnings is the average earnings for this group, welfare is welfare generosity, womens earnings are the relevant earnings of women that the education group faces in the marriage market, SMSA is a geographical fixed effect. $\bar{\alpha}_{ijt}$ is the average individual effect in an SMSA/education group. We assume that we have the same group of people over time since we look at 30-39 year olds in 1980 and 40-49 year olds in 1990. Thus we can assume that $\bar{\alpha}_{ijt}$ does not vary over time (and it can be rewritten as $\bar{\alpha}_{ij}$). The constant in the regression is a time specific effect that is common to all education groups, while ED is a set of education dummies that are allowed to vary in value over time (education specific time effects). ε_{ijt} is the average of the individual error terms.

The variables of interest are fully interacted with education, except that the SMSA fixed effect is treated as the same for all education levels.

In order to control for SMSA effects and time constant group heterogeneity, I estimate the regression with fixed effects.

$$
\begin{aligned}
\Delta \%M_{ijt} = \quad & \Delta b_0 + \Delta b_{1i} * ED_i \\
& + b_2 * \Delta \overline{earnings}_{ij} + b_{2i} * \Delta \overline{earnings}_{ij} * ED_i \\
& + b_3 * \Delta \text{welfare}_j + b_{3i} * \Delta \text{welfare}_j * ED_i \\
& + b_4 * \Delta \text{womens earnings}_{ij} + b_{4i} * \Delta \text{women earnings}_{ij} * ED_i \\
& + b_5 * \Delta \text{SEXRATIO}_{ij} + b_6 * \Delta \%\text{immigrants}_{ij} \\
& + (\varepsilon_{ijt} - \varepsilon_{ijt-1})
\end{aligned}
$$

The regression asks "if men lived in SMSA groups that experienced above average earnings growth did they also see above average marriage growth?". The percent currently married is used as the LHS variable. Currently married works as a summary statistic for a number of flows in and out of marriage: first marriage, divorce and remarriage. The first order question of interest is if earnings changes have made it more unlikely to be married, whatever the channel. The regression on currently married then answers the question of whether men who lived in SMSA groups that experienced higher earnings growth also experienced lower divorce rates, higher remarriage rates and/or lower rates of remaining never married. This is easier to interpret than a change in the percent divorced (which is dependent on the percent married the period before and the timing of this marriage) or percent never married (which leaves out all the effect of lower earnings on divorce and higher remarriage). While I focus on the percent currently married regressions, I also report results with the change in the percent ever married as

a left hand side variable.

1.6.4 Data[7]

How to choose group area?

Choosing the geographic area for analysis is partly limited by the data. The marriage market that a man truly faces may be as small as a town or county. In both 1980 and 1990 the public use micro samples only identify people in areas that are above 100,000 residents which makes the aforementioned areas too small for identification. The micro data identifies people at the level of grouped counties. The next more aggregated groups are called county groups in 1980 and PUMAs in 1990. The county groups and PUMAs have little geographic correspondence, and thus cannot be compared. The next level up is to look at SMSAs. Some of the SMSA definitions have changed between 1980 and 1990, with changes in the counties that they include. Additionally, the sets of counties that comprise a single SMSA are often split between a number of county groups or PUMAs. Because county groups and PUMAs do not contain the same grouping of counties, it was necessary to go to the maps of counties and assign people to an SMSA grouping which was consistent across both years. I call the final geographic unit of analysis the SMSA group. It may include people from counties that are not officially part of the SMSA. The important fact is that this inclusion is consistent between 1980 and 1990. The remainder of a state that is not in an SMSA will be grouped as a single non-SMSA for that state.

[7] A data appendix is available for details on the construction of each variable in the regression.

Men's and Women's Earnings

Average weekly and yearly earnings of working men are used, calculated in each SMSA group for each education level. I calculate average earnings in two ways: one is averaging earnings of all working men, the other is including non-working men as having earnings of zero. I do analysis with both variables. As an additional alternative independent variable I also use the proportion of men employed by education level.

To construct a control for women's earnings for each group of men, one must be careful. Suppose women's earnings growth in an SMSA was large because college women's earnings grew, while other women's earnings growth stayed flat. This should not effect the likelihood of less than high school men marrying, as they are very unlikely to marry college educated women. So for the control on women's earnings for each education group, I first calculate average earnings by education level for women in each SMSA group. For the total sample, I also calculate for married men of each educational group the educational distribution of their wives. This is done by matching couples in the census data in 1980 and 1990. I use these two data inputs to construct a weighted average of women's earnings. For example, to construct the women earnings controls for less than high school educated men in each SMSA group I calculate the weighted average of the average earnings of each educational group of women in that SMSA group. The weights are taken from the national population of women married to less than high school educated men: they are the proportion of women in each education group.

Welfare generosity

Welfare generosity for each SMSA group is measured as the maximum benefit for a

family of 3 by state. Overall real welfare benefits declined (in all states) from 1980 to 1990. But the size of this decline varied greatly by state. If welfare levels affect the probability of being married then states that saw less than average welfare decline might see more than average marriage decline.

Same age vs. Panel style

The age group used for the calculation of the averages by SMSA was always 30-39 year olds in 1980. In 1990 I calculate averages for 40-49 year olds. These panel style differences (comparing 40-49 year olds in 1990 to 30-39 year olds in 1980) are attractive for the reasons mentioned above. Assuming these are the same people we can pose the question: Do SMSA groups where men experienced larger earnings decline between ages 30-39 and 40-49 experience higher divorce rates and lower marriage rates? The fixed effects should control not only for the effects relative to the SMSA group, but also relative to the individuals who inhabit it between 1980 and 1990 (if we believe there is group specific heterogeneity).

Comparisons of two different cross sections (same ages) was Wood's approach. This answers the simple question "do areas where there was larger earnings decline have lower marriage rates", and does not control for group specific fixed effects. The plus of the same age comparison is that what we may truly care about is the changes for these *different* cohorts, and not the life cycle experience of a single cohort. The problem with the same age comparison is that it is very difficult to interpret. We could choose to assume that the men in 1990 are not compositionally different as a group (not different quality people) than the men in 1980. We would additionally have to assume that the distribution of these people across SMSAs was the

same in 1980 and 1990. If we patently do not believe this, and we believe there is group heterogeneity then we have a problem. The problem exists if one believes that average earnings in an SMSA group did not go down because of relative decline in demand, but rather because people who have less positive characteristics now populate that area. For this to bias our regression results it must also be the case that these characteristics are associated with lower marriage rates, which seems reasonable.

1.7 Regression Results

Tables 3 and 4 show the panel results for the grouped marriage regressions for whites, while Tables 5 through 6 show the same results for blacks. Tables 7-10 show the instrumental variable results. In all regressions I estimate fixed effects with WLS, where the weights are the number of men in the SMSA group in 1990.[8]

1.7.1 Panel style results

Whites

In Table 3, Column 1 I simply regress the change in average marriage rates across the SMSA groups on education dummies. This shows us that without any controls for earnings changes that less than high school educated men saw an average decline in marriage of 6 percentage points relative to college educated men.

Column 2 controls for the log difference of average annual earnings between 1980 and 1990, and allows this effect to vary by education group. When we introduce earnings changes

the less than high school education dummy goes from -.06 to -.03. Average earnings changes are explaining, then, half of the divergence between education groups.

Column 3 presents the full model without interactions. It includes the difference in yearly welfare values, the difference in the weighted women's yearly earnings, changes in immigration and the sex ratio. The average effect of earnings grows slightly from .11 to .13. All the control variables have signs as one would expect: potential women's earnings rising are negatively associated with men's marriage rates, higher proportions of immigrants are associated with higher men's marriage rates, and higher levels of welfare generosity are associated with lower men's marriage rates. Changes in the sex ratio do not seem to affect marriage rates. This may be due to low variation in this variable.

Column 4 is the full model with interactions. There are a number of things to note. First, the less than high school education dummy drops over 4 percentage points. The variation in the regressors is then explaining the majority of the difference between college and less than high school educated men's marriage rates. The earnings effects look statistically similar for all education groups, as none of the interactions are highly significant. The college earnings effect here is .164, while for less than high school educated men it is .130. This implies that a college (less than high school educated) SMSA group that saw a 10 percent increase in annual earnings, everything else equal, would see 1.6% (1.3%) higher marriage rates. The impact of potential women's earnings does not vary by education level, as none of the interactions are significant. The welfare generosity interactions are suggestive of welfare generosity having a larger negative effect on college educated men's marriage rates than less than high school educated men's. This is not what would be predicted by theory, but it is also not an unprecedented finding. (Hoffman and

[8] Analysis on the difference in the frequency of observations in 1990 and 1980 show them to be very close.

Duncan, 1993; Schulz, 1992; Moffitt, 1990)

Table 4 shows the same regressions with percent ever married as the dependent variable. It looks very similar to the currently married regression, with slightly smaller coefficients on the earnings variable. Welfare does not seem to affect the percent ever married, while the potential women's earnings remain significant.

I also ran these regressions with men's employment differences over time on the right hand side (they are not reported). Changes in average employment only have an effect on less than high school educated men's marriage rates. Additionally, once the other covariates are added, the effect goes away. The wage effects are much more robust. That there is not a strong relationship between the employment conditions and marriage conditions across educational SMSA groups after controlling for other covariates is not that surprising. There is not much variation in employment levels over time and across education group. For college educated men for example, the earnings variation was substantial while employment variation was minimal (most men work). Less than high school educated men are the only group who saw much variation in their employment levels, as was shown in Table 2.

Blacks

The regression results for blacks in Tables 5 and 6 are not as strong as those for whites. There had to be at least one employed black woman of each educational group in an SMSA in order to construct the women's earnings control for blacks. This shrunk the sample size

dramatically. The smaller sample size for blacks (a little more than half as many SMSA groups than for whites) may be causing inability to identify effects. In the regressions where women's earnings are not needed I use the full set of SMSA education groups that I have for black men.

Regardless, there are still a number of interesting implications in these regressions. In Table 5, column 2 you see that adding earnings changes causes the less than high school educated dummy to drop from -.04 to -.03. The earnings coefficient is a bit smaller for blacks at .08, relative to .11 for whites. In the full model, column 3, the earnings effect remains about the same. While proportion of immigrants has smaller effects on blacks' marriage rates than whites', sex ratio seems to matter more for blacks than it did for whites. Areas that saw gains in numbers of men relative to their potential mates saw decreases in marriage rates. Different from the white regressions is the fact that potential women's earnings have a *positive* effect on men's marriage rates. This is starkly different than the results for whites. We see in the model with full interactions, column 4, that it may be this is only true for college educated blacks, as the coefficients for the other education groups tend more towards zero (but none of them is significant enough to say anything definite).

The percent ever married regressions in Table 6 show similar results, with earnings having significant effects on the percent ever married, although not as high as for whites. The full model again shows that increases in potential women's earnings are associated with higher percents of men ever marrying. This is inconsistent with much of the theory on economics and marriage, and may call for further study.

The main finding in this group of regressions is that the earnings effects look similar in size to those for whites, and that the education dummy drops by a similar proportion when you

add earnings. While the black regressions are not as powerful due to sample size, they do show support for the black experience not being radically different from whites. A caveat to this is potential women's earnings, and their positive association with men's marriage rates.

Including non-employed in average wages

I also ran all the above regressions with an average earnings variable that was calculated as not the average earning of all working men, but actually setting earnings equal to zero for those not working. The results were almost identical.

1.7.2 Endogoneity and IV results

The above regressions do not address the possibility of potential endogeneity. Perhaps some areas experienced exogeneous increases in marriage rates which caused larger than average earnings growth. I approach this problem in two ways. I calculate how much of the wage-marriage effect would be implied by the upper bound of the marriage-wage effect using the Neumark-Korenman estimates. I also use industry/occupation changes as an instrument for average wages.

Upper bound for marriage-wage effect

A first step to assigning some bound for this possibility is to show what the Neumark and Korenman estimated marriage-wage effect would imply in this relationship. Above we showed that a 10% increase in average earnings was associated with a 1.3 percentage point increase in marriage rates for less than high school educated men. What would a 1.3 percentage point

increase in marriage rates do to average earnings if we assume the most upper bond of the marriage-wage effect, a 30% increase in earnings once marriage changes? Assuming all men make the average wage, if 1.3 men out of 100 get married and thus experience a 30% wage increase this should cause average earnings for that group of men to rise by less than one half of a percentage point. Thus, there is a much larger relationship here than would be implied by the marriage wage premium literature. Another way to say this is that there is a small disparity in less than high school educated men's marriage rates across SMSAs, but a large earnings disparity. The marriage-wage premium does not go very far in the effort to explain the change in earnings. Though this is evidence that endogeneity is not driving the relationship, I will still attempt to control for endogeneity with an IV approach.

Instrumental variable results

The instrumental variable results in Tables 7-10 show the same set of regressions, but instrumenting for the earnings with the aforementioned industrial/occupational mix earnings variable. In the first stage, the instrument explained approximately 10-15% of the variation in average earnings changes across education/SMSA groups for whites, but did much worse for blacks. The instrument explained average earnings changes for the more educated groups better than it did for the less educated. This is consistent with the literature that says that much of what is causing devaluation of less educated men is within industry and occupation—all of the earnings changes that are within industry and occupation will not be represented here. Thus while this instrument is effective for controlling for earnings changes caused by marriage changes, it may not be ideal for picking up the major source of earnings variation that less

educated men experienced between 1980 and 1990.

The second stage regressions for percent whites currently married are in Table 7. There are a number of points to note. The coefficient on earnings are very similar to the coefficients in the first set of regressions, while the standard errors are now much larger. Also in the full model in column 3, the coefficient on potential women's earnings is now positive. This could be an issue of the relationship of men's and women's earnings. To some degree these move together by education group and SMSA. If we have eliminated a large source of men's earnings variation that varies with marriage by instrumenting, the women's earnings variable may be picking up this effect. Lastly, unlike the previous regressions, the less than high school educated dummy does not decrease when adding the instrumented earnings to the regression. This is consistent with the story above—it may not be a good instrument for the variation in less than high school educated men's earnings rate changes. Alternatively, an interpretation of this regression is that while exogenous earnings changes matter, they do not explain much of the education time-effect.

The ever married regressions for whites in Table 8 show very similar results to the currently married regressions. The earnings coefficient does not change in size, but the potential women's earnings coefficient changes sign.

The results for black men are in Tables 9 and 10. For percent currently married, simply instrumenting for the earnings in column 2 shows that the IV results are very similar to the preceding results. The full model regressions are somewhat harder to interpret. The effect of most of the covariates changes very little from the preceding regressions. But the earnings effect in the interactions implies that a 10% increase in average earnings for college educated men would cause a 5% *decrease* in their marriage rates, and that for men of other education groups

this effect is zero.

Overall, the instrumental variable results support the assertion that exogeneous earnings changes affect marriage rates, and that the magnitudes in the first set of regressions were not deeply biased by endogeneity. For all but the black interactions, the earnings changes look quite similar to the regressions without IV. The only word of caution is that in the instrumental variable results we do not see the same changes in the education dummies.

Magnitudes

The magnitude of the effect of an SMSAs earnings changes on its residents probability of being married is significant and large enough to explain a good portion of the relative decline in less educated men's marriage rates. An example can becontsructed using the earnings averages from Table 2 for age groups 30-34 and 35-39. Between 1980 and 1990 for both age groups less than high school educated men ages saw an average decline in real earnings of over $2000, while college men saw an increase of over $2000. The earning decline for less than high school educated men translates to a 2 percentage point decline in their marriage rates relative to other men who saw no earnings decline. The earning increase for college educated men implies close to a 2 percentage point increase in their marriage rates. This total of 3-4 percentage points is over 50% of the 5-6 percentage point difference in marriage rate changes that we see for less than high school vs. college. Additionally, the earnings growth that less educated women saw was much higher relative to their potential mates than for college women. This effect adds to the decline in less than high school educated men's marriage rates.

1.8 Conclusion

Both black and white less educated men have seen relative earnings and marriage decline over the past 10 years. Declining marriage rates are not just a black phenomena, but rather are correlated with low education and earnings, regardless of race. The relative earnings decline for less than high school educated men matters in terms of their marriage rates, and can account for over 50% of the marriage differential between less than high school and college marriage rates. Additionally, increases in the earnings of women who would be potential mates is related to lower marriage rates for men of all education levels. Less than high school educated men experience earnings decline relative to other men and also relative to their potential mates. Both of these effects cause less than high school educated men to be less likely to be married (or more likely to be divorced, less likely to remarry). This is a strong welfare consequence of their declining labor market position, and has implications for future welfare issues.

Table 1

Marriage Rates for Men and Women by Education Group and Race

Men

	Age Group	1970			1980			1990		
		<HS	College	Ratio	<HS	College	Ratio	<HS	College	Ratio
Whites	**25-29**	0.80	0.76	0.95	0.69	0.56	0.81	0.54	0.46	0.85
	30-34	0.86	0.87	1.01	0.79	0.76	0.96	0.66	0.69	1.05
	35-39	0.89	0.90	1.01	0.83	0.84	1.01	0.72	0.78	1.08
	40-44	0.88	0.90	1.02	0.85	0.87	1.02	0.76	0.81	1.07
	45-49	0.89	0.91	1.02	0.86	0.88	1.02	0.79	0.83	1.05
Blacks	**25-29**	0.71	0.68	0.96	0.49	0.51	1.04	0.28	0.37	1.32
	30-34	0.80	0.83	1.04	0.65	0.70	1.08	0.42	0.59	1.40
	35-39	0.81	0.86	1.06	0.72	0.76	1.06	0.54	0.68	1.26
	40-44	0.83	0.88	1.06	0.75	0.78	1.04	0.62	0.72	1.16
	45-49	0.81	0.89	1.10	0.76	0.80	1.05	0.66	0.73	1.11

Women

	Age Group	1970			1980			1990		
		<HS	College	Ratio	<HS	College	Ratio	<HS	College	Ratio
Whites	**25-29**	0.85	0.76	0.89	0.77	0.62	0.81	0.67	0.55	0.82
	30-34	0.87	0.83	0.95	0.80	0.75	0.94	0.73	0.71	0.97
	35-39	0.87	0.85	0.98	0.82	0.79	0.96	0.75	0.76	1.01
	40-44	0.86	0.82	0.95	0.82	0.79	0.96	0.76	0.75	0.99
	45-49	0.84	0.80	0.95	0.81	0.79	0.98	0.76	0.74	0.97
Blacks	**25-29**	0.72	0.63	0.88	0.51	0.49	0.96	0.32	0.39	1.22
	30-34	0.77	0.77	1.00	0.59	0.61	1.03	0.42	0.54	1.29
	35-39	0.77	0.78	1.01	0.64	0.66	1.03	0.50	0.58	1.16
	40-44	0.76	0.79	1.04	0.66	0.66	1.00	0.53	0.57	1.08
	45-49	0.73	0.76	1.04	0.65	0.67	1.03	0.57	0.59	1.04

Table 2

Mens Average Yearly Wages by Education Group and Race in 1995 dollars

Men

	Age Group	1970			1980			1990		
		<HS	College	Ratio	<HS	College	Ratio	<HS	College	Ratio
Whites	**25-29**	18376	25900	1.41	15028	22893	1.52	12385	25497	2.06
	30-34	20177	35979	1.78	17207	31455	1.83	14214	35824	2.52
	35-39	20961	41380	1.97	19365	40755	2.10	15349	41673	2.71
	40-44	21601	44346	2.05	20038	45470	2.27	16160	46285	2.86
	45-49	20861	45304	2.17	20115	47158	2.34	17424	51362	2.95
Blacks	**25-29**	13237	21594	1.63	10062	20322	2.02	7964	22032	2.77
	30-34	14470	28159	1.95	12342	26311	2.13	9060	26727	2.95
	35-39	14837	30358	2.05	14296	30633	2.14	10797	30650	2.84
	40-44	14643	33353	2.28	14892	33024	2.22	12463	33830	2.71
	45-49	14190	28995	2.04	14789	32495	2.20	13324	36613	2.75

Mens Employment Rate by Education Group and Race

Men

	Age Group	1970			1980			1990		
		<HS	College	Ratio	<HS	College	Ratio	<HS	College	Ratio
Whites	**25-29**	0.87	0.92	1.06	0.78	0.92	1.18	0.78	0.92	1.18
	30-34	0.90	0.97	1.08	0.82	0.96	1.17	0.79	0.95	1.20
	35-39	0.90	0.98	1.09	0.83	0.97	1.17	0.79	0.96	1.22
	40-44	0.91	0.97	1.07	0.83	0.97	1.16	0.77	0.96	1.24
	45-49	0.89	0.97	1.09	0.82	0.96	1.17	0.77	0.96	1.25
Blacks	**25-29**	0.82	0.88	1.07	0.64	0.87	1.36	0.56	0.89	1.59
	30-34	0.85	0.94	1.11	0.70	0.90	1.29	0.60	0.91	1.52
	35-39	0.85	0.96	1.13	0.75	0.93	1.24	0.62	0.92	1.49
	40-44	0.84	0.96	1.14	0.75	0.93	1.24	0.66	0.91	1.38
	45-49	0.83	0.96	1.16	0.73	0.92	1.26	0.67	0.92	1.37

Table 3

White Men, 30-39 Years Old in 1980, 40-49 Years Old in 1990
Dependent Variable: Change in Percent Currently Married

	Education Only	Log Wage Diff	Full Model	Full Model with interactions
Intercept	0.029	-0.007	-0.008	-0.026
	(0.002)	(0.003)	(0.048)	(0.009)
Education				
<HS	-0.063	-0.029	-0.037	-0.018
	(0.003)	(0.004)	(0.004)	(0.012)
HS	-0.059	-0.027	-0.024	-0.003
	(0.002)	(0.003)	(0.004)	(0.012)
Some College	-0.025	-0.005	0.000	0.017
	(0.002)	(0.002)	(0.003)	(0.012)
Wage change		0.111	0.134	0.164
		(0.008)	(0.010)	(0.019)
Wage change interactions				
<HS				-0.034
				(0.028)
HS				-0.084
				(0.030)
Some College				-0.006
				(0.029)
Welfare Change			-0.021	-0.023
			(0.003)	(0.012)
Welfare change interactions				
<HS				0.022
				(0.020)
HS				0.007
				(0.018)
Some College				-0.010
				(0.017)
Potential Women's Wage			-0.056	-0.034
			(0.013)	(0.024)
Potential Women's Wage Int.				
<HS				-0.003
				(0.036)
HS				-0.019
				(0.035)
Some College				-0.045
				(0.036)
Proportion Immigrants			0.275	0.267
			(0.022)	(0.023)
Sex Ratio			-0.003	-0.008
			(0.008)	(0.008)
R-squared	0.372	0.443	0.493	0.497
N	1419	1419	1419	1419

Table 4

White Men, 30-39 Years Old in 1980, 40-49 Years Old in 1990
Dependent Variable: Change in Percent Ever Married

	Education Only	Log Wage Diff	Full Model	Full Model with interactions
Intercept	0.054	0.030	0.032	0.016
	(0.001)	(0.002)	(0.003)	(0.006)
Education				
<HS	-0.041	-0.018	-0.025	-0.011
	(0.002)	(0.003)	(0.003)	(0.008)
HS	-0.037	-0.015	-0.016	-0.005
	(0.002)	(0.002)	(0.003)	(0.008)
Some College	-0.012	0.001	0.003	0.022
	(0.002)	(0.002)	(0.002)	(0.008)
Wage change		0.075	0.086	0.137
		(0.006)	(0.008)	(0.014)
Wage change interactions				
<HS				-0.069
				(0.020)
HS				-0.119
				(0.021)
Some College				-0.027
				(0.021)
Welfare Change			-0.009	-0.004
			(0.005)	(0.008)
Welfare change interactions				
<HS				-0.009
				(0.015)
HS				-0.007
				(0.013)
Some College				-0.006
				(0.013)
Potential Women's Wage			-0.028	-0.025
			(0.009)	(0.017)
Potential Women's Wage Int.				
<HS				0.008
				(0.026)
HS				0.029
				(0.025)
Some College				-0.027
				(0.026)
Proportion Immigrants			0.114	0.107
			(0.016)	(0.017)
Sex Ratio			0.013	0.008
			(0.006)	(0.006)
R-squared	0.339	0.403	0.425	0.4395
N	1419	1419	1419	1419

Table 5

Black Men, 30-39 Years Old in 1980, 40-49 Years Old in 1990
Dependent Variable: Change in Percent Currently Married

	Education Only	Log Wage Diff	Full Model	Full Model with interactions
Intercept	-0.004	-0.022	-0.041	-0.072
	(0.007)	(0.008)	(0.012)	(0.027)
Education				
<HS	-0.041	-0.027	-0.022	0.005
	(0.009)	(0.009)	(0.009)	(0.030)
HS	-0.037	-0.025	-0.018	0.020
	(0.009)	(0.009)	(0.009)	(0.032)
Some College	-0.005	0.001	0.002	0.057
	(0.009)	(0.009)	(0.008)	(0.034)
Wage change		0.077	0.063	0.054
		(0.016)	(0.018)	(0.048)
Wage change interactions				
<HS				-0.003
				(0.056)
HS				0.034
				(0.063)
Some College				0.010
				(0.062)
Welfare Change			-0.011	-0.093
			(0.020)	(0.056)
Welfare change interactions				
<HS				0.075
				(0.066)
HS				0.087
				(0.067)
Some College				0.132
				(0.071)
Potential Women's Wage			0.054	0.096
			(0.028)	(0.069)
Potential Women's Wage int.				
<HS				-0.019
				(0.082)
HS				-0.078
				(0.088)
Some College				-0.081
				(0.095)
Proportion Immigrants			0.092	0.096
			(0.039)	(0.039)
Sex Ratio			-0.030	-0.030
			(0.010)	(0.010)
R-squared	0.032	0.050	0.076	0.071
N	1109	1109	895	895

Table 6

Black Men, 30-39 Years Old in 1980, 40-49 Years Old in 1990
Dependent Variable: Change in Percent Ever Married

	Education Only	Diff of Log Wage	Full Model	Full Model with interactions
Intercept	0.049	0.036	0.014	-0.024
	(0.005)	(0.006)	(0.009)	(0.021)
Education				
<HS	-0.020	-0.011	-0.004	0.032
	(0.007)	(0.007)	(0.007)	(0.024)
HS	-0.023	-0.014	-0.009	0.047
	(0.007)	(0.007)	(0.007)	(0.025)
Some College	-0.005	0.000	0.002	0.049
	(0.007)	(0.007)	(0.007)	(0.027)
Wage change		0.057	0.048	0.072
		(0.013)	(0.015)	(0.038)
Wage change interactions				
<HS				-0.017
				(0.044)
HS				-0.029
				(0.050)
Some College				-0.046
				(0.049)
Welfare Change			-0.026	-0.090
			(0.016)	(0.045)
Welfare change interactions				
<HS				0.063
				(0.053)
HS				0.091
				(0.054)
Some College				0.070
				(0.056)
Potential Women's Wage			0.059	0.120
			(0.022)	(0.055)
Potential Women's Wage int.				
<HS				-0.045
				(0.065)
HS				-0.113
				(0.070)
Some College				-0.073
				(0.075)
Proportion Immigrants			0.000	0.000
			(0.031)	(0.031)
Sex Ratio			-0.012	-0.012
			(0.008)	(0.008)
R-squared	0.014	0.031	0.041	0.038
N	1109	1109	895	895

Table 7
Instrumental Variables Approach*
White Men, 30-39 Years Old in 1980, 40-49 Years Old in 1990
Dependent Variable: Change in Percent Currently Married

	Education Only	Log Wage Diff	Full Model	Full Model with interactions
Intercept	0.029	0.023	0.001	-0.015
	(0.002)	(0.004)	(0.005)	(0.010)
Education				
<HS	-0.063	-0.059	-0.067	-0.056
	(0.003)	(0.003)	(0.004)	(0.013)
HS	-0.059	-0.056	-0.053	-0.022
	(0.002)	(0.003)	(0.003)	(0.013)
Some College	-0.025	-0.022	-0.019	-0.006
	(0.002)	(0.003)	(0.002)	(0.013)
Wage change		0.088	0.094	0.242
		(0.044)	(0.044)	(0.096)
Wage change interactions				
<HS				-0.023
				(0.132)
HS				-0.319
				(0.125)
Some College				-0.184
				(0.129)
Welfare Change			-0.017	-0.015
			(0.007)	(0.013)
Welfare change interactions				
<HS				0.007
				(0.022)
HS				0.003
				(0.019)
Some College				-0.010
				(0.018)
Potential Women's Wage			0.038	0.054
			(0.011)	(0.022)
Potential Women's Wage int.				
<HS				-0.001
				(0.033)
HS				-0.045
				(0.030)
Some College				-0.012
				(0.032)
Proportion Immigrants			0.258	0.262
			(0.023)	(0.024)
Sex Ratio			-0.002	-0.006
			(0.008)	(0.008)
N	1419	1419	1419	1419

*Instrument is the change in the industrial mix of employment by education group within an SMSA from 1980 to 1990.

