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Abstract

Married men earn more than unmarried men. Previous research suggests that marriage itself “causes” some of the difference, but includes few men who fathered children out of wedlock. This paper asks whether increasing marriage (and possibly cohabitation) following a non-marital birth is likely to increase fathers’ earnings and labor supply. The analyses are based on a new birth cohort study – the Fragile Families and Child Wellbeing Study – which follows unmarried parents for the first five years after their child’s birth. Results provide some support for the idea that increasing marriage will lead to increased fathers’ earnings.

INTRODUCTION

Non-marital childbearing has increased dramatically in the United States during the past several decades, rising from six percent of all births in 1960 to 37 percent of all births in 2004. In response to these trends, Congress has passed legislation to strengthen child support enforcement, require mothers receiving welfare to work, encourage unmarried fathers to become more involved in the lives of their children, and most recently to promote marriage (McLanahan 2007; Garfinkel 2001).

One reason for the concern about non-marital child-bearing is that married men earn more than unmarried men. Whereas a large body of empirical research indicates that married men earn more than men who never marry or divorce and a smaller body of research suggests that marriage actually causes men's earnings to increase, existing studies rarely include men who father children outside marriage. Thus, we don't know whether the findings from this literature can be extended to unmarried fathers.

More generally, we know surprisingly little about men who father children outside marriage. The lack of information is due in part to the fact that a substantial portion of unmarried fathers are missing from our nationally representative surveys either because they are incarcerated or loosely connected to households or because they do not acknowledge their paternity status (Rendall et al. 1999). The 'missing-fathers problem' is especially acute for men who father children outside marriage and who live apart from their children (Garfinkel et al. 1998).

To address the question of whether marriage would increase unwed fathers' earnings, this paper uses data from a longitudinal survey designed explicitly to answer questions about the capabilities and relationships of unmarried parents. The Fragile Families and Child Wellbeing

Study (FFCWS) follows a birth cohort of nearly 5000 children, including 3600 births to unmarried couples. Mothers and fathers were interviewed at the hospital shortly after the birth of their child, and re-interviewed when their child was one, three and five years old. These data are the first to provide longitudinal information on a nationally representative sample of unmarried fathers (Reichman et al. 2001).

WHY WOULD MARRIAGE INCREASE MEN'S EARNINGS?

Social science theory provides several arguments for why marriage might increase men's earnings. Economists, following Becker (1973), focus on gender role specialization. Marriage encourages couples to specialize in market work and home production by providing financial protection to the spouse who devotes time to home production (usually the wife). In turn, specialization leads to the accumulation of human capital and makes both partners more productive. (Mincer 1962; Becker 1965, 1981).

A second, sociological argument emphasizes social norms. According to Nock, marriage provides men with a "script" backed by law, custom, and religious practice which encourages them to work long hours, show loyalty to their employers, and make personal sacrifices to attain organizational objectives (Nock 1998a). These practices make married men more productive and as a consequence they are rewarded in the form of higher wage rates. A third explanation is that employers may discriminate in favor of married men in their hiring and promotion decisions in anticipation of their greater loyalty and work effort. A fourth explanation focuses on social networks. Coleman (1988) argues that marriage exposes men and women to a network of friends and relatives who are willing to help with financial needs, including information and referrals about jobs or better paying jobs.

The Selection Problem

Whereas the first two arguments described above imply that marriage causes men to work harder and to be more productive, the third and fourth are at the very least ambiguous about whether there are productivity gains. An alternative argument is that men with higher earnings and better economic prospects are more likely to marry, and remain married, and less likely to divorce. If “selection” of harder working, more productive men into marriage is all that is occurring, then the association between marital status and men’s earnings is due to differences in the characteristics of people who marry and stay married rather than to the institution of marriage.

A large literature shows that marriage is associated with positive outcomes, including earnings and both physical and mental health (Waite 1995). Several researchers have attempted to test for whether selection alone is responsible for the positive association between marriage and men’s earnings. Using longitudinal data and fixed effects models, Korenman and Neumark (1991) show that changes in marital status are associated with changes in men’s earnings, which they interpret as evidence that marriage causes increases in earnings. Yet, it is possible that the men who married changed their behaviors coincident with rather than because of marriage—that is, they “settled down”, worked more, and got married. Using the same data but a somewhat younger sample, Cornwall and Rupert (1997) find that selection accounts for some of the marriage advantage. These researchers also find that duration of marriage is not associated with higher earnings and that men who eventually marry are more productive before they marry which the authors interpret as evidence in favor of selection. Other researchers have argued that men who marry involuntarily, such as after a non-marital conception, compared to men who marry voluntarily comprise a ‘natural experiment’ (Ginther and Zavodny 2001). Finding no difference in the benefits of marriage for these two groups of men, they conclude that selection is

not the source of earnings differences. Finally, Nock (1998b) uses sibling data to estimate the benefits of marriage and concludes that the effects are mostly causal.

The Generalizing Problem

Even if selection were not a problem, there are reasons to believe that the findings from previous research may not generalize to unmarried fathers. Unmarried fathers come disproportionately from disadvantaged populations including racial and ethnic minorities and less educated men. They are also younger than married fathers. Gender role specialization has always been less common among minority and working class couples (Goldin 1990) and, given their ages and occupations, the returns to specialization are likely to be lower for these men. Similarly, social norms about the provider role are likely to be less powerful among minority and working class men. (Nock 1998b). For these reasons the benefits of marriage may be weaker for men who father children outside marriage. On the other hand, Laub, Nagin, and Sampson (1998) find that marriage “causes” men to desist from crime which suggests that marriage could have positive effects on earnings for very disadvantaged men.