Table 8
Instrumental Variables Approach*
White Men, 30-39 Years Old in 1980, 40-49 Years Old in 1990
Dependent Variable: Change in Percent Ever Married

	Education Only	Log Wage Diff	Full Model	Full Model with interactions
Intercept	0.054	0.047	0.037	0.021
	(0.001)	(0.002)	(0.004)	(0.008)
Education				
<HS	-0.041	-0.037	-0.042	-0.035
	(0.002)	(0.002)	(0.003)	(0.009)
HS	-0.037	-0.033	-0.034	-0.011
	(0.002)	(0.002)	(0.002)	(0.009)
Some College	-0.012	-0.009	-0.008	0.010
	(0.002)	(0.002)	(0.002)	(0.009)
Wage change		0.099	0.091	0.271
		(0.031)	(0.031)	(0.014)
Wage change interactions				
<HS				-0.019
				(0.094)
HS				-0.330
				(0.088)
Some College				-0.299
				(0.092)
Welfare Change			-0.006	0.002
			(0.005)	(0.009)
Welfare change interactions				
<HS				-0.021
				(0.016)
HS				-0.013
				(0.014)
Some College				-0.008
				(0.013)
Potential Women's Wage			0.031	0.043
			(0.008)	(0.016)
Potential Women's Wage int.				
<HS				-0.017
				(0.023)
HS				-0.024
				(0.021)
Some College				-0.009
				(0.022)
Proportion Immigrants			0.105	0.119
			(0.016)	(0.017)
Sex Ratio			0.013	0.010
			(0.006)	(0.006)
N	1419	1419	1419	1419

*Instrument is the change in the industrial mix of employment by education group within an SMSA from 1980 to 1990.

Table 9
Instrumental Variables Approach*
Black Men, 30-39 Years Old in 1980, 40-49 Years Old in 1990
Dependent Variable: Change in Percent Currently Married

	Education Only	Log Wage Diff	Full Model	Full Model with interactions
Intercept	-0.004	-0.010	-0.034	-0.034
	(0.007)	(0.008)	(0.013)	(0.029)
Education				
<HS	-0.041	-0.037	-0.029	-0.036
	(0.009)	(0.008)	(0.009)	(0.033)
HS	-0.037	-0.033	-0.026	-0.025
	(0.009)	(0.009)	(0.009)	(0.034)
Some College	-0.005	-0.003	-0.001	0.023
	(0.009)	(0.009)	(0.009)	(0.036)
Wage change		0.096	0.023	-0.509
		(0.062)	(0.067)	(0.223)
Wage change interactions				
<HS				0.570
				(0.243)
HS				0.710
				(0.266)
Some College				0 490
				(0.263)
Welfare Change			-0.013	-0.083
			(0.021)	(0.057)
Welfare change interactions				
<HS				0.060
				(0.067)
HS				0.063
				(0.067)
Some College				0.127
				(0.071)
Potential Women's Wage			0.080	0.126
			(0.027)	(0.067)
Potential Women's Wage int.				
<HS				-0.031
				(0.079)
HS				-0.081
				(0.085)
Some College				-0.078
				(0.092)
Proportion Immigrants			0.084	0.086
			(0.039)	(0.039)
Sex Ratio			-0.028	-0.027
			(0.010)	(0.011)
N	1109	1109	895	895

*Instrument is the change in the industrial mix of employment by education group within an SMSA from 1980 to 1990.

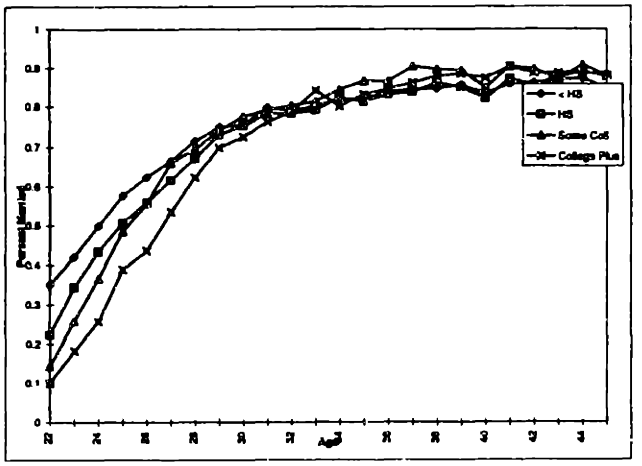
Table 10
Instrumental Variables Approach*
Black Men, 30-39 Years Old in 1980, 40-49 Years Old in 1990
Dependent Variable: Change in Percent Ever Married

	Education Only	Diff of Log Wage	Full Model	Full Model with interactions
Intercept	0.049	0.050	0.023	-0.004
	(0.005)	(0.006)	(0.010)	(0.023)
Education				
<HS	-0.020	-0.020	-0.011	0.010
	(0.007)	(0.007)	(0.007)	(0.026)
HS	-0.023	-0.023	-0.017	0.026
	(0.007)	(0.007)	(0.007)	(0.027)
Some College	-0.005	-0.004	-0.002	0.032
	(0.007)	(0.007)	(0.007)	(0.029)
Wage change		-0.001	-0.034	-0.169
		(0.049)	(0.053)	(0.178)
Wage change interactions				
<HS				0.168
				(0.195)
HS				0.156
				(0.213)
Some College				0.099
				(0.210)
Welfare Change			-0.026	-0.087
			(0.016)	(0.045)
Welfare change interactions				
<HS				0.057
				(0.053)
HS				0.087
				(0.054)
Some College				0.071
				(0.056)
Potential Women's Wage			0.080	0.150
			(0.022)	(0.053)
Potential Women's Wage int.				
<HS				-0.054
				(0.064)
HS				-0.125
				(0.068)
Some College				-0.087
				(0.073)
Proportion Immigrants			-0.005	-0.004
			(0.031)	(0.031)
Sex Ratio			-0.011	-0.010
			(0.008)	(0.008)
N	1109	1109	895	895

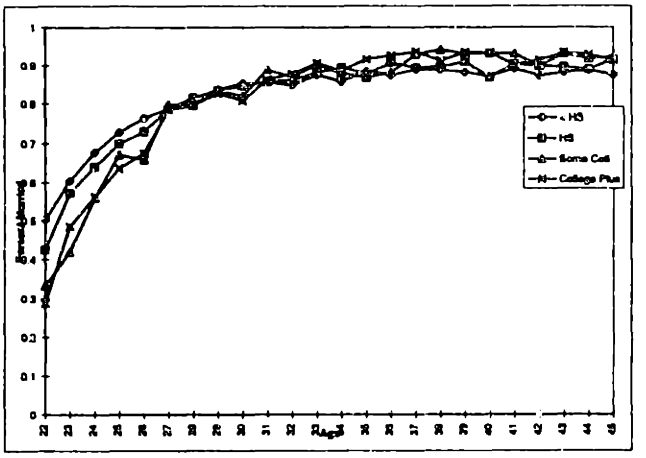
*Instrument is the change in the industrial mix of employment by education group within an SMSA from 1980 to 1990.

Figure 1

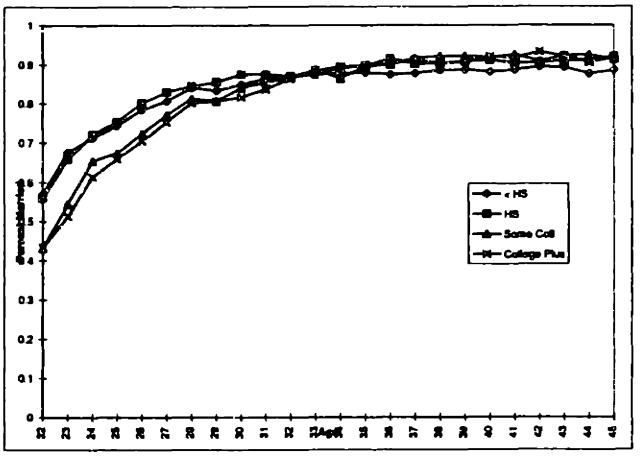
Men, Percent Married, 1940



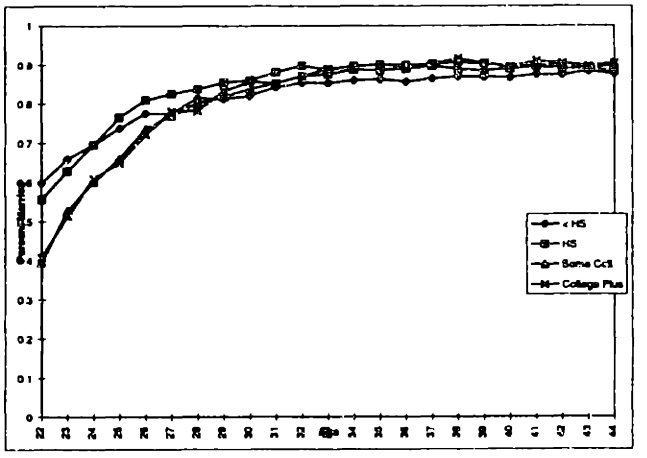
Men, Percent Married, 1950



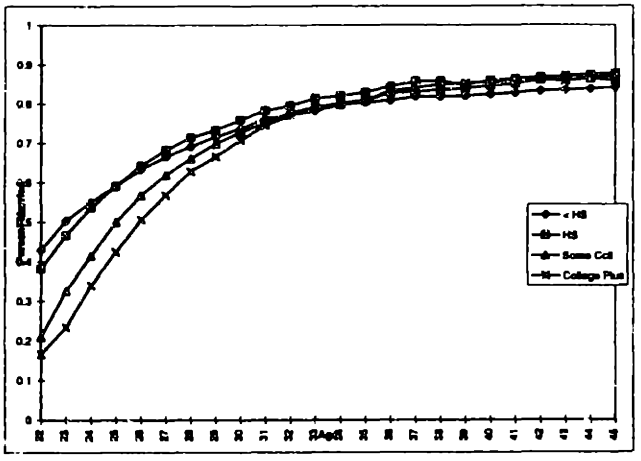
Men, Percent Married, 1960



Men, Percent Married, 1970



Men, Percent Married, 1980



Men, Percent Married, 1990

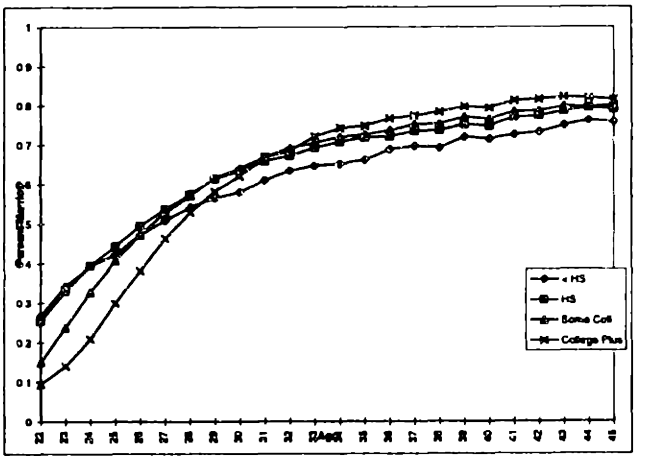


Figure 2

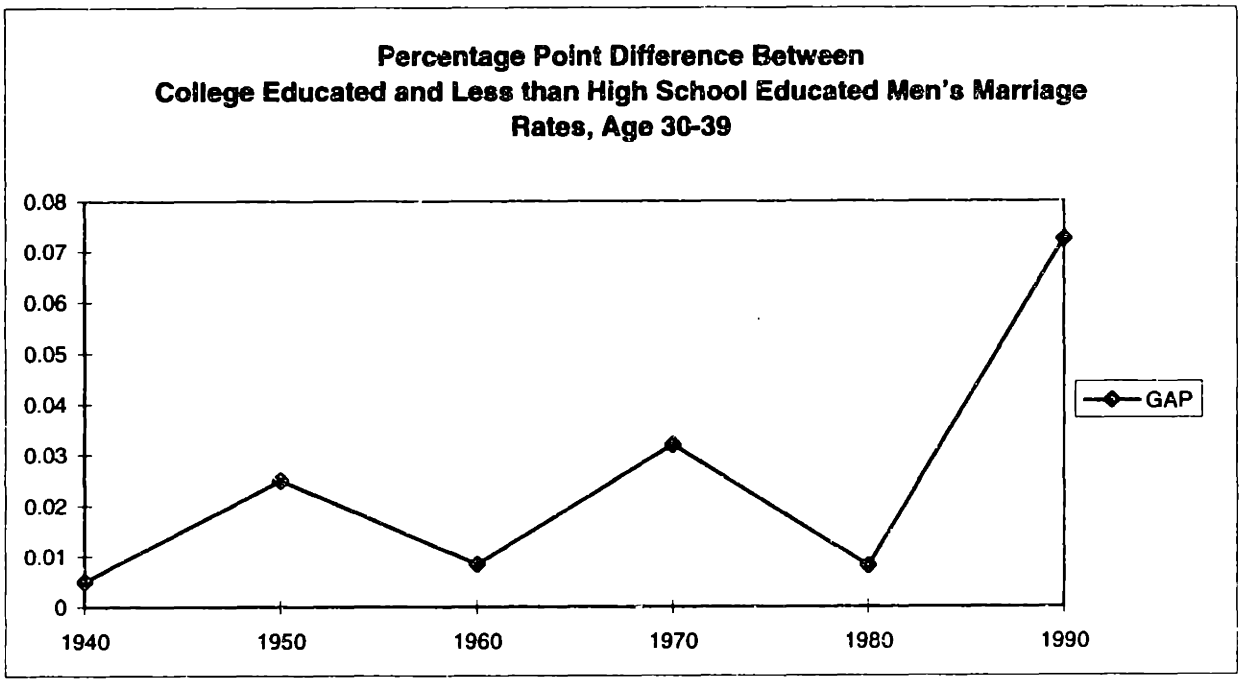
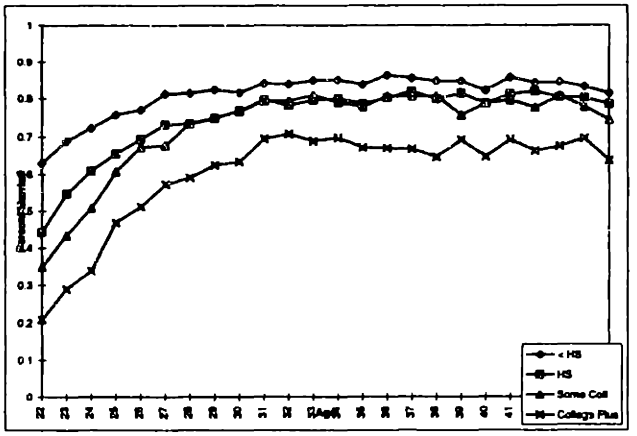
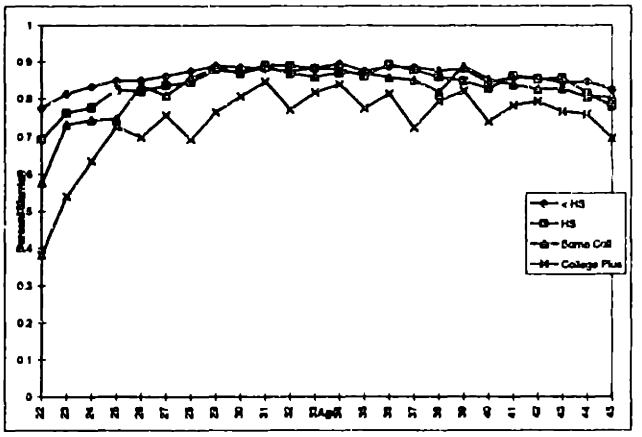

Percentage Point Difference Between
College Educated and Less than High School Educated Men's Marriage
Rates, Age 30-39
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
1940
1950
1960
1970
1980
1990
GAP

Figure 3

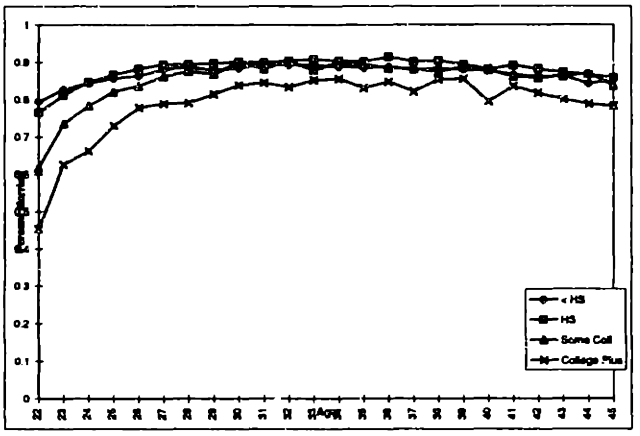
Women, Percent Married, 1940



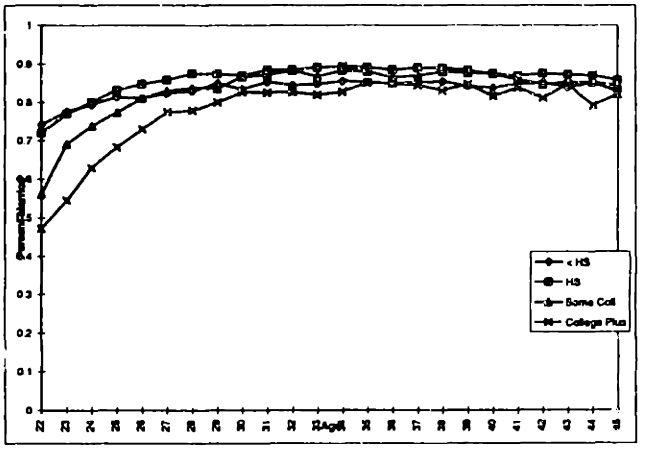
Women, Percent Married, 1950



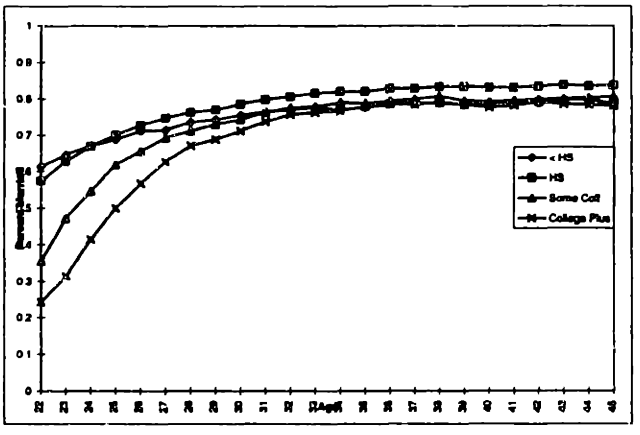
Women, Percent Married, 1960



Women, Percent Married, 1970



Women, Percent Married, 1980



Women, Percent Married, 1990

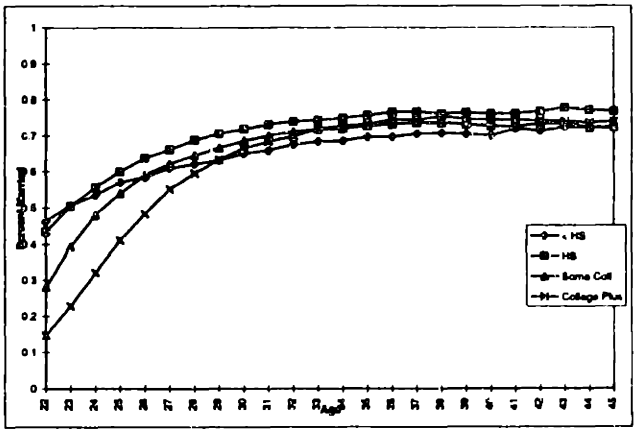
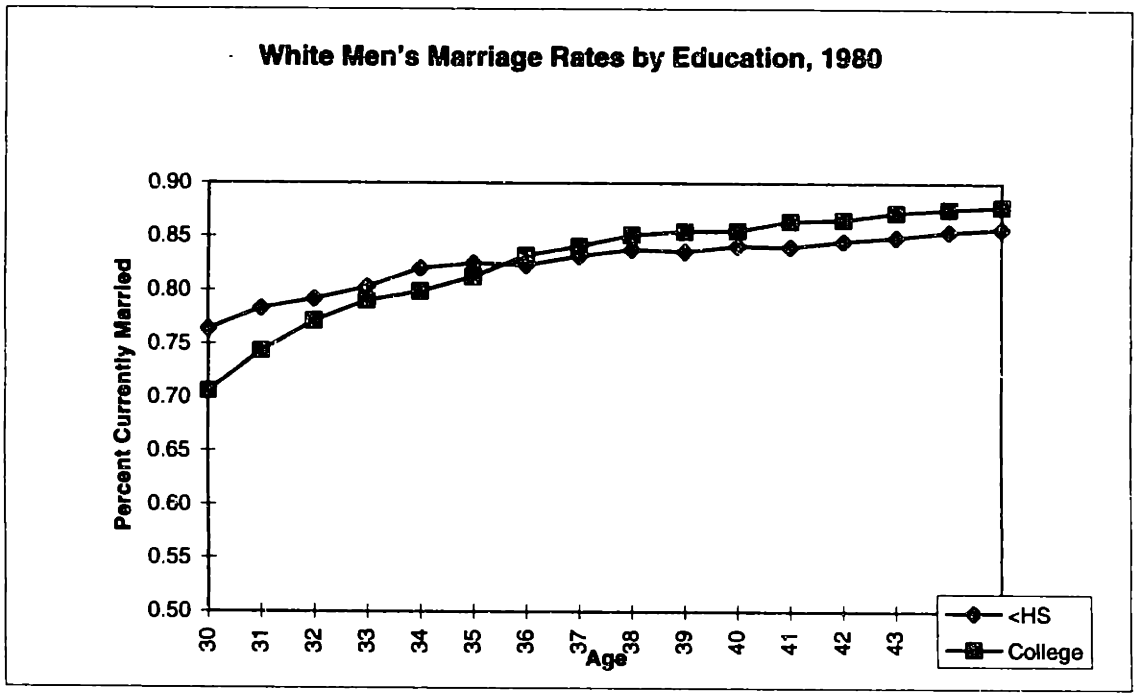


Figure 4a


White Men's Marriage Rates by Education, 1980
Percent Currently Married
0.90
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0.80
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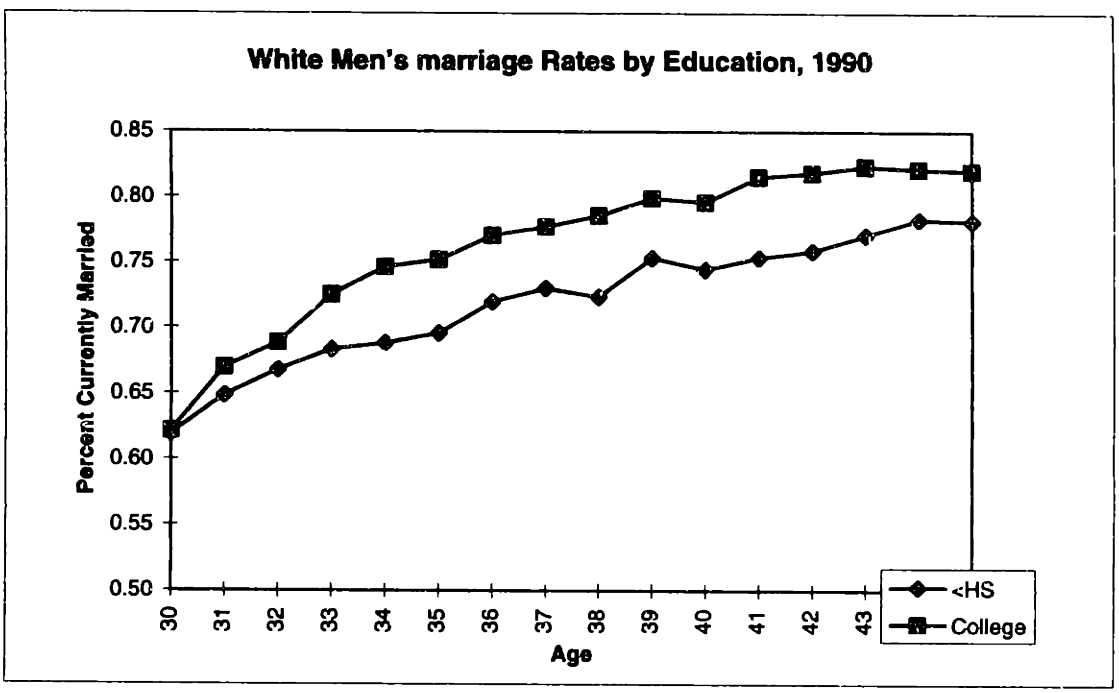
White Men's marriage Rates by Education, 1990
Percent Currently Married
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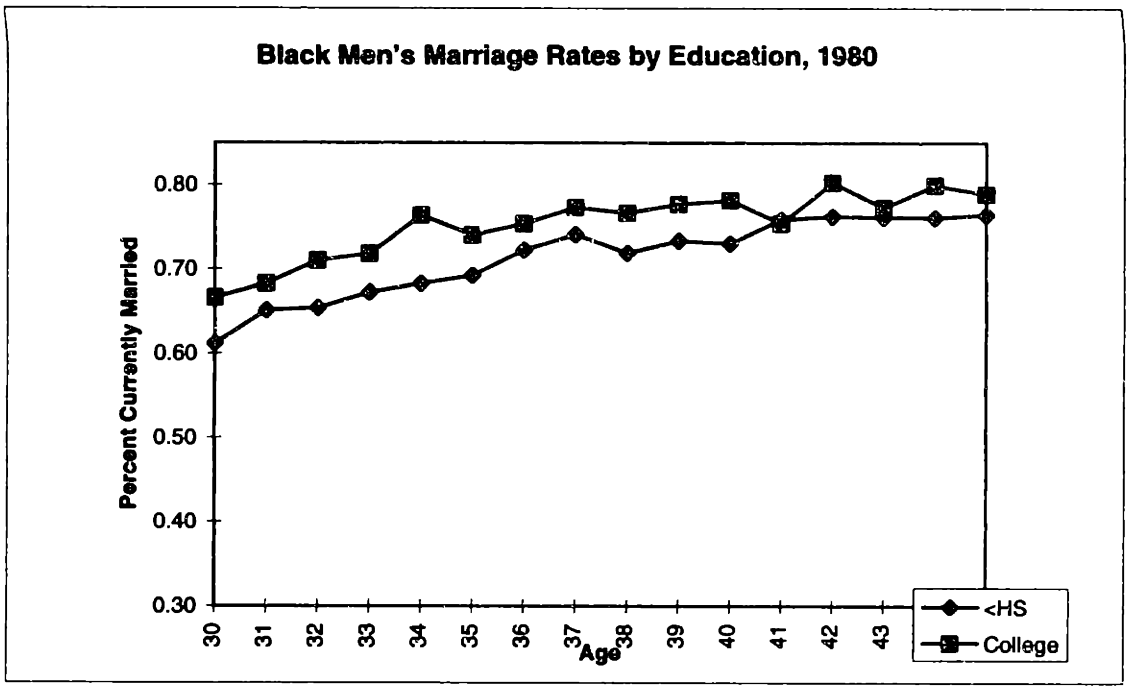
Figure 4b


Black Men's Marriage Rates by Education, 1980
Percent Currently Married
0.80
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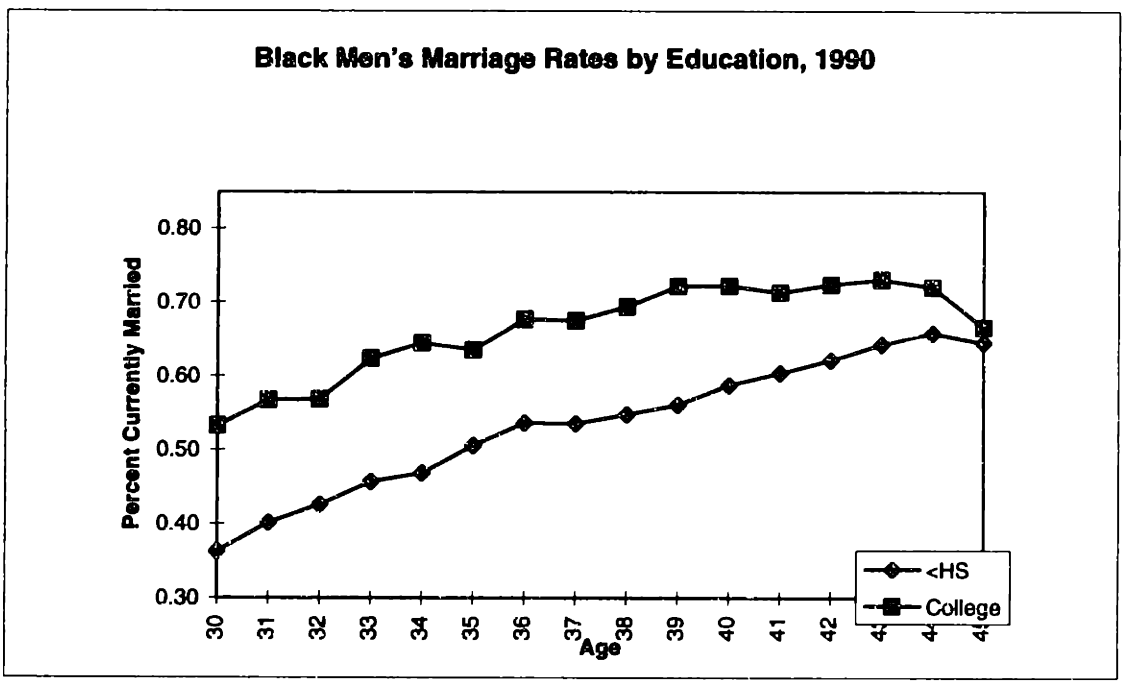
Black Men's Marriage Rates by Education, 1990
Percent Currently Married
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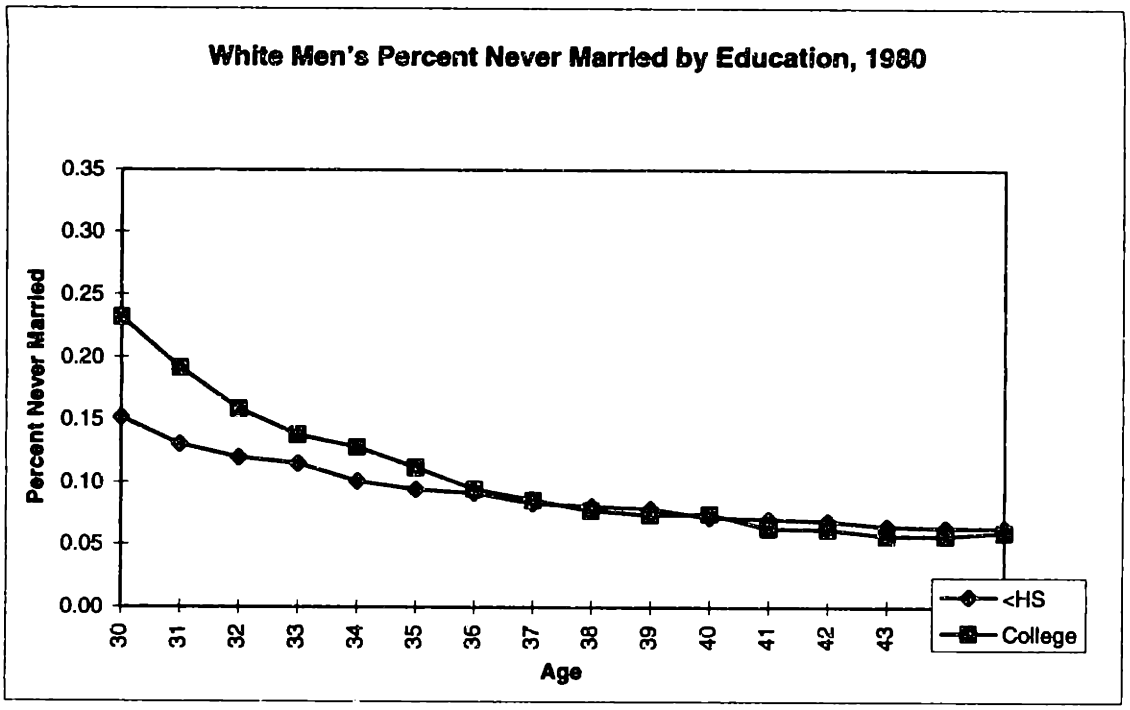
Figure 5a


White Men's Percent Never Married by Education, 1980
Percent Never Married
0.35
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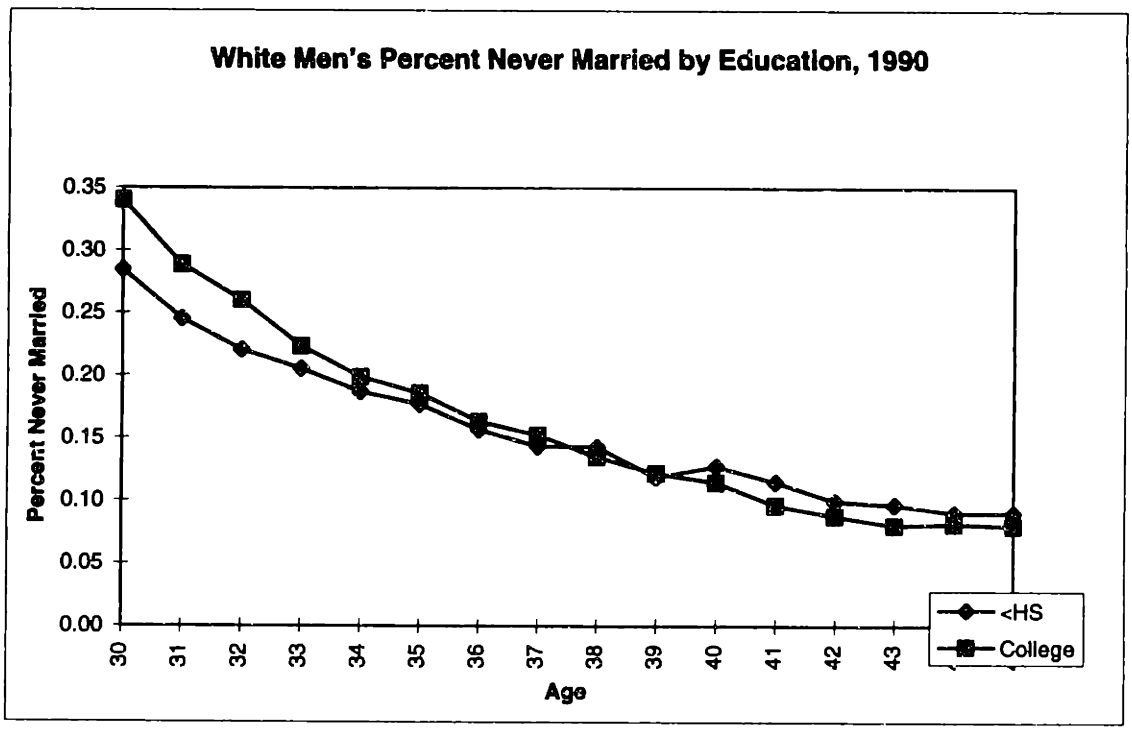
White Men's Percent Never Married by Education, 1990
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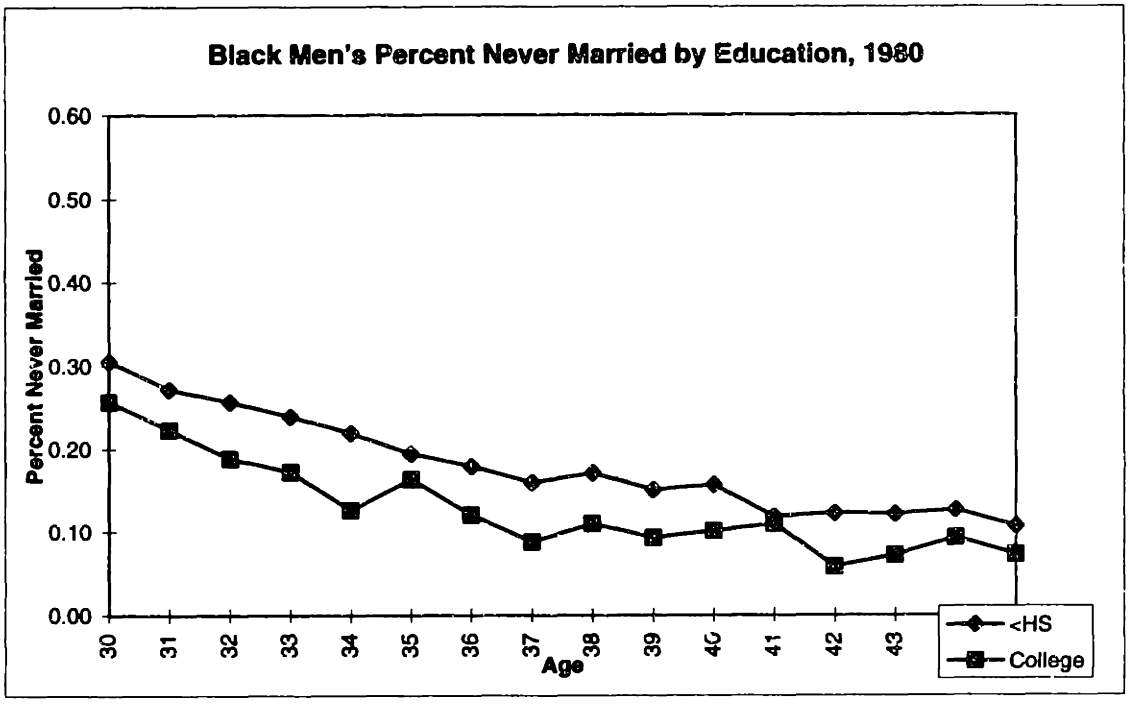
Figure 5b


Black Men's Percent Never Married by Education, 1980
Percent Never Married
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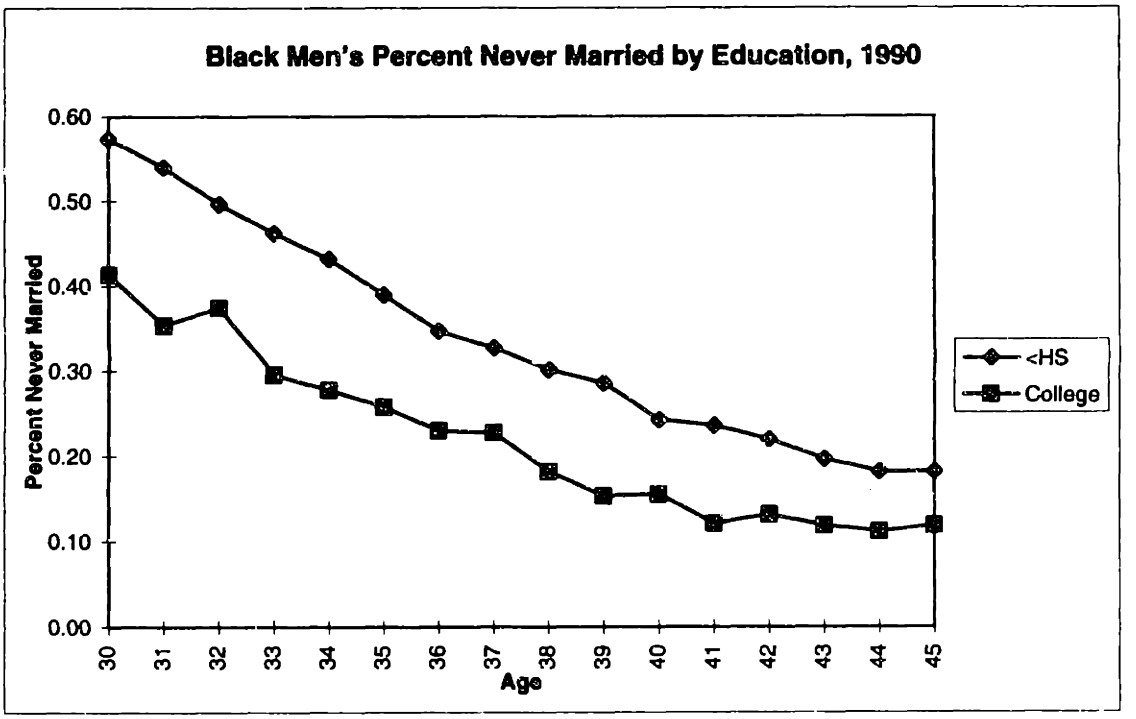
Black Men's Percent Never Married by Education, 1990
Percent Never Married
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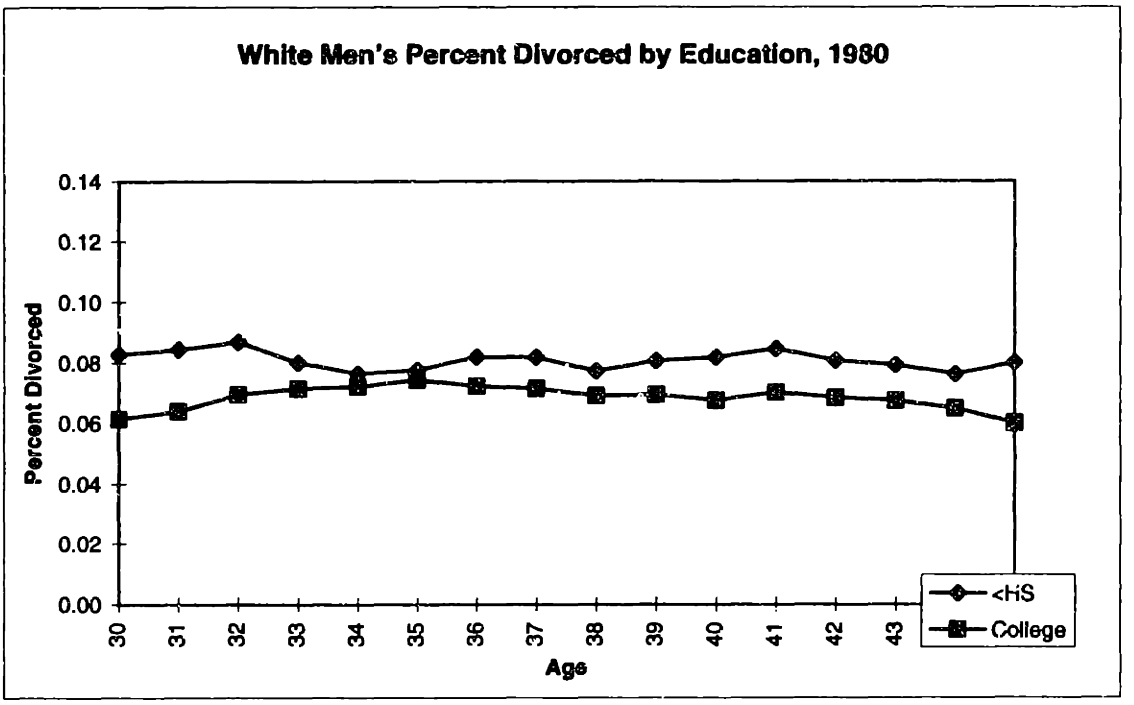
Figure 6a


White Men's Percent Divorced by Education, 1980
Percent Divorced
0.14
0.12
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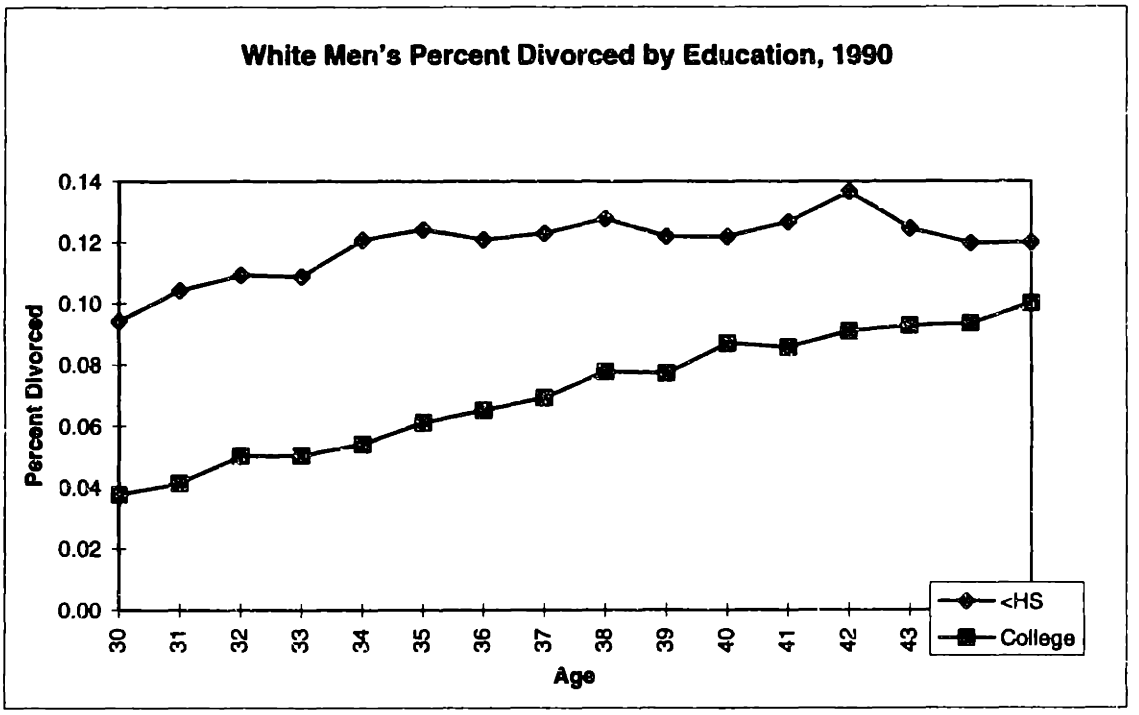
White Men's Percent Divorced by Education, 1990
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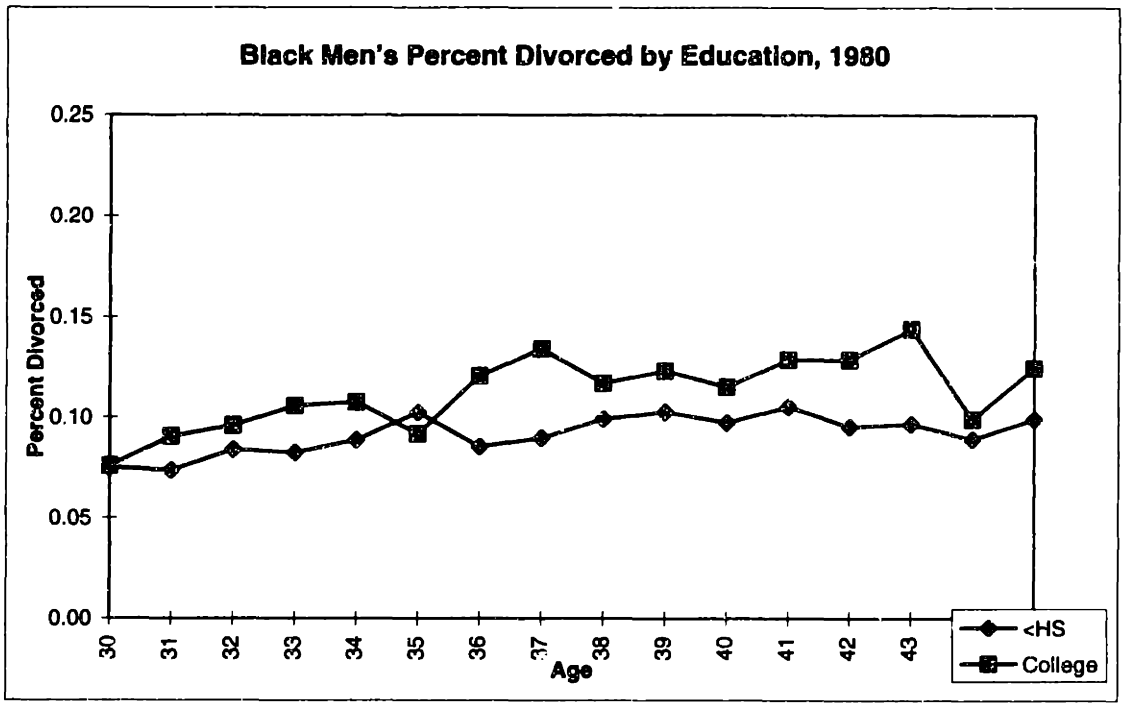
Figure 6b


Black Men's Percent Divorced by Education, 1980
Percent Divorced
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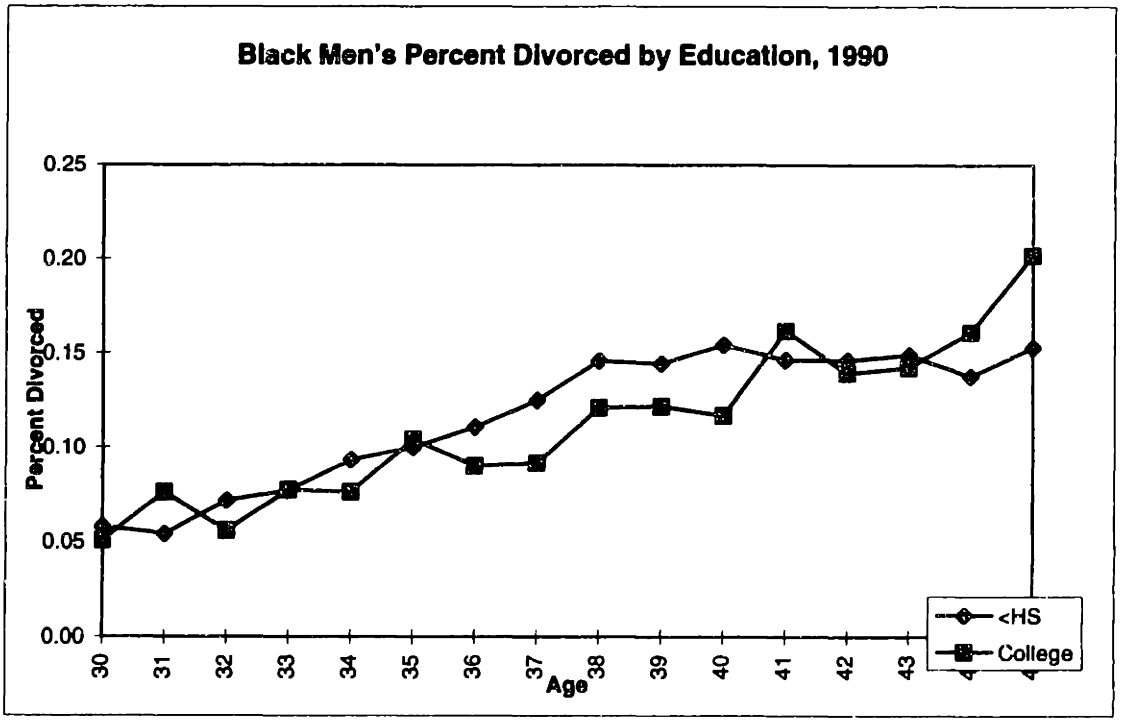
Black Men's Percent Divorced by Education, 1990
Percent Divorced
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Data Appendix

Data is from the 1980 and 1990 5% Public-Use Microdata Samples. The sample is civilian non-institutionalized men and women 30-39 in 1980 and 40-49 in 1990 unless otherwise stated.

Definition and Source

SMSA group
Constant geographical groupings between 1980 and 1990 Census. They follow closely to the borders of the standard SMSA, with some changes in order to allow direct comparability between 1980 and 1990.

ED
Four education groups: < high school (less than 12 years), high school (exactly 12 years), some college (less than 16 years), college plus (16 plus years). The education question changed in the 1990 census from a linear years of schooling to a grouped question. In the 1990 CPS both types of schooling question were asked. From this dataset for each group of schooling years, the average linear year of schooling is calculated for men and women. I then make a comparable linear series for 1990 by assigning the average linear year of schooling for that schooling group. The relationship between the linear education variable and the grouping question in the 1990 Census implies the same type of grouping method that we have done with the linear school variable in the past (and as described above).

$\%M_{ijt}$
Proportion of men who stated they were currently married in an education-SMSA group. Alternative variable is proportion of men who ever were married

earnings_{ijt}
Average yearly earnings in 1995 dollars of all men with positive earnings in an education-SMSA, where the age group is 30-39 in 1980 and 40-49 in 1990. I also discuss use of alternative variable where zero wage earners are included.

welfare_{jt} Maximum welfare benefit for a family of 3 in 1995 dollars, by state.

$\text{womens earnings}_{ijt}$
First calculate average earnings by education level for women with positive earnings in each SMSA group. For the total sample, I also calculate for married men of each educational group the educational distribution of their wives. This is done by matching couples in the census data in 1980 and 1990. I use these two data inputs to construct a weighted average of women's earnings. For example, to construct the women earnings controls for less than high school educated men in each SMSA group I calculate the weighted average of the average earnings of each educational group of women in that SMSA group. The weights are taken from the national population of women married to less than high school educated men: they are the proportion of women in each education group.

SEXRATIO_{ijt}
Number of men relative to number of potential women in an education-SMSA group. Number of potential women in SMSA group is constructed similarly to women's earnings. Weight the numbers in each education group by the weights constructed above. Alternative sexratio variable is number of women in same education group as men.

$\%\text{immigrants}_{ijt}$ Proportion of an education-SMSA group that is foreign born

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Chapter 2

The Historical Link Between Aggregate Marriage Rates and Business Conditions

2.1 Introduction

It is a well know fact that the 1980s and 1990s are characterized by later first marriage ages than we saw in the 1950s. Studies have used these later marriage patterns to forecast unprecedented lower final marriage rates for people in this time period (Bloom and Bennett, 1990) There has also been much discourse around the causes of this phenomena and numerous explan ·ions exist for the apparent hesitance in young people's entry into first marriage in the past 20 years. These explanations include higher levels of education, the availability of birth control, women's liberation and work force participation, general economic conditions, cultural and psychological response to growing up with divorce, and even the decline of the moral fiber of the family structure.

What is not a well known fact is that the average age of first marriage in 1890 for men in the U.S. was the same as that in 1990 (Haines, 1996). In fact in the face of historical marriage rates, the early marriage ages in the 1950s and 1960s look more an aberration than the marriage patterns we see today. In the past 150 years in the U.S. we have seen long term cycles in the age of first marriage. Among other explanations, historians and economists such as Easterlin (1968, 1985) have related these cycles anecdotally to the economic conditions that different generations faced relative to their parents or the previous cohort. The loose argument is that when times are bad, people are less likely to marry young.

The idea that a cohort would wait to get married when times are bad can be supported by economic theory on marriage. In this paper, I will explain the economic reasons that would cause a cohort to wait to enter into marriage when economic times are bad. Then with econometric analysis on the historical US data I will identify whether aggregate business conditions actually influence a cohort's marriage rates. I will exhibit the short term variation in marriage patterns across cohorts and use this variation to show that the economic conditions that a cohort faces when in the age range of their first marriage decisions (18-30 years old) affect the timing of first marriage. Lastly, I will relate the timing of first marriage to the percent that ever get married by age 35. Simply, if economic conditions cause a cohort to marry later, will they be less likely to marry at all by 35?

2.2 Background

While it is popularly known that the average age at first marriage has increased in the past 20 years, the history of patterns of age at first marriage has been familiar almost solely to the demographers and historians (Haines, 1996; Rodgers and Thorton, 1985; Schoen, et.al, 1985). There has been considerable effort put into establishing and characterizing the demographic patterns of marriage rates by age over time. Haines, combining primary data sources and data from other historians work (U.S. Bureau of the Census, parish records, genealogies, and family reconstitutions) gives a picture of the long term pattern of mean age of first marriage in the U.S.

Table 1
History of Marriage Patterns

1800	Mean age of first marriage young, high fertility levels
1800-1890	Increase in mean age at first marriage, declining fertility levels (1890 high point-- Males: Mean age 27.6, Females: Mean age 23.6)
1900-1945	Slow decline in mean age at first marriage
1945-1960	Fast decline in mean age at first marriage, increase in fertility levels (1960 low point-- Males: Mean age 23.4, Females: Mean age 20.3)
1960-1990s	Sharp increase of mean age at first marriage until present (1990-- Males: Mean age 27.6, Females: Mean Age 25.4)

Explanations for these long term trends are often related to the economic conditions that a cohort faces but also to institutional and attitudinal changes (Cherlin, 1981). Easterlin (1985) argues that the long term cyclicality is caused by cohort size cycles, and the resulting economic environment a cohort faces. Imagine a cohort that goes through bad times when it enters into the general age of first marriage and child bearing. Easterlin proposes that the cohort will marry later and thus have lower fertility rates. This causes a baby bust in the next generation. This new cohort will see good relative economic conditions due to the smaller cohort size and thus will marry earlier and have higher fertility rates. When the children in the third cohort come of age, they will be part of a baby boom, and thus will find tighter labor market conditions, marry later and have lower fertility rates. Elder(1974) argues that cohort socio-psychological effects were responsible for the earlier marriage and higher fertility rates in the 1950s. Rather than focusing on cohort size, Elder maintains that when a cohort faces bad conditions as children and thus grows up with those experiences (e.g. the Great Depression) that they have a stronger need for the stability of a family in their adult lives. They will value

family more, and search to begin one (and have children) earlier in order to express this need for assurance and control. Both cohort size and socio-psychological explanations hinge on the idea that when times are bad (or even more so, bad relative to before) that people get married later. But the mechanism that translates bad conditions to later marriage is either not spelled out or is not economic.

The effect of employment conditions on marriage rates and timing has been discussed and even identified as a major player by historians and demographers. But there has been little effort to formalize the relationship between aggregate marriage patterns and economic conditions. Theory and formal empirical work can help us to understand the nature and extent of these effects.

2.3 Economic Theory and Marriage Timing

Before going into the empirical analysis, the proposal that people wait to get married when economic times are bad must be considered. Why would this be true? Is it consistent with economic theory on marriage? A disclaimer: economics is surely just one piece of the marriage puzzle. As a result economic theory on marriage is not meant to encompass all the reasons that two people would choose to marry. Rather it attempts to describe the economic component to these decisions. Some sociologists relate marriage rates to economic conditions through changes in peoples feelings about life or what marriage means. While this is perfectly valid, the following discussion will illuminate reasons for lower marriage in bad times which do not depend on changes in preferences, but rather on the economic reasons for marrying.

There are a number of reasons to believe that less people would enter into marriage in bad economic times that are relatively intuitive. There are one time costs to marrying, including paying for a wedding and beginning a new household. Many couples may choose to wait, even if they have already implicitly agreed to marry, in order to take on these costs when they are easier to manage. In terms of matching to a partner, it is true that unemployed people are less likely to be married than those that are employed. When larger sections of the population are unemployed, you might believe that on average less people will enter into marriage, as less people will have resources to contribute to the other partner and the marriage. A variation on this is the lower level of information in bad times. Suppose that an individual takes his or her potential partner's future earnings into account when deciding whether to marry or keep looking. In bad times with more unemployment and underemployment, the information about any potential partner's future earnings path might be obscured. There may be a gain to waiting until you can get a better read. All of these ideas are consistent with the already existing theoretical literature on marriage and economics.

There is a relatively large theoretical literature on economics and marriage that is well surveyed by Weiss (1992). Economic theory on marriage can be loosely grouped into three categories: the economic reasons for any individual to ever enter into marriage, the marriage market-decision (who marries who given a distribution of possible partners), and the decision to marry as the outcome of a search process. Under not especially restrictive assumptions, all three of these subgroups of theory would predict that when times are relatively bad that individuals would wait to enter into marriage, everything else equal.

Gains to marriage for an individual

There a number of models that describe the possible gains to two individuals of entering into a marriage arrangement. These models are not concerned with the distribution of possible marriage partners per say. Rather, they are rich in describing how any particular marriage arrangement might allow increases of utility for both individuals considering it, and thus would be preferable to staying single. Examples of these models are division of labor or returns to household specialization (Becker, 1991), extending credit and coordination of investment activities, sharing of collective goods, and risk pooling. Each set of models has a different way of describing the possible gains to the union of marriage. What these models have in common is that at a static point in time, two individuals are making the choice of entering into a marriage or staying single, given the benefits of both. A subsection of these models imply that marriage is always beneficial, as there is no cost to entering into the union, and only gains to pairing. On the most basic level though, all of these models say that one enters into marriage when the benefits outweigh the costs.

While these models generally do not discuss the timing of the marriage decision, it is easy to see how at a static point in time the general economic conditions would affect on average the number of marriages entered (given the number considered). Assume there is a one time cost to entering into a marriage, which can be the cost of a wedding, or the cost of beginning a new household. An individual will choose to marry when the benefit to being married is higher than the benefit to remaining single. The cost to marrying (relative to the benefits) will rise in bad times, if one pays for a wedding out of

current resources (this assumes that credit markets are not perfect, or it is costly for at least some people to borrow). Imagine you have two individuals who, in good times would decide on the margin to marry. Place those identical individuals in bad times with unemployment and lower wages. Even if the potential marriage has identical characteristics and the gain would outweigh the gain to being single, the gain plus the *cost* may not outweigh the gain to remaining single. There may be a level effect that it is too costly to enter into that union currently. So they would choose not to marry at all in that time period, or to postpone until better times.[1]

Matching literature or the marriage market-decision

Another way that economists look at marriage is by modeling it as a market (Roth and Sotomayor, 1990). Again, there are many types of matching models, given the particulars on what one has defined as the specifics of the match (e.g. what is the gain to entering a match, what are the relevant characteristics of the potential partner and the distribution of these characteristics across the population, is utility transferable or nontransferable). The major contribution of matching models is in their ability to be predictive about who would marry who (and who would remain single), given the gains to marriage, the procedure for proposing, and the distribution of the relevant characteristics in both the male and female population.

It is not a strong assumption in a matching model setup to propose that, for at least some individuals, being single would be better than being married to someone who is

[1] Of course there is always the possibility that marriage works as a type of risk-sharing arrangement. This might cause the benefits of marriage to be higher in bad times, and if this outweighed the cost increase, to cause higher marriage rates in bad times.

unemployed, everything else equal. If an unemployed person will not be matched in a time period, and in bad time periods there are more unemployed people, then there are fewer possible matches in bad times. Less possible matches means less marriages, everything else equal. It does not need to be a strong restriction that unemployed people do not enter marriage. As long as on average they are less likely to enter marriage, then time periods where a higher proportion of the population is unemployed should be time periods where there are less marriages. Conversely, time periods when there is less unemployment we should see more potential matches, and higher marriage rates.

Search process

The marriage decision has also been modeled as a search process by simply modifying job-search theory (Oppenheimer, 1988). A single person receives opportunities to marry from the distribution of possible partners that are available. The distribution includes, among many things, the labor market experience that a potential partner will have. The rate at which offers are received from this distribution may be time dependent, as the pool of possible partners declines over time (they get married). Since there are gains to being married, it is costly to remain single and continue to search. A single person will choose to marry when the expected lifetime gain to accepting an offer from the possible partner at hand is greater than the expected gain of continuing to search. So generally at all times one is choosing between entering into marriage or continuing to search for a more suitable partner.

Oppenheimer additionally proposes that as one gets older the signal about potential partners' characteristics is stronger. Any potential partner is farther along their

life cycle earnings path, and thus it will be easier to forecast what their lifetime labor market involvement will be. The model then implies that when times are bad the gains to search increase for two related reasons. The first is that on average the current state of offers will not be as good as they might be later, as people are unemployed and underemployed. The second is that the information about a potential partner is less clear when times are bad. There are gains to waiting in order to get a better set of signals.

The historians' proposed link between bad employment conditions and lower marriage rates seems relatively sound given the economic theory on marriage. The question now is whether we observe this in the world, and if so, how important it is.

2.4 Data

The historical data of the U.S. can be used to show the effect of aggregate business conditions on the timing and ultimate incidence of marriage. Information on marriage rates is available for multiple cohorts who have come of age in varying economic conditions. These varied experiences can be used to identify the effect of aggregate economic conditions on aggregate marriage rates.

Using the 1960 and 1980 Census Micro Samples and the Current Population Survey (CPS) data I can construct the marriage experience for cohorts born in 1898 through 1959: specifically, the flows into marriage by age from 18 to 34 years old for each of these cohorts.

For the later cohorts, this is elementary. From 1964 to present the CPS can provide the percent ever married by age. The March CPS is available from 1964 to

present, while from 1979 to present the larger outgoing rotations of the CPS are available. We use the percent ever married as opposed to the percent currently married in order to have comparability with the earlier cohorts. Because the CPS is a random sample, average characteristics for 22 year olds sampled in 1980 and 23 year olds sampled in 1981 can be used as average characteristics over time for the same cohort. Synthetic panels of marriage rates from ages 18 through 34 can be set up for cohorts born from 1949 through 1959.

For the earlier cohorts, we do not have yearly data as provided in the CPS. But it is possible to construct the marriage experience by age for each cohort from the question "Age at first marriage" in the later Census data. An example: the 60 year olds in the 1980 census were born in 1919, and hence were 18 years old in 1937. If we calculate the distribution of the age at first marriage question for all 60 year olds sampled in 1980, we can find the percent ever married by age for this cohort as it moves through time.

Table 2
Percent Ever Married Calculated from the Age at First Marriage Question

60 year olds in the 1980 Census

Age	18	19	20	21	22	23	24	25	26
Distribution of Age at 1st Marriage	4%	5%	5%	5%	5%	7%	10%	10%	10%
Year that cohort reached above age	1937	1938	1939	1940	1941	1942	1943	1944	1945
Percent of this age group married in this year	4%	9%	14%	19%	24%	31%	41%	51%	61%

This construction relies on a couple assumptions.

First, that the 60 year olds who answer this question in 1980 are representative of the population in the 1930s. There is evidence that married people have lower mortality rates than single people. If "single people" are defined as those who never married, this would not bias our marriage pattern estimate, as we are concerned with married people only, and more specifically people who marry by the age of 30. If "single people" are those who spend much of their lives single but were once married , and additionally of the married population these are people who married earlier than others, then the estimate would be biased towards later marriage rates than was true for the population. To help with the possible bias (and measurement error) in these estimates, I use both 1960 and 1980 Census data sets to calculate 2 separate series of estimates for each cohort. Averaging these estimates for the cohorts which are represented in both data sets allows a better estimate of the cohorts experience.

Chart 1 shows the percent of the cohort of white men married by year at ages 22, 24 and 26 from each of the four data sets. It is clear that the CPS data is more noisy than the Census data due to sample size. Also, the 1980 Census data relative to the 1960 Census data shows consistently lower percentage marriage (but similar variation). These results imply that as you get older you either forget your actual first marriage (and that this forgetting is not correlated with the age of your first marriage) or that married people are more likely to die (and that this also is not correlated with the age of first marriage). Regression analysis on the 1960 and 1980 constructed marriage rates shows them to have an almost 1 for 1 volatility. Thus the only real difference is the lower percentage married

at ALL ages in the 1980 question. Since we are interested in the transitions, averages of the two are a reasonable way to proceed.

The data representing aggregate economic conditions will be the unemployment rate and annual manufacturing wages. Unemployment data comes from the Bureau of Labor Statistics, *Employment and Earnings* and the *Historical Statistics of the United States* resource created by the Census, while the wage data is from the *Historical Statistics of the United States* and the *National Income and Product Accounts* (see Data Appendix).

2.5 Historical Marriage Rates

Chart 2 shows the percent ever married for white[2] men at ages 22 through 30 from the Census and CPS data. A number of things stand out. First, as previously discussed, there appears to be a long term cycle in the average age of first marriage. This is evidenced by the lower number of younger men married before the early 1940s, the increasing percentages of young men married through the 1950s and 1960s, and then beginning in the early 1970s the sharp decline of young men married. Note that by the late 1980s the low marriage rates for young men are almost exactly the same as those in the 1920s. Secondly, there is a good deal of yearly variation around these long term trends. Obvious dips include the Great Depression and WWII time periods, where the percentage of young men married decline and then recovers. Lastly, the variation over time of the percent of men ever married is lower for much younger and much older men.

[2] I focus on white men as the sample for blacks is much smaller. The marriage rates of whites and blacks have been somewhat divergent. In the early part of the century, whites had lower marriage rates than blacks. Currently, blacks marriage rates have declined much more than whites.

The percentage of 24 year old men ever married spans from a low of about 40% in the earlier and later years, to a high of close to 70% in the late 60s, early 70s. On the other hand, the percentage of 30 year old men ever married goes from a low of around 70% to a high of approximately 88%. This addresses the debate over whether a cohort which marries later will ultimately marry less. It appears that while the cohort behavior is dampened for older ages, that there is still a link between the age distribution of marriage and the ultimate level of marriage. The older ages are not graphed here, but they show even less variation over time than the 30 year olds do.

How do women's patterns look relative to men? Chart 3 shows the percentage of white women ever married at ages 18 through 30. It is immediately obvious that women marry earlier than men. The percent of 18 year old women ever married varies around the value of 20%, which is similar to men who are 21 years old. One should also note that the women's marriage patterns have been less variable over time than men's. Since the large majority of women marry men who are 1-3 years older than them, for comparison purposes one should think of the variation of 30 year old men's marriage rates vs. 28 year old women's marriage rate. The percentage of 28 year old women who have ever been married goes from a low of around 78% to a high of 90%. The fact that women's marriage rates in the age range of 18-30 are less variable than men's is not surprising. The vast majority of women marry far sooner than men. In other words, the distribution of their marrying age is less wide (men's marriage rates are spread over a longer age range). For both men and women the change over time in the percent ever married at age 40 is far less variable than the changes at younger ages. This smaller change can not be

supported by marriage rates that vary as much for women as for men at young ages if the majority of women that will ever marry, marry by the age of 28.

On Charts 4 and 5 the aggregate unemployment rate and alternatively log real annual manufacturing earnings are plotted along with men's marriage rates to exhibit the varying economic conditions these cohorts were facing as they worked through their marriage decisions. From a cursory look it appears that the timing of marriage rates are somewhat responsive to the unemployment conditions that a cohort is facing, although the correlation is not strongly evident. On the earnings graph you see that log earnings rise steeply until the 1970s and then flatten out. This decline in earnings growth matches the timing for the decline in men's marriage rates. Additionally, by eye it appears that the short term cycles of earnings growth seem to match men's marriage behavior, except for the WWII and immediate post-war period.

2.6 Model

Do aggregate business conditions affect marriage rates? The data allows us to identify this effect free of cohort and age effects, while also controlling for another time effect, the change in average education level of the cohort. The long term cycles that appear in the age of first marriage may be difficult to relate to long term economic conditions empirically, as we view only two apparent cycles in U.S history. But the short term variation in marriage rates across cohorts allows identification of the effect of current economic conditions on marriage rates. By controlling for cohort effects, we control for the experience that the cohort had growing up (the Elder story). We can then identify the effect that current employment conditions have on average. We can

additionally test the Elder story by specifying the economic conditions when a cohort was young explicitly, and then relating these conditions to the cohort's marriage rates.

Assume the probability of exiting from the state of being single is dependent on

$$p_t = f(\text{Economic Conditions}_t, \text{Age}_t, \text{Ed}_t, \delta, t)$$

where δ is a specific effect for people born in one's cohort, and t represents everything else happening in time t. This implies that the proportion of the single population left in a cohort that marries in a years time is a function of the average level of these variables for a cohort.

The reduced form model is

$$P_{it} = \alpha + \beta_1 * \text{ECONOMIC CONDITIONS}_{it} + \gamma_1 * \text{AGE}_{it} + \gamma_2 * \text{ED1}_i * \text{AGE}_{it} + \delta_i + \varepsilon_{it}$$

where

P_{it} is the percent of single people left in a cohort in time t-1 that become married from time t-1 to t (the rate of escape from the single state), the ECONOMIC CONDITIONS are alternatively unemployment and the change in unemployment from last year, and log real annual manufacturing wages and the difference in log real annual manufacturing wages from last year, A_{it} are age dummies, δ_i are cohort dummies and $ED1_i$ is the proportion of

the cohort whose final level of schooling was less than a high school education (and this is interacted with age).[3]

The effect of unemployment on the probability of exiting marriage is identified from the time variation in unemployment and marriage rates within these cohorts. As long as unemployment is not correlated with another time effect that affects the probability of a cohort marrying in a single period, the effect of unemployment should be correctly identified. The regressions are run using weighted least squares. Because the latest years in the sample are from the CPS which has much smaller sample sizes, their weights will be much lower and thus they will be less important in the final coefficient estimation.

2.7 Current Economic Conditions

We first look at the effect that current economic conditions have on current marriage rates. After controlling for age and cohort effects we can see if higher unemployment or lower wages cause a cohort to have a lower aggregate exit rate from the single state into marriage.

All Men

The regression results are reported In Table 3. As a check, we look at regressions of age effects alone and cohort effects alone, and then to the full model.

[3] The education variable is estimated from the respondents in the Census and the CPS data. For the Census data I use the educational distribution that each cohort reported (these are people aged 35 to 60+). For the CPS data, I used the average of the educational distribution reported by the 35 year olds and the 40 year olds (averaging across these two samples). Additionally, I ran all regressions using the percent that

Column 1 shows the effect of age dummies alone on the probability of exiting the single state. [4] The omitted category is 18-19 years old. This shows that there is a nonlinear exit rate from being single into marriage, which is consistent with what we would expect. As men get past their early twenties there is an increasing exit rate, which declines as they reach their late twenties. This is the average case for all cohorts.

The yearly estimated cohort effects are plotted in Chart 6, and tell us another part of the story. The omitted category is the cohort born in 1898, which had low marriage rates, and also married older. The cohort effect gets largely positive and significant as we reach cohorts who entered into their marrying age years in the 1950s and 60s. The cohort effects go back to zero as we get to the 1980s where we see lower marriage rates on average again. Chart 6 plots the estimated cohort effects from 3 different regressions. Each set of single year cohort effects was estimated with age and age times education controls, while one had no economic controls, one controlled for unemployment and unemployment changes, and one controlled for log annual manufacturing earnings and lagged log annual manufacturing earnings. It is clear to see that the economic conditions, and most especially earnings, are associated with a non-trivial portion of the cohorts behavior.

To find the exact magnitude of the unemployment and wage effects we must return to the reported regression results in Table 3, columns 4 and 5. Both the unemployment and the wage regressions were run separately with both single year cohort

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graduated from college as a regressor. The two variables are highly negatively correlated, and worked as very similar controls.

[4] Note that all regressions were also run with dummies for the years that the marriage data was spliced together, given that four datasets were used to compose the time series. There were no qualitative or quantitative changes to the basic results.

effects and then with a polynomial in cohort. The effect on the regressors of interest was the same, and thus the polynomial cohort effect will be reported.

Column 4 shows the full model with unemployment as the economic condition. It identifies the effect of unemployment on the probability of getting married after controlling for both the age and cohort effects, another time effect which I allow to vary with age (average education level interacted with age), and dummies for World War II and the immediate post-war years. Additionally, it has been noted by Christie Romer (1986) that there is excess cyclicality in unemployment data that was collected before 1948. To control for this I interact the unemployment variables with a dummy for the pre-1948 years.[5]

As you can see, the higher levels of unemployment and changes in unemployment certainly have a significant effect on the ultimate proportion of single men who will experience their first marriage in that time period, with t-statistics well above the 1% confidence level. While this relationship is statistically significant though, the effect of unemployment and unemployment changes on aggregate marriage rates is relatively small. A 1 percentage point increase in the unemployment rate everything else equal will decrease the proportion of men who marry by around 0.5 percent in the post 1948 years. Unemployment rate changes have an even smaller effect in the pre-1948 years (which is consistent with Romer's assertion of excess volatility). The pre-1948 years show that a 1 percentage point increase in the unemployment rate should decrease marriage rates by less than a tenth of a percent. The change in unemployment from the previous year is positive but not strongly significant for the post-1948 years, but for pre-

[5] See Data Appendix for full description of all data construction and regressor descriptions.

1948 appears to be negative. If unemployment is high this period *relative* to last period this has an additional negative effect on exit rates into marriage. Lastly, the WWII period is associated with significantly lower marriage rates, while the immediate post-war period has much higher marriage rates on average.

Column 5 shows the effect of log annual real manufacturing earnings on leaving the single state into marriage. There is a strong relationship between annual earnings and aggregate marriage rates, even after controlling for age, education and cohort effects. A 10% increase in contemporary earnings is associated with a half a percentage point increase in aggregate marriage rates. And if earnings were higher in the preceding year, then marriage rates will be somewhat lower this year (10% higher earnings in the period before are associated with a .1 percent decline in marriage rates this period). These results say that when average earnings are high, men are more likely to enter into a first marriage. This is consistent with the idea that there are costs to marriage and that the marginal marriage will be more likely to take place when more people can afford the cost.

What is also interesting is the effect that wages have on the cohort polynomial. Comparing the coefficients on cohort in the unemployment and wage regressions you see a large decline in the coefficient on the linear term of the cohort polynomial when controlling for earnings. This is supportive of the information shown in Chart 6. Earnings growth is correlated with a large portion of the difference in marriage rates among cohorts in the early part of the century, even after controlling for cohort effects. Note also that earnings are not proxying alone as a linear effect increasing over time, as the control for percent of cohort whose final schooling level was less than high school is declining steadily over time.

Younger men

The economic effects above are the average of the effects on men ages 18 to 34 leaving the state of being single to have their first marriage. It may be that economic conditions effect the timing of younger men's marriage rates more than older men, as younger men would experience more than a proportional percent of unemployment and earnings changes. Table 4 shows means of the data for all men and women, and then for men at age 26 and women at age 23 separately. It is clear that the bigger variation over time AND the larger level of exit rates into marriage happen for younger men and women.[6]

The same regressions are run on a subgroup of the data, men aged 20 to 27. As is evident from Table 5, column 4, the unemployment effects for men aged 20-27 do not differ significantly from those for 18-34 year olds. Younger men's marriage rates seem to be more sensitive to real earnings changes though. A 10% increase in average earnings is associated with an .8 % point decline in aggregate marriage rates (although this is not statistically significantly different from the .5% point decline for men 18-34 years old).

Women

Table 6 shows the same regression results for women. The age effects look different for women as they marry much earlier in life (the exit rates at age 34 are lower

[6] The minimum exit rate from singlehood into marriage is negative for both men and women, which is clearly measurement error since we are looking at what percent of the cohort enters into first marriage. These negative values are due to using different CPS data sets to estimate a cohort's experience. This kind of measurement error causes only 3 observations for men and women to be negative, and thus is not an alarming problem.

than at age 19). In the cohort only regression (not reported) the cohort effects are generally not significantly different from the omitted category, which is consistent with women's average marriage rates by age group being less variable than men's over time.

The effect that unemployment has on women's marriage rates is insignificant but goes in the same direction as the effect on men. The coefficients on earnings effects for women look more similar to the regressions for men. An 10% increase in average earnings should increase women's aggregate marriage rates by 0.6 percent.

In Table 7, regressions for a subgroup of younger women look similar to those for the whole group of women. The sample size is smaller and so they are measured with less precision, but still the effect of a 10% increase in annual earnings is equal to approximately a 0.6% increase in the marriage rate.

Unemployment in the Great Depression as a Test Case

The degree to which unemployment affects ultimate marriage rates can be illustrated by the unemployment path of people who experienced the Great Depression vs. those who came of age just 8 years later. Chart 7 shows the actual marriage paths that were experienced for the cohort born in 1911 who which would have intimately experienced the Great Depression, and the cohort born in 1919 who would have been 20 years old in 1939 and thus mostly experienced the recovery. Also on Chart 7 are the predicted paths these cohorts would have experienced without any cohort effect (i.e. the unemployment effect is all that drives the difference between the curves). These two cohorts had wildly different employment experiences. While it seems clear that unemployment was part of the story of the marriage experiences of these two cohorts, it

does not pick up all of the divergence between their marriage paths. And it explains less than half of the difference in their marriage rates at age 34.[7]

2.8 How Persistent are the Effects of Bad Economic Times on Marriage Rates?

There are two ways to ask this question. First, the Elder view proposes that facing bad economic conditions when a child should affect a cohort's marriage rates when they reach their 20s. Thus the suggestion is that bad economic times are quite persistent. A second way to view the persistence of the effect of bad economic times on aggregate marriage rates is as a response to the previously reported results about current economic conditions and marriage rates. If a negative economic shock causes current marriage rates to go down, does this result persist for the cohort, or do they have higher marriage rates later?

Elder View

Elder proposes that if a cohort faces difficult economic conditions as children, that their marriage rates will be higher as adults because they will desire stability in relationships. This is basically a change in preferences towards marriage that a cohort will experience given the economic circumstance they face growing up. This hypothesis is testable—by specifically setting the cohort effect as some measure of wages or unemployment we can estimate what effect childhood conditions have on marriage rates controlling for the wage a cohort may face as adults. The childhood economic conditions

[7] It is noted that part of this difference is due to the 1919 birth year group being an unusual cohort. They would have been 25 in 1945, just in time to experience World War II. Marriage rates were lower during WWII, but picked up again (and at a higher rate than pre-war) immediately after the war.

control will be a 9 year average of the conditions a cohort faced as children. I take the years when the cohort was aged 8-16, and compute the average of the unemployment rate, and the log of the 9 year average of annual earnings in manufacturing, respectively.[8]

Table 8 shows the results for both women and men. I run the regressions with and without including the cohort polynomial, as one might expect it to overpower the explicit economic cohort effects. Column 1 shows that without a cohort polynomial, the effect of the cohort's wage experience is consistent with Elder's view. Facing lower earnings as children is associated with higher marriage rates as adults, after controlling for the current level of manufacturing earnings. Comparing column 1 and column 2 in Table 8 you see that this effect disappears once you add the cohort polynomial, which will mimic to some degree the progression of the cohort's childhood earnings experience.[9]

In column 3 the effect of the average childhood years unemployment rate is measured. Two results are of interest. The first is that higher unemployment when a child is associated with higher marriage rates as adults (again, consistent with Elder). But the contemporaneous unemployment rate for the post 1948 years ceases to be significant once the childhood unemployment experience is included. The pre-1948 years still show a decline in marriage rates associated with an increase in current unemployment. Comparing columns 3 and 4 we see that the adding the cohort effects not only increases the size of the negative effect that current unemployment has on aggregate marriage rates, but additionally causes the childhood average unemployment rate to switch sign. This

[8] I additionally ran all regressions with 7 and 5 year averages for cohort experience. They gave very similar results.

[9] And again, the cohort's earnings are not the only cohort effect that is increasing over time. The education level of the cohort is also trending up (more specifically the proportion that have less than a high school diploma is trending down).

would imply that once controlling for the long term curve in cohort that cohorts that faced higher unemployment as children are less likely to get married as adults. [10]

The effects look similar for women and for men in both the earnings and the unemployment regressions. The main result here is that there is some evidence for the Elder story that earnings and unemployment that a cohort faces as children will effect their marriage behavior as adults. The difficulty is separating this from any other cohort effect that moves in the same way as these economic conditions have over time.

Life Cycle Experience

The second question about persistence has to do with the life cycle experience of a cohort. This experience has been different for many cohorts. As is consistent with all the data presented before, cohorts in the early 1900s and late 1900s saw later marriage rates and lower ultimate marriage rates. Cohorts marrying in the middle of the century saw early ages of first marriage and higher overall marriage rates.

If the unemployment effects on marriage rates are small but real, are they lasting? Our history would seem to imply that if a cohort does not marry till later that generally less of them will ultimately marry. This relationship is simply numerical if you believe constant rates of exit to marriage by age over time. But this need not be the case. A behavioral component could be driving these relationships. Cohorts that prefer having high ultimate marriage rates may also prefer marrying young. So that if some exogenous event made a cohort that prefers high marriage rates to delay for a couple years, they

[10] The earnings and unemployment regressions were run on a subsample of the data that does not include the Great Depression cohorts in order to ascertain whether these cohorts were the drives of the result that

would express their pent up demand for marriage in the following years with much higher marriage rates. It seems clear that the conditions a cohort faces as it moves through time have an effect on their marriage rates. The question is if the conditions that a cohort faces when young on average affect their final marriage rates at an older age.

To address this question Table 9 shows the results of regressions for men and women of the economic conditions a cohort experiences at ages 22-27 and the educational attainment variable on the percent ever married at age 35[11] (with and without controls for cohort). The only variable with a significant effect is the education variable, which proxies also as a declining time variable (percent married at 40 increased in the 50s and 60s at the same time that the proportion of those who stopped school before receiving a high school degree declined). As the contemporary effects of unemployment and earnings have been measured to be somewhat small for the cohort at hand, it is not surprising that lasting effects do not show up in this regression. Another way altogether to explain why these results would be so weak is as follows: exogenous business conditions generally move in cycles. If a cohort faces worse than average times at age 22-25 they may face better than average times at age 26-28 as the business cycle moves on. Some of the marriages that were postponed will be made up. [12]

2.9 Conclusion

The long term cycles in marriage rates and the age of first marriage are only partially explained by the economic conditions a cohort faces. As I have shown,

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childhood conditions matter. The result in both the earnings and unemployment post-Great Depression regressions were similar in sign and significance to those on the whole sample.

[11] Regressions were run on 40 year old ever married rates also, with similar results.

unemployment has a significant but small effect on contemporary marriage choices. It also appears that this effect declines in importance over time. The different unemployment paths of the Great Depression cohort and the recovery cohort only partially explained their divergence in marriage rates. Real manufacturing earnings are also correlated to the marriage behavior of a cohort, and the path of earnings changes in the U.S. follows the path of marriage behavior relatively well until the cohorts who were born in the late 1940s. The marriage decline in the 1980s and 1990s is much larger than the average change in earnings growth might have implied. And lastly, while the average economic conditions when a cohort is in childhood seem to explain some of the average marriage rate that a cohort experiences, it is not so strong that it survives when allowing the cohort effect to be free.

So while the believers that economic conditions have affected marriage rates are right, there is still much more in the picture that must be explained. More work must be done in order to identify the cohort effects that remain. Real economic variables have been used here to identify a portion of this cohort behavior. As we refine our understanding of economics and marriage, we may be able to use economic conditions to identify a larger portion of these effects. We are currently on our way to understanding how economics has affected marriage changes over time.

[12] Of course we have had many business cycles that do not follow a clean 3 year cycle.

Table 3

Dependent Variable: Men's Probability of Becoming Married (Exiting Single State)

Men Ages 19-34

	Economic Conditions Only		Full Model with Age/Cohort/Ed Effects	
Age Effects	**UN effects**	**Wage Effects**	**UN effects***	**Wage effects***
UN	-0.138 (0.020)		-0.165 (0.052)	
UN*pre1948			0.088 (0.047)	
Change in UN	-0.080 (0.046)		0.085 (0.059)	
dUN*pre1948			-0.195 (0.061)	
Earnings		12.712 (3.499)		5.066 (1.645)
Earnings lagged		-9.126 (3.483)		-1.270 (1.554)
WWII Dummy		-0.016 (0.424)	-1.084 (0.231)	-0.638 (0.232)
post WWII Dummy		4.369 (0.502)	2.358 (0.256)	3.081 (0.229)
Age effects				
20	2.818 (0.458)		4.679 (0.583)	4.592 (0.611)
21	5.911 (0.458)		8.883 (0.583)	8.765 (0.612)
22	7.849 (0.458)		11.811 (0.583)	11.634 (0.614)
23	9.063 (0.458)		12.571 (0.583)	12.291 (0.617)
24	9.686 (0.458)		11.878 (0.583)	11.473 (0.621)
25	9.841 (0.458)		10.941 (0.583)	10.518 (0.624)
26	9.519 (0.458)		9.385 (0.584)	8.927 (0.628)
27	8.838 (0.458)		7.781 (0.584)	7.237 (0.632)
28	8.064 (0.458)		6.102 (0.585)	5.532 (0.637)
29	7.249 (0.458)		4.603 (0.586)	4.027 (0.641)
30	6.279 (0.458)		2.790 (0.587)	2.205 (0.645)
31	5.177 (0.460)		1.490 (0.596)	0.874 (0.660)
32	4.310 (0.462)		-0.245 (0.607)	-0.872 (0.677)
33	3.599 (0.465)		-1.246 (0.620)	-1.942 (0.696)
34	2.991 (0.467)		-2.373 (0.634)	-3.182 (0.717)
Cohort			0.158 (0.029)	0.080 (0.028)
Cohort-sq			0.002 (0.001)	0.001 (0.002)
Cohort-cubed/1000			-0.069 (0.017)	-0.052 (0.020)
R-squared	0.553	0.055	0.166	0.884	0.854
N	981	981	981	981	981

***Also has controls for percent of cohort whose final schooling is less than high school interacted with age dummies**

Table 4
Data Means

	Mean	SD	Min	Max
Economic Variables, Cohorts 1898 to 1959, Ages 18-34				
Level Real Manufacturing Earnings	18032.91	6173.54	7848.54	26538.45
Log Manufacturing Earnings	9.73	0.38	8.97	10.19
Unemployment Rate	7.4	5.5	1.2	24.9
% whose completed schooling is <HS diploma	0.38	0.22	0.09	0.76
9 Year MA of Log Wages when Child	9.49	0.40	8.92	10.12
9 Year MA of Unemployment Rate when Child	7.0	4.3	3.5	19.3
Exit Rate from Single to Marriage, Different Groups				
Men Aged 18-34	11.81	4.07	-1.74	25.97
Men Aged 26	14.72	3.07	4.64	20.80
Women Aged 18-34	12.62	5.40	-2.23	29.46
Women Aged 23	17.80	3.54	10.87	25.81

Table 5

Dependent Variable: Men's Probability of Becoming Married (Exiting Single State)

Men Ages 20-27

	Age Effects	Economic Conditions Only: UN effects	Economic Conditions Only: Wage Effects	Full Model with Age/Cohort/Ed Effects: UN effects*	Full Model with Age/Cohort/Ed Effects: Wage effects*
UN		-0.191 (0.027)		-0.101 (0.074)	
UN*pre1948				0.021 (0.069)	
Change in UN		-0.068 (0.060)		0.093 (0.087)	
dUN*pre1948				-0.185 (0.088)	
Earnings			14.943 (3.827)		8.217 (2.381)
Earnings lagged			-7.937 (3.823)		-0.735 (2.073)
WWII Dummy			-0.910 (0.465)	-1.451 (0.324)	-1.709 (0.368)
post WWII Dummy			4.194 (0.551)	2.196 (0.357)	2.768 (0.307)
Age effects					
21	3.091 (0.548)			-2.523 (1.190)	3.992 (0.595)
22	5.030 (0.548)			-4.735 (1.190)	6.773 (0.599)
23	6.239 (0.548)			-3.621 (1.190)	7.306 (0.607)
24	6.862 (0.548)			-0.632 (1.190)	6.406 (0.616)
25	7.022 (0.548)			1.874 (1.189)	5.397 (0.626)
26	6.698 (0.548)			4.791 (1.190)	3.725 (0.636)
27	6.020 (0.548)			6.949 (1.191)	1.972 (0.648)
Cohort				0.149 (0.043)	0.042 (0.036)
Cohort-sq				0.006 (0.002)	0.003 (0.003)
Cohort-cubed/1000				-0.137 (0.024)	-0.096 (0.031)
R-squared	0.348	0.101	0.488	0.872	0.864
N	503	503	503	503	503

***Also has controls for percent of cohort whose final schooling is less than high school interacted with age dummies**

Table 6

Dependent Variable: Women's Probability of Becoming Married (Exiting Single State)

Women Ages 19-34

		Economic Conditions Only		Full Model with Age/Cohort/Ed Effects	
	Age Effects	UN effects	Wage Effects	UN effects*	Wage effects*
UN		-0.162 (0.025)		-0.063 (0.055)	
UN*pre1948				-0.007 (0.050)	
Change in UN		-0.102 (0.057)		0.085 (0.063)	
dUN*pre1948				-0.239 (0.064)	
Earnings			16.641 (4.643)		6.214 (1.758)
Earnings lagged			-15.340 (4.622)		-6.126 (1.661)
WWII Dummy			0.184 (0.562)	-0.268 (0.244)	0.474 (0.248)
post WWII Dummy			4.597 (0.666)	2.906 (0.270)	3.608 (0.245)
Age effects					
20	1.976 (0.484)			3.018 (0.617)	2.997 (0.653)
21	3.644 (0.484)			5.605 (0.617)	5.667 (0.654)
22	4.221 (0.484)			6.235 (0.616)	6.351 (0.656)
23	3.398 (0.484)			3.367 (0.616)	3.483 (0.660)
24	2.308 (0.484)			0.517 (0.616)	0.606 (0.663)
25	0.997 (0.484)			-2.448 (0.617)	-2.267 (0.667)
26	-0.351 (0.484)			-4.627 (0.617)	-4.375 (0.671)
27	-1.589 (0.484)			-6.578 (0.618)	-6.321 (0.676)
28	-2.686 (0.484)			-8.218 (0.619)	-7.892 (0.680)
29	-3.714 (0.484)			-9.270 (0.620)	-8.874 (0.685)
30	-4.598 (0.484)			-10.530 (0.620)	-10.093 (0.690)
31	-5.687 (0.486)			-12.156 (0.630)	-11.673 (0.705)
32	-6.380 (0.488)			-12.661 (0.642)	-12.102 (0.724)
33	-7.134 (0.491)			-13.955 (0.656)	-13.391 (0.744)
34	-7.875 (0.494)			-15.045 (0.671)	-14.523 (0.766)
Cohort				0.149 (0.031)	0.094 (0.030)
Cohort-sq				0.006 (0.001)	0.008 (0.002)
Cohort-cubed/1000				-0.115 0.017	-0.150 0.021
R-squared	0.678	0.050	0.051	0.904	0.892
N	981	981	981	981	981

***Also has controls for percent of cohort whose final schooling is less than high school interacted with age dummies**

Table 7

Dependent Variable: Women's Probability of Becoming Married (Exiting Single State)

Women Ages 20-27

		Economic Conditions Only		Full Model with Age/Cohort/Ed Effects	
	Age Effects	UN effects	Wage Effects	UN effects*	Wage effects*
UN		-0.198 (0.026)		-0.117 (0.085)	
UN*pre1948				0.037 (0.079)	
Change in UN		-0.130 (0.059)		0.176 (0.099)	
dUN*pre1948				-0.334 (0.101)	
Earnings			20.169 (4.268)		6.859 (2.806)
Earnings lagged			-14.871 (4.262)		-6.667 (2.444)
WWII Dummy			-0.182 (0.519)	-0.688 (0.371)	0.299 (0.434)
post WWII Dummy			5.402 (0.615)	3.050 (0.408)	4.024 (0.362)
Age effects					
21	1.660 (0.584)			2.622 (0.659)	2.647 (0.701)
22	2.235 (0.584)			3.241 (0.659)	3.324 (0.706)
23	1.416 (0.584)			0.395 (0.658)	0.472 (0.715)
24	0.335 (0.584)			-2.407 (0.658)	-2.367 (0.726)
25	-0.982 (0.584)			-5.395 (0.659)	-5.260 (0.737)
26	-2.334 (0.584)			-7.600 (0.660)	-7.391 (0.750)
27	-3.570 (0.584)			-9.526 (0.662)	-9.325 (0.764)
Cohort				0.147 (0.049)	0.011 (0.042)
Cohort-sq				0.009 (0.002)	0.014 (0.003)
Cohort-cubed/1000				0.000 (0.000)	0.000 (0.000)
R-squared	0.244	0.124	0.349	0.828	0.807
N	503	503	503	503	503

***Also has controls for percent of cohort whose final schooling is less than high school interacted with age dummies**

Table 8

Dependent Variable: Probability of Becoming Married (Exiting Single State)*

Ages 18-34

	Earnings & Avg Earnings in Childhood with and w/o Cohort Effects		UN & Avg. UN in Childhood with and w/o Cohort Effects	
	No Cohort	With Cohort	No Cohort	With Cohort
MEN				
Earnings	7.687 (0.601)	3.963 (0.892)		
Log of 9-Year Average of Earnings in Childhood	-5.555 (0.653)	1.105 (1.418)		
UN			0.029 (0.047)	-0.158 (0.046)
UN*pre1948			-0.103 (0.043)	0.061 (0.043)
9-Year Average of Unemployment in Childhood			0.030 (0.012)	-0.054 (0.012)
R-squared	0.838	0.853	0.826	0.864
WOMEN				
Earnings	8.650 (0.663)	0.714 (0.960)		
Log of 9-Year Average of Earnings in Childhood	-3.889 (0.720)	-2.071 (1.525)		
UN			0.198 (0.050)	-0.094 (0.050)
UN*pre1948			-0.269 (0.046)	0.009 (0.046)
9-Year Average of Unemployment in Childhood			0.061 (0.013)	-0.001 (0.013)
R-squared	0.873	0.891	0.869	0.898

***All regressions have age controls, age*ed controls, and WW2 controls similar to regressions in Tables 3, 5-7.**

Age Controls	yes	yes	yes	yes
Age*Ed Controls	yes	yes	yes	yes
N	981	981	981	981

Table 9

Dependent Variable: Percent of Cohort Ever Married at Age 35

	Avg Earnings in Marrying Years with and w/o Cohort Effects				Avg. UN in Marrying Years with and w/o Cohort Effects			
	No Cohort		With Cohort		No Cohort		With Cohort	
MEN								
Average of Earnings from Age 22-27	-4.470	(4.906)	2.542	(2.655)				
Average of Unemployment from Age 22-27					0.005	(0.009)	0.003	(0.004)
Proportion of Cohort with Final Schooling Level at Less than High School	-21.189	(8.627)	-13.687	(4.640)	-13.736	(1.405)	-15.244	(4.283)
R-squared	0.645		0.950		0.642		0.950	
WOMEN								
Average of Earnings from Age 22-27	1.247	(3.378)	3.941	(2.370)				
Average of Unemployment from Age 22-27					-0.008	(0.006)	-0.010	(0.003)
Proportion of Cohort with Final Schooling Level at Less than High School	-10.267	(5.944)	-3.179	(4.142)	-11.901	(0.951)	-6.529	(3.612)
R-squared	0.776		0.948		0.783		0.953	

Chart 1

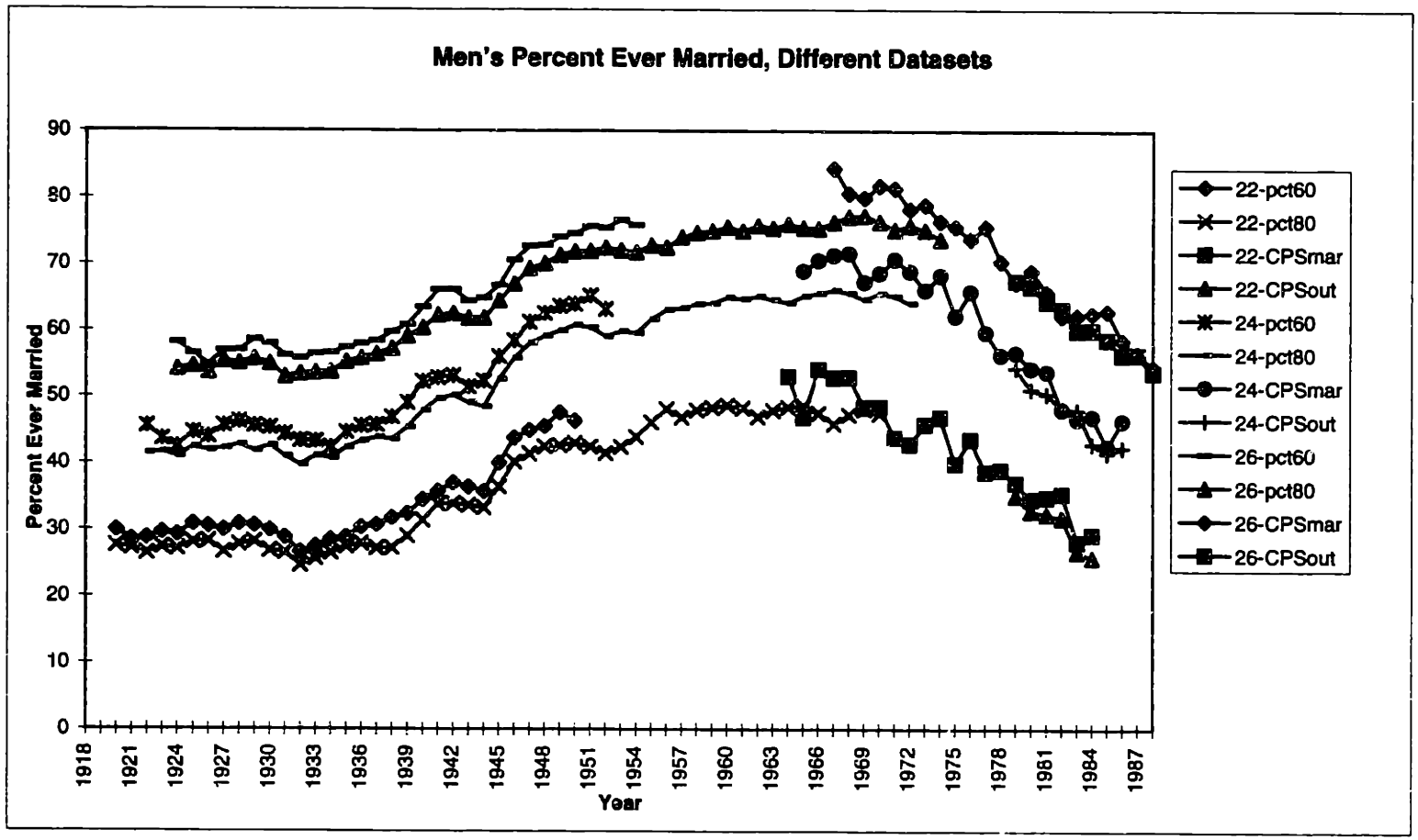

Men's Percent Ever Married, Different Datasets
Percent Ever Married
Year
0
10
20
30
40
50
60
70
80
90
1918
1921
1924
1927
1930
1933
1936
1939
1942
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
22-pct60
22-pct80
22-CPSmar
22-CPSout
24-pct60
24-pct80
24-CPSmar
24-CPSout
26-pct60
26-pct80
26-CPSmar
26-CPSout

Chart 2

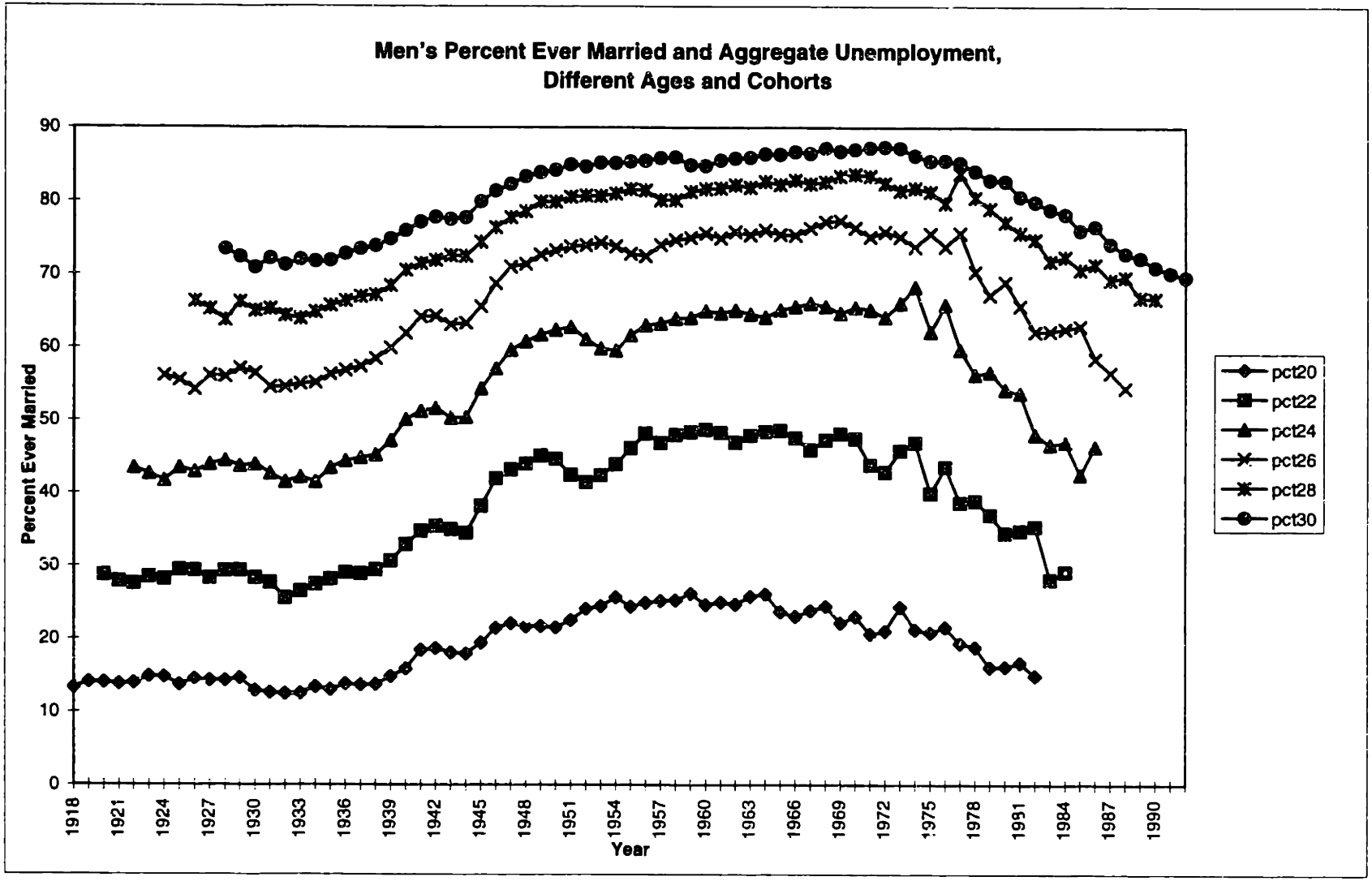

Men's Percent Ever Married and Aggregate Unemployment,
Different Ages and Cohorts
Percent Ever Married
0
10
20
30
40
50
60
70
80
90
1918
1921
1924
1927
1930
1933
1936
1939
1942
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
Year
pct20
pct22
pct24
pct26
pct28
pct30

Chart 3

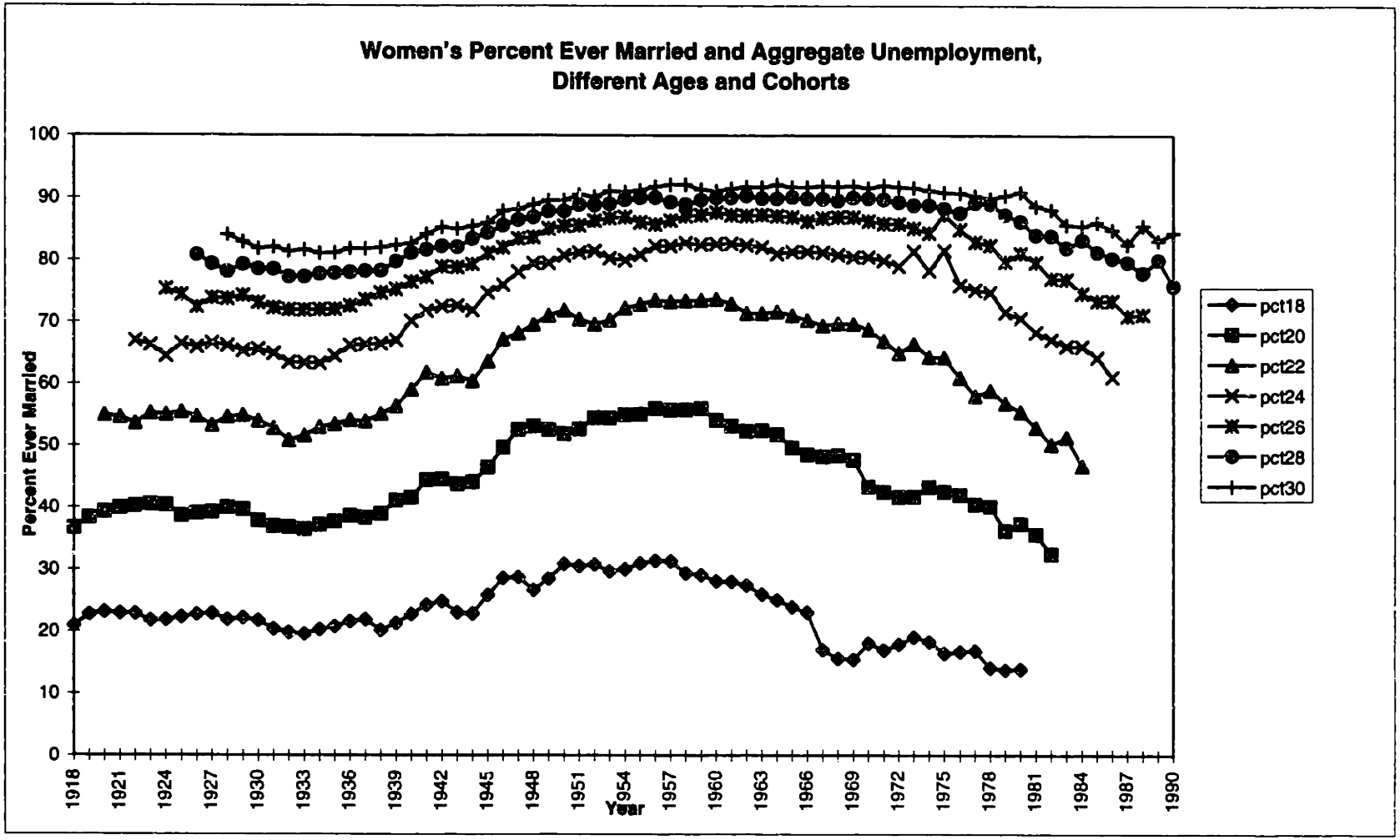

Women's Percent Ever Married and Aggregate Unemployment,
Different Ages and Cohorts
Percent Ever Married
100
90
80
70
60
50
40
30
20
10
0
1918
1921
1924
1927
1930
1933
1936
1939
1942
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
Year
pct18
pct20
pct22
pct24
pct26
pct28
pct30

Chart 4

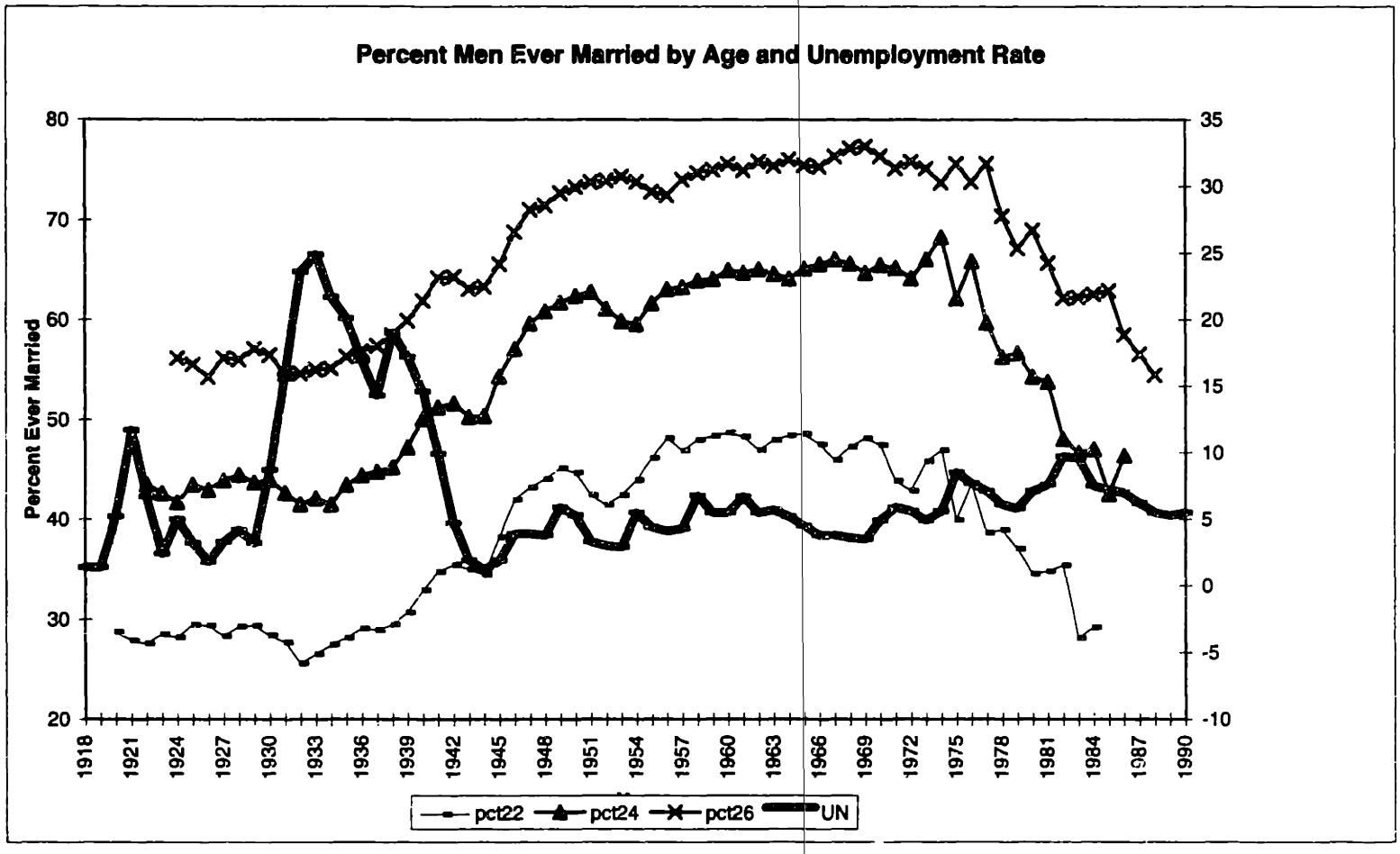

Percent Men Ever Married by Age and Unemployment Rate
Percent Ever Married
80
70
60
50
40
30
20
35
30
25
20
15
10
5
0
-5
-10
1918
1921
1924
1927
1930
1933
1936
1939
1942
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
pct22
pct24
pct26
UN

Chart 5

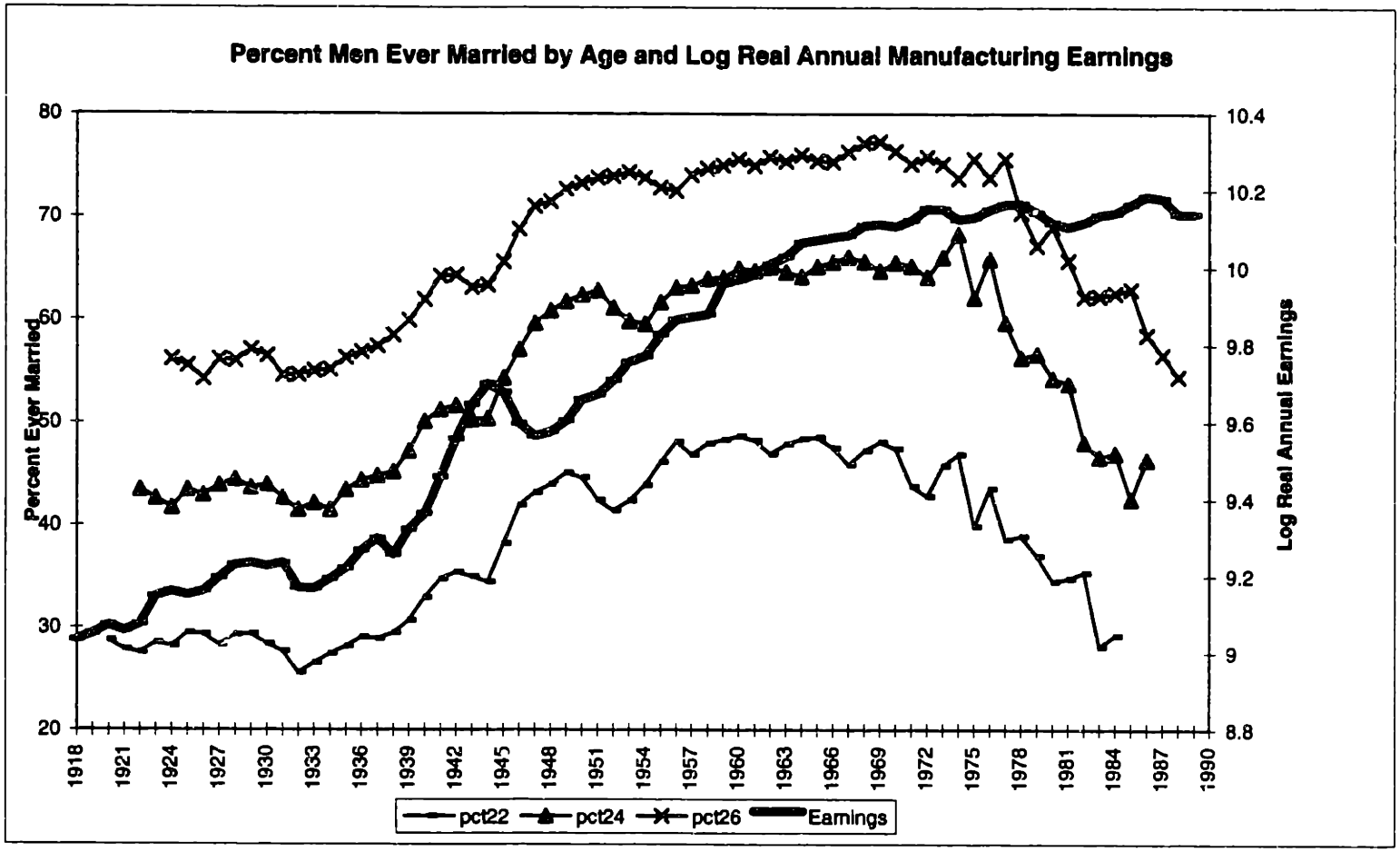

Percent Men Ever Married by Age and Log Real Annual Manufacturing Earnings
Percent Ever Married
Log Real Annual Earnings
80
70
60
50
40
30
20
10.4
10.2
10
9.8
9.6
9.4
9.2
9
8.8
1918
1921
1924
1927
1930
1933
1936
1939
1942
1945
1948
1951
1954
1957
1960
1963
1966
1969
1972
1975
1978
1981
1984
1987
1990
pct22
pct24
pct26
Earnings

Chart 6

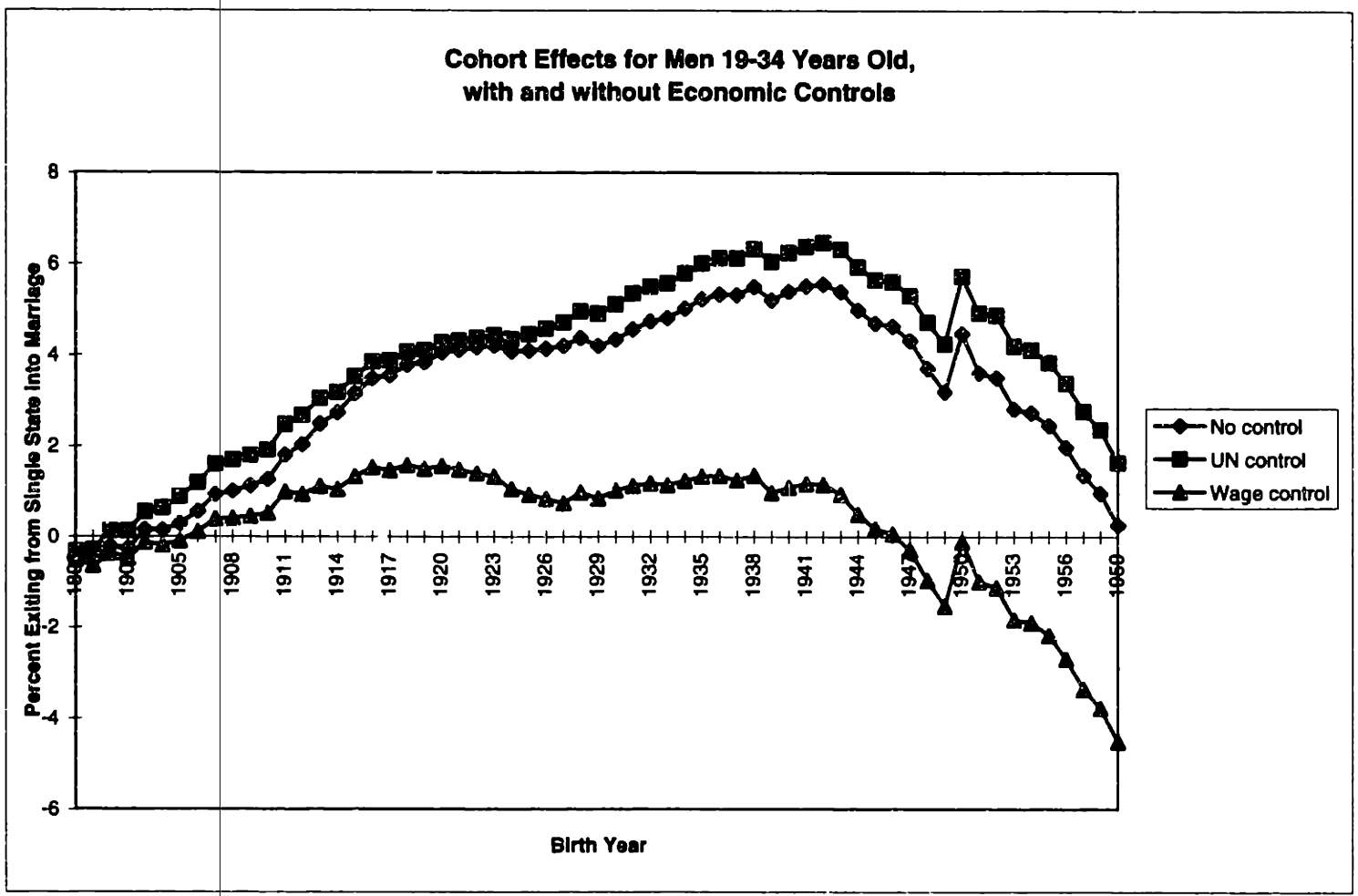
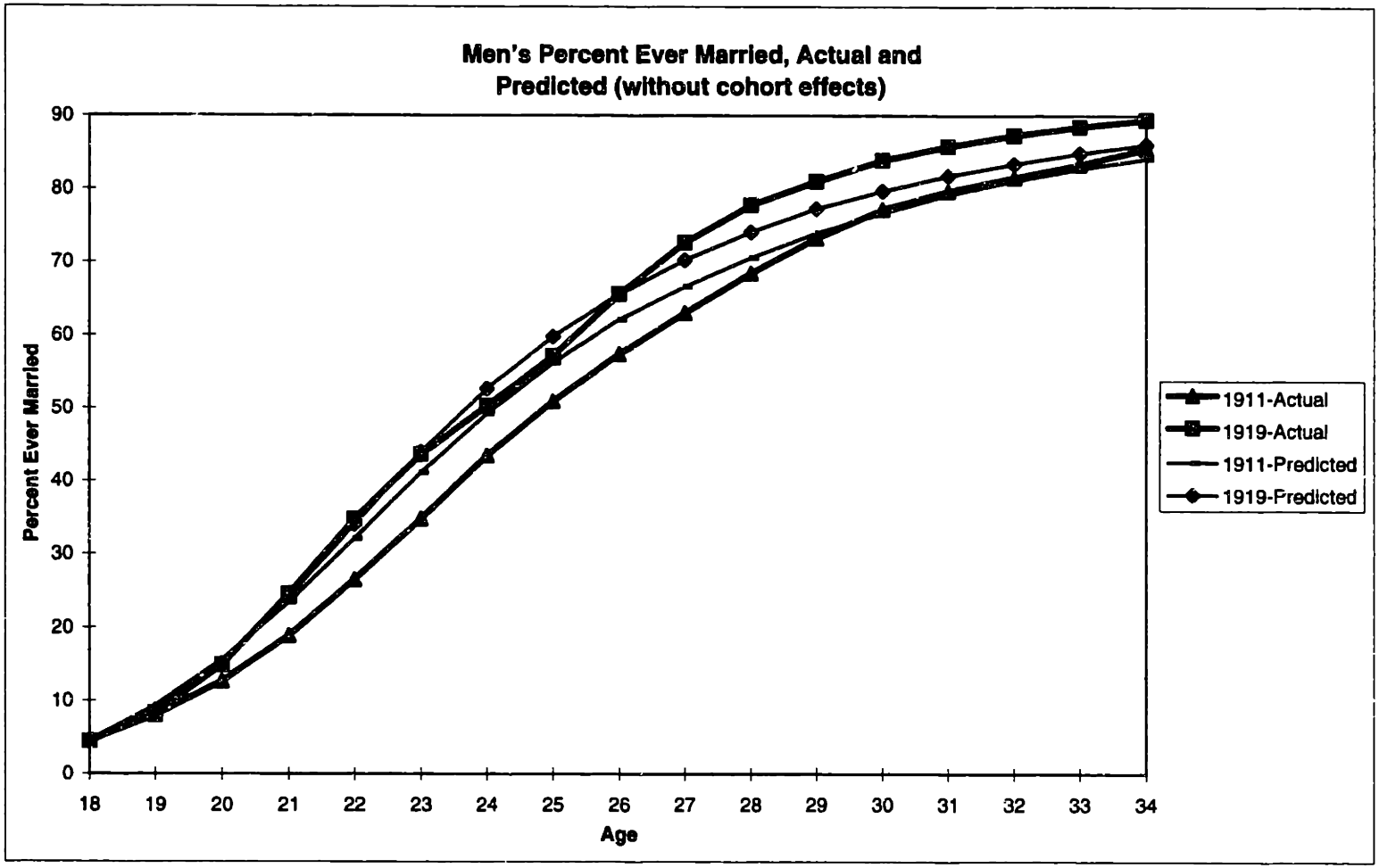

Cohort Effects for Men 19-34 Years Old,
with and without Economic Controls
Percent Exiting from Single State into Marriage
8
6
4
2
0
-2
-4
-6
1905
1908
1911
1914
1917
1920
1923
1926
1929
1932
1935
1938
1941
1944
1947
1950
1953
1956
1959
Birth Year
No control
UN control
Wage control

Chart 7


Men's Percent Ever Married, Actual and Predicted (without cohort effects)
Percent Ever Married
90
80
70
60
50
40
30
20
10
0
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
Age
1911-Actual
1919-Actual
1911-Predicted
1919-Predicted

Data Appendix

Data are from a variety of sources. Data are for white men and women in the U.S. unless otherwise stated.

Definition and Source

MARRIAGE RATE

1964 to present:
The March CPS is available from 1964 to present, while from 1979 to present the larger outgoing rotations of the CPS are available. We use the percent ever married as opposed to the percent currently married in order to have comparability with the earlier cohorts. Because the CPS is a random sample, average characteristics for 22 year olds sampled in 1980 and 23 year olds sampled in 1981 can be used as average characteristics over time for the same cohort. Synthetic panels of marriage rates from ages 18 through 34 can be set up for cohorts born from 1949 through 1959.

Pre-1964:
For the earlier cohorts, we do not have yearly data as provided in the CPS. But it is possible to construct the marriage experience by age for each cohort from the question "Age at first marriage" in the later Census data. An example: the 60 year olds in the 1979 census were born in 1919, and hence were 18 years old in 1937. If we calculate the distribution of the age at first marriage question for all 60 year olds sampled in 1980, we can find the percent ever married by age for this cohort as it moves through time. I use averages of the constructed marriage rates from the 1960 and 1980 Census. (see Table 2 in text)

The dependent variable is then the percent leaving the single state in a year:
hdpanel = (%ever marriedt - %ever married t-1)/%ever married t-1

ED

The education variable is the percent of a cohort whose final level of schooling was less than a high school education. It is estimated from the respondents in the Census and the CPS data. For the Census data I use the educational distribution that each cohort reported (these are people aged 35 to 60+) when they were adults. For the CPS data, I used the average of the educational distribution reported by the 35 year olds and the 40 year olds (averaging across these two samples). Additionally, I ran all regressions using the percent that graduated from college as a regressor. The two variables are highly negatively correlated, and worked as very similar controls.

EARNINGS
The earnings variable is real annual earnings in manufacturing: Historical Statistics Series, D 740, 1900-1970; National Income and Product Accounts, Tables 6.6B-6.6C, 1959-1991. Deflators were used to bring wage into real dollars: Historical Statistics, Series E 135, 1900-1960; Economic Report of the President, implicit GNP deflator for all consumption, 1961-1991.

UN and pre-1948 interaction
The annual unemployment for all civilians as reported by Employment and Earnings and the Historical Statistics of the United States. As Christie Romer (19xx) there is excess cyclicality in unemployment data that was collected before 1948. To control for this I interact the unemployment variables with a dummy for the pre-1948 years.

WW2 and POSTWW2 dummies
These dummies are in place due to the fact that WW2 (1942-1945) and the immediate post-war years (1946-1948) would cause aberrations in the marriage market that have little to do with economic conditions at that time.

Cohort, Cohort-Squared, Cohort-Cubed
The cohort polynomial is estimated on a linear series in cohort that is equal to 1 for the cohort born in 1898, equal to 2 for the cohort born in 1899, and so on.

9-Year Average of Earnings and Unemployment in Childhood
The childhood economic conditions control will be a 9 year average of the conditions a cohort faced as children. Take the years when the cohort was aged 8-16, and compute the average of the unemployment rate, and the log of the 9 year average of annual earnings in manufacturing, respectively.

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Chapter 3

The Role of Small Firms in Wage Adjustments

3.1 Introduction

Over the past two decades there has been much debate about the role of small firms in the changing wages of semi-skilled workers. In this paper we attempt to clarify the debate itself, and then to systematically explore the outcomes relevant to answering the outsourcing question: is employment growth in small firms hurting less educated workers?

We test for the role of small firms in the absolute and relative falling wages of high school-educated men between 1979 and 1993. To fully characterize how changing employment over time in small firms has affected men's wages, we pose four main questions. We first investigate the quantity effect. Viewed from the perspective of the employee, what is the extent of downsizing and the resultant shift of employees to smaller firms? How does this shift vary across education levels and industrial sector? Second, we estimate the price effect. How has the return to being in a large firm changed over time? Does the change in the firm size premium (if any) vary by education? Does it differ for wages versus wages plus fringes? Our third approach is then to quantify the overall role of small firms in declining wages of semi-skilled workers. To what extent can the shift of labor into small firms explain the declining wages and compensation of semi-skilled workers? And the fourth and final question concerns firm size and the college-high school wage differential. How have differential shifts in employment across firm size affected the wage/compensation differential between college and high school workers?

The paper begins with a background on the firm-size literature which also provides motivation for the above set of questions. The data section follows. We then address the above posed four questions, and conclude.

3.2 Background and Motivation

Over the past two decades, three different literatures have advanced very different descriptions of the role of small firms in the U.S. economy. The most widely discussed of these literatures begins in the work of David Birch (1987) who argued that small firms were the major source of new jobs in the economy. Over time, Birch's work has been criticized for focusing on gross, rather than net, job creation (Davis and Haltiwanger, 1992) and Birch himself has recently disavowed the strong conclusion of his earliest studies.[1] Nonetheless, in a time of relentless downsizing in large corporations, the image of the small firm as the large job generator retains substantial appeal.

A second, older literature, well known within the economics profession, argues that when worker characteristics are held constant, small firms typically pay lower wages and are less likely to pay fringe benefits than large firms (Brown and Medoff, 1989). While this firm size-wage effect has spurred a large literature, its causes remain elusive. Brown and Medoff group the traditional explanations for the size-wage effect into four categories; labor quality, institutional factors, market size/rent sharing, and monitoring/recruiting. They then use a variety of available data sets to test the validity of each explanation. Using numerous cross-section data sets, both individual and firm/establishment based, they show that a premium is associated with employment in

1 Remarks delivered at the Milken Institute Conference on Jobs, Washington DC, November 1994.

larger firms and establishments, after controlling for observables. With longitudinal data they also control for fixed effects, and find that while the firm size-wage premium is reduced, it is not eliminated. Additionally the firm size-wage effect is stronger for employees who switch firm size than for those whose present firm shrinks or grows. In conclusion, they find that the empirical results are not wholly consistent with any of the traditional stories and thus the cause of the firm size-wage effect remains open. Nevertheless, the firm size-wage effect is shown to be large in magnitude and robust.

The third, and most recent literature on small firms is, in some ways, a combination of the first two. It begins with the fact that during the 1980s, large manufacturing firms came under substantial pressure to reduce costs first from the 1980-82 recession and then from the overvalued dollar of 1982-86 which enhanced the competitiveness of manufactured imports. As part of this process, large firms found that they could reduce production costs by contracting part of their operations out to smaller domestic firms (Harrison, 1993).[2]

According to this third literature, cost savings sometimes came from small firms' efficiency advantages - advantages that surfaced in the short production runs used in flexible manufacturing. But more often, small firms' cost advantage comes from their lower wages. Beginning with 1980-82 recession, the U.S. economy experienced a sustained shift in relative demand away from semi-skilled labor (Katz and Murphy, 1992). Small firms, it is argued, are less constrained by custom and internal labor markets in their ability to set wages and so could more quickly take advantage of the falling wages produced by slack demand. As Burtless suggested:

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2 A related option, of course, was to contract operations out to overseas producers.

> Falling wages [for less educated workers] may have reflected a shift of less educated labor away from large, paternalistic firms and toward smaller firms who set wages on the spot market.[3]

Compared to the first two literatures, this third literature relies heavily on anecdotes (of which there are many) and has received relatively little empirical validation. The problem, of course, is in this case anecdotes will be asymmetric. When General Electric shuts down an operation and contracts out the work to smaller firms, it creates a visible, newsworthy event. When General Electric retains another part of its operation intact, there may well be no visible decision and so there won't be any news. Hence anecdotes alone can say little about the role of small firms in the falling wages of less skilled workers.

A priori, this role can take two forms. A price effect would involve a growing wage premium between bigger and smaller firms as large firms continued to pay customary wages while small firms paid falling, spot market wages. A quantity effect would involve a growing share of semi-skilled manufacturing labor in small firms as large firms shed operations to reduce costs. There is some evidence already that the price effect across firm size will not be a big player. Katz and Krueger (1991) use the 1979 and 1988 CPS data to show that aggregated across all industries, "education differentials have moved similarly in small and large firms in the private sector in the 1980s". We support and augment their result, by extending the years of analysis through 1993, characterizing the above mentioned price effect in a more detailed way across industry (adding non-wage compensation), and by examining the effect of changing levels

of employment across firm size category.

While most of the literature's examples are couched in terms of manufacturing, the process may apply to services as well - in particular, the contracting out of routine services from high wage, large corporations (both manufacturing and service) to low wage firms most of which would be in the Business Service industry.

One caveat. We recognize, as does this third literature, that the cost reducing effect of contracting out can be obtained by a related process: segregating semi-skilled jobs in separate, geographically isolated facilities. For example, the reason that Citibank NA maintains its credit card operations (including 800 customer service) in Sioux Falls, South Dakota, is because it believes it costs less than it would cost in New York City to provide an operation of equivalent quality. Data limitations preclude us from testing for that possibility in this analysis.

3.3 Data

The data used in this paper comes from three May supplements to the Current Population Survey (CPS) for survey years 1979, 1988 and 1993. In these years the May Survey of Employee Benefits contains information on firm and establishment size[4] and

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3 Paraphrase of comment made by Gary Burtless at the Colloquium on Wage Trends, Federal Reserve Bank of New York, November 1994 (reconstructed as best as Levy can remember it).

4 Establishment size is the size of the physical plant where a worker works. Firm size is the size of the organization that employs a worker (it may have many establishments). In the benefits supplement establishment size categories vary greatly in the different samples, and thus are not comparable over time. Using the finest firm size categories that are available for comparison in all samples, we have five firm size categories: <25, 25-99, 100-499, 500-999, and 1000+. The focus on firm size is more consistent with the stories about wage decline—larger firms are the organizations that we consider in downsizing, not establishments per se.

group health insurance on the job. Questions from the supplement survey were asked of all persons employed for pay (as identified during the CPS interview) in one-half of the CPS sample. The May supplement is then matched with the March income supplement and the June CPS files by the Bureau of Labor Statistics, in order to obtain detailed individual data.

We restrict our study to men, aged 24-55, with positive earnings. It has been well documented (Levy and Murnane, 1992) that male workers with a high school education (or less) saw a steady decline in real wages over the 1980s. The years of 1979, 1988 and 1993 bracket this observed decline and thus these three supplements enable us to examine the effect of employment by firm size on declining wages for semi-skilled workers.

In this study we focus on two measures of compensation for workers: hourly wages and the value of health insurance received on the job. We look at wages within manufacturing and services separately, and also separate levels of health benefit generosity within these two sectors. Yearly estimates of the value of receiving group health insurance on the job are available in the yearly "Employee Benefits Report" published by the US Chamber of Commerce. For a richer estimate of compensation than the hourly wage alone, we construct an hourly measure of the wage plus health benefits, by adding the value of 'health benefits as cents per payroll hour' to a worker's hourly wage if that worker receives group health insurance on the job. It is also important to understand that while our measure of the value of health insurance varies by industry, we do not have information available by firm size. Thus our measure of fringes may still be an underestimation of the value of fringes as larger firms generally give more generous

benefits than smaller firms. For details on how we construct the data see the Data Appendix.

We proceed to establish how the changing employment distribution across firm size has affected these two measures of compensation for different educational groups.

3.4 Quantity Effects

Employment by Firm Size Category

Table 1A shows for the manufacturing sector the distribution over time of employment by firm size category for workers with a high school diploma or less.[5] The shift of employment into smaller firms is evident in manufacturing, and is consistent with other work that has shown that workers overall have experienced declining average establishment size over time (Davis, Haltiwanger, and Schuh, 1996). In 1979 62.4 percent of semi-skilled workers in manufacturing were in firms with 1000 or more employees. By 1993 this number had fallen 15.3 percentage points, to 47.1 percent. The proportion of workers in firms with 500 or less employees grew from 32.3 to 44.9 percent over this time, with each firm size category inside this group gaining about 3-5 percentage points. One can see from the table that the youngest semi-skilled workers bore the brunt of much of this firm size shifting, a likely outcome of seniority based layoffs in larger firms.

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5 The question regarding education level changed in 1990. Previous to this change, respondents were asked how many years of schooling they had, and whether they had completed the last of these years. After the change in 1990, respondents were asked questions about the educational *group* to which they belonged (e.g. 7-9 year, high school diploma, etc.). Hank Farber and Alan Krueger have been generous enough to share their methods for constructing comparable education variables for the pre and post 1990 data.

Employment shifts by firm size in manufacturing were not nearly as dramatic for workers with more than a high school degree, as one can see in Table 1B. Between 1979 and 1993 the percent of workers with at least some college that where employed in firms with 1000 or more employees fell 8.8 percentage points from 70.7 to 61.9.

Employment in the services sector is characterized in Tables 2A and 2B, and shows a different pattern than in manufacturing. In the services sector as a whole, we do not see a strong trend toward smaller firm size. The proportion of workers in large firms is about the same in 1993 as it was in 1979. The services sector is quite heterogeneous and arguably the aggregate numbers could be masking more directed changes in particular service industries. We examined the more detailed industries that compose services, and still saw no startling patterns in employment changes across firm size other than relatively stronger upsizing for both semi-skilled and skilled workers in Retail Sales and FIRE, and relatively stronger upsizing for semi-skilled labor in Personal Services.

Receiving Health Benefits by Firm Size and Over Time

Tables 3A and 3B show the distribution of receiving health benefits for both worker types across years and over firm size. It is evident that whatever the sector or firm size, workers are less likely to be covered by health insurance in 1993 than in 1979, as the overall coverage of male workers, 24-55 years of age, fell from 83 percent to 70 percent. But this decline is seen most acutely for less educated workers in both the manufacturing and services sectors. From 1979 to 1993, coverage in the manufacturing sector for workers with a high school education or less fell over ten percentage points, and even more so in firms with less than 100 employees. Coverage for college workers in

manufacturing showed a much smaller decline of 4 percentage points from 1979 to 1993. Generally, workers in the manufacturing sector overall are more likely to be covered by health insurance than workers in the services sector, and workers in larger firms are more likely to be covered than workers in smaller firms.

Overall Quantity Effects

The shift of high school graduate employment out of large manufacturing firms, coupled with the loss of benefits in smaller manufacturing firms, suggests that the movement of employment to smaller firms may play a role in declining wages and benefits of semi-skilled workers in manufacturing and thus in the economy overall. There does not seem to be a parallel shift within services sector firms. There are, to be sure, many stories about the contracting out of custodial and other low-skilled services to providers in the Business Services industry. In our sample, however, the Business Services industry was not a large employer of male high school graduates and dropouts: 3.7 percent of such men in 1979 rising to 6.0 percent of such men in 1993. Conversely, the proportion of such men employed in Manufacturing fell over the same period by 7 percentage points.

3.5 Price Effects

Measuring the Price Effect

The role of small firms in the falling wages of semi-skilled workers could also show up as a price effect. If small firms are increasingly organized like a spot-market for

semi-skilled labor, and large firms are constrained to pay customary wages, we should see the wage differential between large and small firms increasing over the 1980s.

We establish the firm size-wage differential in manufacturing and services separately for 1979, 1988 and 1993. Our approach is to augment a cross sectional wage equation with dummies for the 5 firm size categories. Worker i's wage rate in 1993 dollars, w_i, is specified to depend on a vector of observable characteristics, X_i, dummies for firm size (with the smallest category omitted), FS_i, and an error, ε_i. For 1979, 1988 and 1993 we estimate a standard log linear wage equation

$$\ln(w_i) = \alpha_j' + X_i\beta_j' + FSIZE_i\gamma' + \varepsilon_i$$

for two separate populations, those with a high school education or less, and those with at least some college. An educational dummy is included to distinguish between high school grads and dropouts, and college grads and those with some college, in the two respective regressions. This formulation permits the firm size differential to vary by (a proxy for) semi-skilled and skilled workers.

Unionization

Before discussing the results, we should spotlight the fact that one of the controls in all of our regressions is whether a person is in a union. There are a number of ways to think about how unionization will affect this picture. The first most obvious one is the correlation with unions and firm size. Unions tend to be associated with higher wages and with larger firms. Depending on one's philosophy, separating the union effect from

the firm size effect could either be prudent or misguided. Perhaps one of the perks of belonging to a large firm is that additionally one is more likely to be in a union and thus receive another wage bonus. On the other hand, we might want to see the effect of the firm size organization clean of the changing status of unions. And lastly, one might guess that estimates of the firm size-wage premium over time with and without controlling for unions would pick up different trends. As unions decline, you would expect to see a decline in the firm-size wage premium measured without union controls due solely to the omitted union decline. Controlling for unionization would eliminate this problem.

Our decision was to control for unionization, but also to check all our results against similar regressions run without union controls. We find that while across the board the firm size-wage premium is higher when you do not control for unionization, the *changes* are very similar. The substantive conclusions about the effect of employment decline in large firms over time would be the same whether reporting from the regressions controlling for unions, or those that do not. We proceed with reporting our results that control for unionization.

Results

Table 4A gives the regression results for workers with a high school education or less. In the manufacturing sector regressions, we see that in 1979 similar workers make 16% higher wages if they are in a firm of over 1000 employees versus being in a firm of 25 or less employees. This firm size-wage effect increases to 21% in 1988 and then falls

back to 16% in 1993.[6] The increase in the firm size wage differential of 5% between 1979 and 1988 is not significant at the 95% confidence interval. So, while the return to being in a large firm is significant for semi-skilled workers in the manufacturing sector, this analysis does not support that this wage differential has increased greatly over the 1980s. In the services sector, the return to being in the largest firm class has declined from 1979 to 1993, but not in a statistically significant manner. Looking at the more detailed services industries separately, we find the same result-- a tendency towards a lower return to firm size, but no statistically significant changes.[7]

For comparison, one can look at Table 4B to see the same regressions for those with at least some college education. In manufacturing, the return to being in a large firm has increased from a 21% wage increase to a 30% wage increase between 1979 and 1993, although this could still be driven by sample variation. In contrast in services, the return to being in a large firm has declined 10 percentage points for educated workers. Looking at the more detailed services industries separately, we find similar results across industry, with the exception of an increase in the firm-size wage differential in the transportation industry.

The wage alone is not the only measure of compensation of interest. Since employees in small firms are increasingly less likely to receive health insurance benefits

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6 The 1988 regressions for manufacturing for men with a high school education and less look somewhat different than the other regresssions estimates (worse fit, stronger firm size coefficients). From intensive review of the data, it appears that this is simply a function of the sample, and not a data problem.

7 It was noted by Jared Bernstein at the AEA meetings in 1995 that the linear coefficient on experience for semi-skilled men in our regressions did not increase between 1979 and 1988. This would seem to be contradictory to the trends in the return to experience documented by Katz and Murphy (1992). Closer examination on our part showed non-linear increases in the return to experience for semi-skilled men, with younger men seeing increases in the return to experience and older men seeing little change.

on the job, we could expect to see the average wages plus benefits of workers in smaller firms to decline relative to those in larger firms. We repeat the regressions discussed above, but use our measure of wage plus compensation as the dependent variable to measure the amount of increased disparity in the total compensation package across firm size.

Tables 5A and 5B report the results. For workers with no more than a high school education, working in the largest firm size is worth 2-3 percentage points more in wages plus health insurance than in wages per se. This result holds for all years and both industries (Table 4A). The larger coefficient for wages plus health insurance is driven by the fact that large firms are much more likely to cover their employees with health insurance than small firms, and thus the total benefit to being in a large firm is higher than the wage benefit. At the same time, the *changes* across years in the wage plus health insurance disparity between large and small firms look almost identical to those of wages alone for semi-skilled workers. Comparing Table 4B and Table 5B we see that this result is the same for workers with at least some college. So even when one adds health insurance to the measure of compensation, the evidence does not point to a growing disparity between compensation in large and small firms for similar workers.

3.6 The Role of Small Firms in the Wage Adjustment Process

In this section, we turn to a summary question of our investigation: to what extent can the falling wages of semi-skilled workers be explained by the shift of those workers to smaller firms. We focus the question on two age groups (25 to 34 and 35 to 44 year old

males) and the same two education groups we have focused on throughout the paper (men high school education and less and men with at least some college). We concentrate on the change in wages plus health insurance for each group of men in manufacturing, and separately, in the services sector.[8] The results of the decomposition are contained in Tables 6 and 7 and are anticipated by the results in previous sections. In Section III, we saw that shifts of employment into smaller firms were moderately important for less educated men in manufacturing but were not important for less educated men in the services sector or for more educated men in either section. Additionally, we saw that the shifting employment across firm size in manufacturing was more concentrated for men in the youngest age group, 25 to 34 years old. In Section IV, we saw that while the firm-size wage premium was substantial in any year, it did not grow appreciably during the 1979-93 period. This second finding indicates that falling wages for semi-skilled workers were a fact of life in all firms - not only small firms. The decompositions in Table 6 and 7 confirm these developments.

Table 6 shows a standard shift-share analysis[9] for men aged 25 to 34. Recall that this age group of men experienced the largest employment shift into smaller firms and thus one would expect the effect on wages of shifting across firm size categories to be the largest for them. For men with a high school education or less we see that wage plus health insurance changes within firm size accounts for the majority of wage decline in

8 The related question - the role of the shift of labor from manufacturing to services has been analyzed by Murphy and Welch (1993) who find that inter-industry shifts account for about 20 percent of the growing earnings-education premium.

9 In order to double-check our results and to test for sensitivity to the index we use, we do two separate decompositions. In the first decomposition we weight by 1993 wages and 1979 firm size concentration, while in the second decomposition we weight by 1979 wages and 1993 firm size concentration. Both show similar results.

manufacturing and almost the entirety in the services sector. By contrast, the pure shift of less educated men's employment to smaller firms accounts for one-fifth to one-third of the wage decline in manufacturing, and the shifts of employment across firm size category in services actually works to increase wages slightly.

Decomposition results for men with at least some college are more varied but have less meaning because the wage plus health insurance changes for college graduates are relatively small - a one-half percentage point decline in manufacturing, and a 4 percent decline in services between 1979 and 1993.

Table 7 shows the same results for men aged 35-44 as a point of comparison. Here the across firm size wage effects for men with a high school education or less are even a bit smaller (as we would expect given their relative employment shifts). Both tables support the idea that the shifting employment across firm size category is not the main player in wage changes for these education groups. Rather, the within firm size-wage changes are the major drivers.

3.7 Firm Size and the College-High School Wage Differential

We turn now to the final question posed in our introduction: to what extent is the rising return to a college education over a high school education associated with the shifting distribution of different skill levels across firm sizes? We have shown in the above shift share analysis that wage changes within firm size class seem to be the main drivers for wages changes for the two education groups. The following analysis additionally confirms that firm size is not a major player in the changes in the return to

education over time.

Changes in the Return to Education

The increased return to education over the 1980s is the focus of much current work and accounts for at least half of the overall increase in wage inequality in this time period. A variety of articles have established that this change has occurred within both industry and occupation (Katz and Murphy, 1992) but most studies have not been able to trace the effect below this level.

One potential source of wage variation that exists within industry and occupation is, of course, firm size. We have seen that larger firms pay higher wages controlling for observables. Evidence also exists that within manufacturing a large part of the increase in wage variation through the 1980s can be accounted for by wage dispersion across plants, and that the most powerful observable plant characteristic in determining across plant wage variation is plant size (Davis and Haltiwanger, 1991).

Holding the firm size premium constant, a shift of workers into smaller firms would cause a decrease in wage growth. If such a shift were more pronounced for high school workers than college workers the wage inequality between these two groups would increase. This effect would be even stronger if one added benefits since benefits are more likely to be offered in large firms. Additionally, the probability of receiving health insurance declines more with declining firm size for high school workers than for college workers.

As shown in Table 1A and 1B, there has been a differential shift of employment by education level across firm size in manufacturing, with the proportion of less skilled

workers employed in smaller firms rising much more than that of more skilled. Comparing high school graduates and those with a college education or more between 1979 and 1993 we see a stark contrast. The proportion of high school graduates employed in firms of 1000 or more employees fell 14.4 percentage points from 66.9 percent to 52.5 percent, while college graduates fell from 73.5 percent to 69.9 percent, only 3.6 percentage points. The proportion of high school workers in firms of size 100 or less, rose from 16.7 to 22.8 percent over this same time period. Given the disparity of employment shifts, it is reasonable to question this effect on the increase in the college-high school wage differential.

Estimating the Role of Firm Size in the Change in the Return to Education

To examine this we estimate the return to a college education over a high school education separately for 1979, 1988 and 1993, with and without controlling for firm size (a similar log wage specification as that in the previous section, but using the entire sample of male workers, 24-55 years of age). EDDUM is a matrix of dummies for the four educational categories of less than a high school degree, high school exactly, some college and college or more. A high school education is the omitted education category.

$$\ln(w_i) = \alpha_1' + X_i\beta_1' + EDDUM_i\delta_1' + \varepsilon_i$$

$$\ln(w_i) = \alpha_2' + X_i\beta_2' + EDDUM_i\delta_2' + FSIZE_i\gamma' + \varepsilon_i$$

To test if firm size plays a significant role in the *change* in the return to education, one must compare the changes between the college education coefficient in 1979, 1988 and

1993 estimated with and without firm size. The extent to which the change in the employment distribution across firm size explains the increase in the measured return to a college education over the 1980s will be reflected by the degree to which the increase in the college education coefficient is lessened by controlling for firm size in the wage regression.[10]

Tables 8A shows the results for the manufacturing sector. Columns 1, 4 and 7 give the return to a college education without controlling for firm size. It has increased 20 percentage points from 40% in 1979 to 60% in 1993. Columns 2, 5 and 8 show the return to a college education after controlling for firm size. The measured increase is now only 18%, a difference of 2 percentage points. So while controlling for employment shifts across firm size tends to lower the increase in the return to education in manufacturing, it does not do so in a significant manner. Even though a larger fraction of high school educated workers were employed in smaller firms at the end of the 1980s relative to college workers, controlling for this shift does not seem to account for much of the change in the wage differential between college and high school workers. Or alternatively put, the increase in the return to a college education happened within firms of different sizes in manufacturing. To compare one can look at the same regression for services (Table 7B), and we see that controlling for firm size does not change the increase in the return to a college education significantly either (as we would expect, given that the employment shifts were not of the magnitude in services that they were in

10 The firm size categories are now grouped into 3 groups in order to increase the efficiency of the regressions when we interact firm size and education level. The groups are now less than 100, 100-999, and 1000+. The results are not highly sensitive to changing the groupings (e.g. putting 500-999 with the 1000+ category, and leaving 100-499 by itself).

manufacturing). When we look at more detailed services industries, we get the same results.

When we use wages plus health benefits as the dependent variable our results are almost identical to those in Table 8A and 8B, and thus the wage plus health benefit regressions are not reported. In summary though, the shift across firm size does not affect the increase in the college wage premium even when one includes health insurance as part of the compensation package.

Estimating Return to Education Variation by Firm Size Category

The previous test constrains the return to a college education over a high school education each year to be the same within firm size. Thus it controls for the effect of employment shifts across these firm sizes, but does not allow for differential price changes within firm size class. We make one last attempt to illuminate the role of employment shifts across firm size class in the college/high school wage differential by regressing log wages on the same independent variables but adding interactions between firm size and education level. This allows the yearly return to a college education over a high school education to vary over firm size class. We can then establish whether the college/high school wage differential varies by firm size class, and if the increases over the 1980s in the return to a college education over a high school education are similar by firm size class.

$$\ln(w_i) = \alpha'_3 + X_i\beta'_3 + EDDUM_i\delta'_3 + FSIZE_i\gamma'_3 + FSIZE * EDDUM\,\phi'_3 + \varepsilon_i$$

If it were true that large firms are constrained to rigid wage norms and must outsource semi-skilled workers, then everything else equal we should see the college-high school wage differential growing more in small firms than in large firms over the 1980s. If large firms are able to adjust wages down without outsourcing, than one could expect to see more similar increases in the return to a college education by firm size.

Table 8A columns 3, 6 and 9 report the regressions with interactions. The coefficient on the college education dummy is now the return to a college education over a high school education in a firm of less than 100 employees. Similarly, the firm size dummies are now the firm size return to a high school worker. The firm size-education interactions represent how the education returns vary for the larger firm size classes or alternatively how the firm size returns vary by educational level.

It is clear from the regressions, and of interest, that in manufacturing the return to a college degree over a high school one is larger in large firms in each cross section. In 1993, the college return was 17.5 percentage points higher in firms of 1000 or more employees than in firms of less than 100 employees. Table 8B shows that we do not see this pattern in services.

As far as *changes* over time, though, the return to a college education does not seem to be increasing more in small firms in manufacturing. The increases in the return to a college education are similar across firm size. This is also true in services.[11] So there is no strong evidence of a differential change of the high school-college wage gap across

11 The cells used to calculate the education-firm size interactions were of varying size, some becoming relatively small. This is reflected in the standard errors reported in the tables.

firm size, which is the final effect we test for in light of the downsizing stories.

3.8 Conclusions

We began this paper with three descriptions of the role of small firms in the economy. The newest of these descriptions painted small firms and the outsourcing of work to small firms as an important factor in the falling wages of semi-skilled workers and, by implication, in the rising return to higher education.

Our analysis for the period 1979-93 suggests this picture is substantially over-stated. To be sure, small firms have paid and continue to pay lower wages and fringes than do large firms. And it is true that the employment shifts in manufacturing mirror the above story. But this is as far as we can go to support the above argument. In services we have seen higher levels of employment in larger firms. And across both industrial sectors, the firm size-wage differential has not appreciably grown over these years.

Our shift share analysis shows that what has happened is something more prosaic: wages for men with a high school education or less have fallen by roughly equal percentage amounts across firms of all sizes. This, in turn, has meant that the college-high school earnings premium has grown similarly within firm size class. In short, falling wages of semi-skilled workers are not so much explained by the shift of workers from large paternal firms to smaller spot-market firms. Rather, the falling wages reflect the fact that whatever the firm size, semi-skilled workers are experiencing absolute and relative wage declines. We cannot point to the rise of employment in small firms as a lead cause of this circumstance.

TABLE 1A

Distribution of Workers with a HS Education or Less
by Firm Size
Manufacturing Sector, Men Ages 25-54

	25-34 Years Old			35-44 Years Old			45-54 Years Old			All Ages		
Firm Size, # of Employees	1979	1988	1993	1979	1988	1993	1979	1988	1993	1979	1988	1993
<25	8.8	12.3	13.6	8.6	9.1	14.6	6.2	7.9	9.0	7.9	10.0	12.8
25-99	12.3	15.0	17.4	11.5	10.8	14.7	10.4	10.5	11.2	11.4	12.3	14.8
100-499	13.2	21.1	19.9	10.7	17.1	18.0	15.1	21.8	12.2	13.0	20.0	17.3
500-999	5.9	5.3	8.8	6.7	5.8	6.0	3.4	4.5	9.9	5.3	5.2	8.0
1000+	59.8	46.4	40.3	62.6	57.5	46.9	64.9	55.3	57.8	62.4	52.6	47.1
Proportion of Total Workers	35.1	38.8	38.5	32.0	32.9	36.3	32.9	28.3	25.2	100	100	100

TABLE 1B

Distribution of Workers with at Least Some College
by Firm Size
Manufacturing Sector, Men Ages 25-54

	25-34 Years Old			35-44 Years Old			45-54 Years Old			All Ages		
Firm Size, # of Employees	1979	1988	1993	1979	1988	1993	1979	1988	1993	1979	1988	1993
<25	5.8	11.1	8.7	4.9	6.4	8.1	3.5	7.6	6.3	5.0	8.6	4.7
25-99	7.9	10.5	10.8	6.2	8.4	8.8	12.8	8.3	8.8	8.5	9.2	9.8
100-499	11.7	18.0	17.6	11.1	12.7	14.7	9.9	12.6	10.4	11.1	14.8	14.6
500-999	4.1	3.3	6.8	4.6	4.8	5.1	6.1	3.1	7.9	4.7	3.8	6.5
1000+	70.6	57.1	56.2	73.3	67.7	63.4	67.7	68.4	66.5	70.7	63.6	61.9
Proportion of Total Workers	49.1	40.2	32.1	28.1	38.5	42.9	22.8	21.3	25.0	100	100	100

TABLE 2A

Distribution of Workers with a HS Education or Less
by Firm Size
Services Sector, Men Ages 25-54

	25-34 Years Old			35-44 Years Old			45-54 Years Old			All Ages		
Firm Size, # of Employees	1979	1988	1993	1979	1988	1993	1979	1988	1993	1979	1988	1993
<25	35.5	28.7	35.6	38.7	26.9	36.8	27.1	26.8	37.3	33.8	27.7	36.4
25-99	19.0	14.8	14.4	13.9	12.6	13.3	16.7	13.4	12.5	16.7	13.8	13.5
100-499	11.1	13.5	13.1	10.2	17.8	10.1	12.0	13.0	9.5	11.1	14.6	11.6
500-999	3.3	3.8	4.2	3.4	2.8	3.9	3.9	3.1	3.3	3.6	3.3	3.8
1000+	31.2	39.2	32.7	33.8	39.9	35.9	40.2	43.7	37.5	34.9	40.5	35.1
Proportion of Total Workers	36.4	47.3	40.1	31.3	28.7	31.5	32.3	23.9	27.9	100	100	100

TABLE 2B

Distribution of Workers with at Least Some College
by Firm Size
Services Sector, Men Ages 25-54

	25-34 Years Old			35-44 Years Old			45-54 Years Old			All Ages		
Firm Size, # of Employees	1979	1988	1993	1979	1988	1993	1979	1988	1993	1979	1988	1993
<25	23.1	22.6	26.6	22.9	19.3	30.7	26.1	21.7	34.0	23.6	21.2	29.9
25-99	14.6	14.7	12.6	12.8	13.8	11.6	10.1	10.9	9.1	13.3	13.6	11.4
100-499	14.8	17.0	10.5	16.1	18.1	13.9	13.4	18.0	12.3	14.9	17.6	12.2
500-999	5.9	3.5	5.6	6.9	4.9	3.7	6.1	5.1	4.7	6.3	4.3	4.7
1000+	41.5	42.2	44.8	41.3	44.0	40.1	44.3	44.4	39.9	42.0	43.3	41.8
Proportion of Total Workers	51.9	42.0	37.9	29.6	38.5	37.8	18.5	18.2	24.3	100	100	100

TABLE 3A

Percentage of Workers with Health Insurance on the Job
by Firm Size and Education
Manufacturing Sector, Men 24-55

	Firm Size, Number of Employees					
	<25	25-99	100-499	500-999	1000+	All
1979						
HS and less	61.9	82.2	91.3	96.4	97.8	92.2
At least some college	75.9	84.9	97.9	94.8	97.1	95.0
All Education Levels	66.3	83.1	93.9	95.7	97.5	93.4
1988						
HS and less	64.3	77.4	89.7	88.7	96.4	89.0
At least some college	73.8	86.9	93.5	94.2	96.8	93.3
All Education Levels	68.2	80.9	91.1	90.7	96.5	90.9
1993						
HS and less	50.4	69.9	82.6	85.9	94.8	82.8
At least some college	62.6	89.4	94.2	88.9	94.5	91.3
All education levels	55.0	78.0	88.0	87.2	94.6	87.1

TABLE 3B

Percentage of Workers with Health Insurance on the Job
by Firm Size and Education
Services Sector, Men 24-55

	Firm Size, Number of Employees					
	<25	25-99	100-499	500-999	1000+	All
1979						
HS and less	44.8	80.6	86.9	96.1	92.2	73.7
At least some college	58.6	79.9	89.1	90.0	92.6	82.1
All Education Levels	51.8	80.2	88.3	91.9	92.5	78.7
1988						
HS and less	44.0	68.6	75.9	72.5	84.5	69.3
At least some college	61.1	85.5	85.6	90.7	90.4	82.77
All Education Levels	53.1	78.7	82.0	84.6	88.2	77.4
1993						
HS and less	25.1	63.0	68.4	86.3	80.9	57.0
At least some college	41.6	74.3	81.3	85.0	86.9	71.1
All education levels	34.7	69.5	76.8	85.4	84.9	65.8

TABLE 4A

Dependent Variable: Log Wages in 1993 dollars*

Men, 24-55, with High School or Less Education

	Manufacturing			Services		
	1979	**1988**	**1993**	**1979**	**1988**	**1993**
HS diploma	.227	.189	.300	.205	.221	.249
	(.020)	(.024)	(.028)	(.024)	(.025)	(.027)
Experience	.023	.013	.035	.024	.027	.028
	(.005)	(.006)	(.007)	(.005)	(.005)	(.006)
Exp-Squared/100	-.033	-.011	-.054	-.043	-.042	-.047
	(.010)	(.012)	(.015)	(.011)	(.012)	(.012)
Firm Size						
25-99	-.040	.116	-.007	.095	.044	.105
	(.042)	(.044)	(.047)	(.032)	(.033)	(.032)
100-499	-.041	.122	.061	.185	.074	.045
	(.041)	(.041)	(.046)	(.037)	(.032)	(.035)
500-999	.059	.228	-.009	.168	.043	.149
	(.052)	(.055)	(.054)	(.057)	(.057)	(.052)
1000+	.161	.214	.161	.237	.180	.178
	(.036)	(.038)	(.041)	(.028)	(.027)	(.028)
Adj. R-Square	.233	.166	.256	.230	.221	.235
# Observation	1240	1292	973	1455	1794	1723

*Each regression includes controls for race, union and marital status.

TABLE 4B

Dependent Variable: Log Wages in 1993 dollars*

Men, 24-55, at Least Some College

	Manufacturing			Services		
	1979	**1988**	**1993**	**1979**	**1988**	**1993**
College degree	.246	.242	.343	.182	.296	.328
	(.024)	(.023)	(.026)	(.020)	(.019)	(.018)
Experience	.028	.028	.029	.037	.025	.043
	(.005)	(.006)	(.006)	(.005)	(.005)	(.005)
Exp-Squared/100	-.042	-.044	-.004	-.068	-.031	-.083
	(.015)	(.015)	(.017)	(.013)	(.012)	(.013)
Firm Size						
25-99	.047	.116	.094	.109	.103	.100
	(.069)	(.057)	(.067)	(.034)	(.033)	(.033)
100-499	.094	.162	.109	.220	.161	.134
	(.065)	(.052)	(.063)	(.034)	(.031)	(.032)
500-999	.148	.118	.088	.213	.167	.128
	(.077)	(.071)	(.072)	(.044)	(.047)	(.043)
1000+	.213	.242	.302	.307	.249	.212
	(.058)	(.046)	(.057)	(.027)	(.027)	(.025)
Adj. R-Squared	.228	.256	.288	.185	.194	.210
# Observations	911	1032	1032	2069	2565	2867

*Each regression includes controls for race, union and marital status.

TABLE 5A

Dependent Variable: Log Wage plus Health Insurance in 1993 dollars*

Men, 24-55, with High School or Less Education

	Manufacturing			Services		
	1979	**1988**	**1993**	**1979**	**1988**	**1993**
HS diploma	.219	.175	.297	.202	.221	.261
	(.019)	(.022)	(.027)	(.024)	(.024)	(.026)
Experience	.022	.012	.029	.023	.025	.028
	(.004)	(.005)	(.006)	(.005)	(.005)	(.006)
Exp-Squared/100	-.032	-.012	-.043	-.041	-.004	-.047
	(.009)	(.011)	(.014)	(.011)	(.012)	(.012)
Firm Size						
25-99	-.018	.133	.020	.114	.071	.149
	(.041)	(.041)	(.045)	(.031)	(.032)	(.032)
100-499	-.014	.155	.107	.203	.103	.098
	(.040)	(.038)	(.043)	(.036)	(.032)	(.035)
500-999	.085	.256	.057	.195	.071	.223
	(.049)	(.051)	(.051)	(.057)	(.056)	(.052)
1000+	.180	.244	.210	.255	.208	.234
	(.034)	(.035)	(.039)	(.028)	(.027)	(.028)
Adj. R-Squared	.242	.181	.288	.242	.235	.262
# Observations	1240	1292	973	1455	1794	1723

*Each regression includes controls for race, union and marital status.

TABLE 5B

Dependent Variable: Log Wage plus Health Insurance in 1993 dollars*

Men, 24-55, at Least Some College

	Manufacturing			Services		
	1979	**1988**	**1993**	**1979**	**1988**	**1993**
College degree	.235	.223	.316	.179	.289	.315
	(.023)	(.021)	(.024)	(.020)	(.018)	(.017)
Experience	.027	.024	.027	.037	.024	.044
	(.005)	(.005)	(.006)	(.005)	(.004)	(.004)
Exp-Squared/100	-.041	-.038	-.040	-.068	-.027	-.087
	(.014)	(.014)	(.016)	(.013)	(.012)	(.012)
Firm size						
25-99	.053	.130	.125	.116	.118	.120
	(.068)	(.052)	(.062)	(.034)	(.031)	(.032)
100-499	.108	.177	.147	.227	.175	.162
	(.062)	(.048)	(.058)	(.033)	(.030)	(.031)
500-999	.155	.146	.121	.219	.184	.156
	(.073)	(.065)	(.067)	(.043)	(.045)	(.042)
1000+	.219	.257	.320	.312	.261	.239
	(.055)	(.043)	(.053)	(.027)	(.025)	(.024)
Adj. R-Squared	.232	.264	.287	.191	.203	.218
# Observations	911	1032	1032	2069	2565	2867

*Each regression includes controls for race, union and marital status.

Table 6
Decomposition of Wage Changes in 1979 to 1993
Men 25-34 Years Old by Education Group:
Men with a High School Education or Less and Men with at Least Some College

A. Percentage Change in Wages-Plus-Health Insurance by Firm Size, 1979 to 1993

	HS or Less		At Least Some College	
Firm Size	**Manufacturing**	**Services**	**Manufacturing**	**Services**
< 25	0.48%	-15.77%	-5.53%	0.54%
25-99	-26.52%	-11.30%	-2.48%	2.20%
99-499	-9.61%	-25.35%	4.43%	-7.98%
499-1000	-19.47%	-12.13%	-17.41%	0.68%
>1,000	-9.94%	-21.93%	3.41%	-9.12%
All Firm Sizes	-15.48%	-17.50%	-0.61%	-4.53%

B. Decomposition of the Change in Wages-Plus-Health Insurance by Firm Size

Manufacturing

	HS or Less		At Least Some College	
	1979	**1993**	**1979**	**1993**
Wages + H.I.	$14.11	$11.93	$17.64	$17.53
% change 1979-93		-15.48%		-0.61%
Decomposition #1				
(1993 Wages, 1979 FS)	**Dollars**	**Percent**	**Dollars**	**Percent**
Total Wage Change	($2.19)	100.00%	($0.11)	100.00%
Within Firm	($1.64)	75.27%	$0.32	-303.23%
Across Firm	($0.39)	17.76%	($0.43)	404.69%
Interaction	($0.15)	6.97%	$0.00	-1.47%
Decomposition #2				
(1979 Wages, 1993 FS)	**Dollars**	**Percent**	**Dollars**	**Percent**
Total Wage Change	($2.19)	100.00%	($0.11)	100.00%
Within Firm	($1.65)	75.29%	$0.33	-310.74%
Across Firm	($0.77)	35.29%	($0.81)	761.04%
Interaction	$0.23	-10.59%	$0.37	-350.30%

Services

	HS or Less		At Least Some College	
	1979	**1993**	**1979**	**1993**
Wages + H.I.	$12.84	$10.59	$15.93	$15.20
% change 1979-93		-17.50%		-4.53%
Decomposition #1				
(1993 Wages, 1979 FS)	**Dollars**	**Percent**	**Dollars**	**Percent**
Total Wage Change	($2.25)	100.00%	($0.72)	100.00%
Within Firm	($2.36)	105.12%	($0.81)	112.42%
Across Firm	$0.12	-5.12%	$0.09	-12.42%
Interaction	($0.00)	0.00%	$0.00	0.00%
Decomposition #2				
(1979 Wages, 1993 FS)	**Dollars**	**Percent**	**Dollars**	**Percent**
Total Wage Change	($2.25)	100.00%	($0.72)	100.00%
Within Firm	($2.48)	110.29%	($0.86)	119.49%
Across Firm	$0.26	-11.77%	$0.29	-40.01%
Interaction	($0.03)	1.48%	($0.15)	20.52%

Table 7
Decomposition of Wage Changes in 1979 to 1993
Men 35-44 Years Old by Education Group:
Men with a High School Education or Less and Men with at Least Some College

A. Percentage Change in Wages-Plus-Health Insurance by Firm Size, 1979 to 1993

	HS or Less		At Least Some College	
Firm Size	**Manufacturing**	**Services**	**Manufacturing**	**Services**
< 25	-20.51%	-17.45%	-13.98%	6.23%
25-99	-1.98%	-8.78%	2.83%	0.92%
99-499	3.48%	-28.92%	-9.22%	0.00%
499-1000	-25.17%	-31.76%	-17.93%	-11.31%
>1,000	-7.21%	-9.39%	2.96%	-4.30%
All Firm Sizes	-9.17%	-12.32%	-1.74%	-1.83%

B. Decomposition of the Change in Wages-Plus-Health Insurance by Firm Size

Manufacturing

	HS or Less		At Least Some College	
	1979	**1993**	**1979**	**1993**
Wages + H.I.	$15.80	$14.35	$21.36	$20.99
% change 1979-93		-9.17%		-1.74%
Decomposition #1				
(1993 Wages, 1979 FS)	**Dollars**	**Percent**	**Dollars**	**Percent**
Total Wage Change	($1.45)	100.00%	($0.37)	100.00%
Within Firm	($1.23)	84.73%	$0.04	-10.20%
Across Firm	($0.22)	15.08%	($0.41)	110.13%
Interaction	($0.00)	0.19%	($0.00)	0.07%
Decomposition #2				
(1979 Wages, 1993 FS)	**Dollars**	**Percent**	**Dollars**	**Percent**
Total Wage Change	($1.45)	100.00%	($0.37)	100.00%
Within Firm	($1.12)	77.50%	($0.02)	5.44%
Across Firm	($0.49)	33.65%	($1.01)	270.56%
Interaction	$0.16	-11.15%	$0.66	-176.00%

Services

	HS or Less		At Least Some College	
	1979	**1993**	**1979**	**1993**
Wages + H.I.	$14.48	$12.70	$19.15	$18.80
% change 1979-93		-12.32%		-1.83%
Decomposition #1				
(1993 Wages, 1979 FS)	**Dollars**	**Percent**	**Dollars**	**Percent**
Total Wage Change	($1.78)	100.00%	($0.35)	100.00%
Within Firm	($2.17)	121.56%	($0.41)	117.59%
Across Firm	$0.38	-21.56%	$0.06	-17.52%
Interaction	($0.00)	0.00%	$0.00	-0.07%
Decomposition #2				
(1979 Wages, 1993 FS)	**Dollars**	**Percent**	**Dollars**	**Percent**
Total Wage Change	($1.78)	100.00%	($0.35)	100.00%
Within Firm	($2.19)	122.74%	($0.42)	121.19%
Across Firm	($0.06)	3.49%	($0.12)	34.98%
Interaction	$0.47	-26.24%	$0.20	-56.17%

TABLE 8A

Dependent Variable: Log Wage in 1993 dollars

Manufacturing Sector, Men 24-55

		1979			1988			1993	
Less than HS	-.251	-.232	-.346	-.196	-.183	-.205	-.334	-.304	-.311
	(.021)	(.021)	(.044)	(.024)	(.024)	(.047)	(.029)	(.028)	(.050)
Some College	.129	.115	.148	.148	.139	.176	.196	.178	.240
	(.020)	(.019)	(.051)	(.021)	(.020)	(.046)	(.022)	(.021)	(.050)
College plus	.404	.370	.233	.427	.398	.312	.600	.547	.421
	(.021)	(.021)	(.053)	(.021)	(.021)	(.050)	(.023)	(.023)	(.055)
Firm Size									
100-999		.038	-.014		.084	.074		.040	.038
		(.025)	(.040)		(.023)	(.035)		(.026)	(.039)
1000+		.184	.127		.161	.144		.207	.187
		(.021)	(.032)		(.021)	(.032)		(.023)	(.035)
Interactions									
<HS									
100-999			.074			.024			.042
			(.062)			(.066)			(.074)
1000+			.168			.030			-.021
			(.050)			(.056)			(.066)
Some college									
100-999			.013			-.050			-.053
			(.068)			(.063)			(.065)
1000+			-.046			-.043			-.080
			(.056)			(.053)			(.057)
College plus									
100-999			.170			.089			.056
			(.072)			(.066)			(.072)
1000+			.156			.106			.175
			(.058)			(.056)			(.061)
Adj. R-Squared	.276	.312	.318	.269	.288	.288	.387	.419	.423
# Observations	2151	2151	2151	2324	2324	2324	2005	2005	2005

*Each regression includes controls for race, union, experience, experience squared and marital status.

TABLE 8B

Dependent Variable: Log Wage in 1993 dollars

Services Sector, Men 24-55

		1979			1988			1993	
Less than HS	-.256	-.214	-.209	-.266	-.238	-.266	-.282	-.253	-.283
	(.025)	(.025)	(.034)	(.026)	(.026)	(.037)	(.028)	(.028)	(.039)
Some College	.115	.091	.110	.146	.132	.121	.191	.178	.136
	(.021)	(.021)	(.032)	(.019)	(.018)	(.032)	(.018)	(.018)	(.031)
College plus	.309	.269	.273	.446	.429	.433	.526	.510	.528
	(.020)	(.020)	(.031)	(.017)	(.017)	(.029)	(.018)	(.017)	(.030)
Firm Size									
100-999		.162	.176		.091	.053		.066	.028
		(.021)	(.040)		(.019)	(.034)		(.020)	(.035)
1000+		.245	.255		.192	.199		.158	.153
		(.017)	(.031)		(.016)	(.027)		(.016)	(.028)
Interactions									
<HS									
100-999			-.013			.073			.057
			(.069)			(.067)			(.078)
1000+			-.005			.051			.731
			(.053)			(.057)			(.065)
Some college									
100-999			-.043			.012			.084
			(.060)			(.052)			(.052)
1000+			-.026			.018			.053
			(.045)			(.042)			(.040)
College plus									
100-999			-.008			.066			.022
			(.052)			(.045)			(.049)
1000+			-.008			-.039			-.042
			(.042)			(.038)			(.039)
Adj. R-Squared	.181	.227	.223	.248	.272	.272	.282	.297	.297
# Observations	3524	3524	3524	4359	4359	4359	4590	4590	4590

*Each regression includes controls for race, union, experience, experience squared, and marital status.

Data Appendix

The data used in this paper comes from three May supplements to the Current Population Survey (CPS) for survey years 1979, 1988 and 1993. In these years the May Survey of Employee Benefits contains information on firm and establishment size and group health insurance on the job. Questions from the supplement survey were asked of all persons employed for pay (as identified during the CPS interview) in one-half of the CPS sample. The May supplement is then matched with the March income supplement and the June CPS files by the BLS, in order to obtain detailed individual data.

We restrict our study to men who answered the benefits questionnaire, aged 24-55, with positive earnings. We do not include the self-employed.

Definition and Source

FIRMSIZE

Firm size is reported as the result of three questions. The first asks about the size of the establishment where the worker is employed. The second question asks if there are multiple establishments. If the answer to the second is yes, then the third asks what the firm size is. Establishment size categories vary greatly in the different samples, and thus are not comparable over time. Using the finest firm size categories that are available for comparison in all samples, we have five firm size categories: <25, 25-99, 100-499, 500-999, and 1000+.

LNWAGE

Hourly wages are constructed as earnings per week divided by usual hours per week. We then put nominal wages into real 1993 dollars using the CPI. Wages are additionally adjusted for topcoding and outliers ($1.50 < w < $250.00) are dropped.

GROUP HEALTH INSURANCE COVERAGE

A question in all three benefits supplement asks if the employee is covered by group health insurance on the job. An affirmative answer to this question was the criteria for being counted as receiving group health insurance. In 1988 and 1993 the supplement additionally asks if health insurance is offered on the job. So in 1988 and 1993, anyone who answered yes to being covered by health insurance was also checked to make sure they answered yes to health insurance being offered on the job.

LNWAGEHI

Yearly estimates of the value of receiving group health insurance on the job are available in the yearly "Employee Benefits Report" published by the US Chamber of Commerce for 1979, 1988 and 1993. We construct an hourly measure of the wage plus health benefits, by adding the value of 'health benefits as cents per payroll hour' to a worker's hourly wage if that worker receives group health insurance on the job. We use the value of health insurance in manufacturing and services separately, in order to include the health benefit coverage rates within these two sectors to the wage. The value of health insurance is not available by firm-size, thus this measure may still be an underestimation of the value of fringes as larger firms generally give more generous benefits than smaller firms.

EDUCATION

Four education groups, < high school (less than 12 years), high school, some college (less than 16 years), college plus. The education question changed in the 1990 census from a linear years of schooling to a grouped question. Hank Farber and Alan Krueger have been generous enough to share their methods for constructing comparable education variables for the pre and post 1990 data. In the 1990 CPS both types of schooling question were asked. From this dataset for each group of schooling years, the average linear year of schooling is calculated for men and women. We then make a comparable linear series for 1990 by assigning the average linear year of schooling for that schooling group. The relationship between the linear education variable and the grouping question in the 1990 Census implies the same type of grouping method that we have done with the linear school variable in the past (and as described above).

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