METHODS

Sample

The FFCWS is based on a stratified, multi-stage, probability sample of 4,898 children born between 1998 and 2000 in large U.S. cities, including 3,712 children born to unmarried parents and 1,186 children born to married parents. When weighted, the data are representative of births in each of 20 cities; they also are representative of births in all cities with populations over 200,000. Only 16 of the 20 cities are in the nationally representative sample. The other four

cities were selected because of their high concentrations of poverty (Reichman et al. 2001). To maximize sample size and power, we use data from all 20 cities and use city weights.

In the Fragile Families study, mothers were interviewed in the hospital shortly after giving birth, and fathers were interviewed either at the hospital or as soon as possible thereafter. Proxy information about fathers was collected from mothers in order to learn something about the men who could not be located or who refused to participate in the study. This approach resulted in high response rates among unmarried fathers; 60 percent of fathers completed the baseline interview at the hospital and another 15 percent completed the interview outside the hospital. An additional ten percent of the fathers participated in at least one of the follow-up interviews when the focal child was ages one, three, and five. Overall, 42 percent of unmarried fathers participated in every wave of data collection and 86 percent participated in at least one wave. The numbers for married fathers were 63 and 96, respectively. Where possible, this analysis uses mothers' reports about fathers' characteristics to impute missing data when data from fathers are not available.

Measures

Fathers' annual earnings, annual hours worked, and hourly wage rates are examined.

Relationship status is measured by a set of dummy variables summarizing fathers' relationship status during the first five years after birth: (1) continuously married, (2) continuously cohabiting, (3) continuously single, (4) exit marriage, (5) exit cohabitation, (6) enter marriage from cohabitation, (7) enter marriage from single, (8) enter cohabitation, and (9) more than one change in status. In addition to these time-invariant measures, we construct annual indicators of whether a particular change occurred each year.

Control variables include fathers' age (continuous), education (less than high school, high school only, some college and a college degree or more), race-ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic and other), whether U.S. born, and total fertility. This set of control variables is fixed and measured at the time of birth. We also measure whether a father has a mental or physical health problem or a substance abuse problem at baseline using father and mother reports, whether he has ever been incarcerated reported by either the father or mother at year 1, and mother's ratings of his impulsive and anti-social behavior reported at year 5. This second set of variables is not measured in most surveys. Ideally, all of the measures used would have been measured at baseline, but this was not the case. While the measures of impulsivity and anti-social behavior are conceptually supposed to be permanent traits and incarceration between birth and the first year interview is likely to account for only a small portion of the ever incarcerated population, the inclusion of these variables could result in endogeneity bias. However, the results do not differ materially if they are excluded.

We do not differentiate whether a father enters a union with the biological mother or a new partner. Nearly all of the marriages are between the focal child's biological parents. Consequently there are too few marriages to a new partner to analyze separately. Furthermore, while from the focal child's perspective this distinction is likely to be important, the theories reviewed here do not suggest that a co-residential union with the child's biological mother would have a different effect on the father's earning trajectory than would a union with a new partner. While initial analyses distinguish between entering marriage from cohabitation and entering marriage from single, most of the analyses collapse these two groups because the differences between them were not significant.

Analytic Strategy

We use latent growth models to estimate fathers' earnings at birth and earning trajectories for eight groups of fathers, adjusting for basic demographic characteristics. Adjusting for these characteristics reduces but does not eliminate differences between groups of fathers. Thus in the next step we adjust for an additional set of characteristics that are not observed in most other data sets (see above). Because some of these characteristics may be a consequence rather than a cause of fathers' relationship status, the second adjustment may overcorrect for differences between fathers. Even with the second adjustment, however, statistically significant differences between groups of fathers remain.

While marriage is associated with higher earnings even after controlling for observed differences between groups of fathers, it is possible that there are unmeasured differences between the two groups. We conduct two additional analyses to address this issue. First we use latent growth models to examine whether changes in fathers' earnings (hours worked and wages) are associated with changes in relationships status. Second, we use fixed effects models to examine the pre- and post-transition earnings (hours worked and wages) of unmarried fathers who marry or cohabit after birth. The fixed effects model adjusts for unmeasured differences between fathers that do not change over time. The latent growth and fixed effects models are described in more detail below.

Latent Growth Models. Primary analyses use latent growth curve modeling to capture the dynamic aspect of family structure on trajectories of father's annual earnings, annual hours worked, and hourly wage rates (Bollen and Curran 2006). Each father's trajectory is characterized by a unique intercept (α), linear, time-dependent slope (β), and some measurement error (ϵ). Thus, the level one equation is as follows:

$$y_{it} = \alpha_i + \beta_i t + \varepsilon_{it} \quad (\text{Equation 1})$$

Each y_{it} is an observed measure of earnings, wage rates, or hours (i.e., earnings at the baseline, one-year, three-year, and five-year interviews). This equation represents within-individual (i) change over time (t).

Time-varying family structure. In order to incorporate the time-varying covariates representing changes in family structure into the model, Equation 1 is modified as follows:

$$y_{it} = \alpha_i + \beta_i t + \gamma_t w_{it} + \varepsilon_{it} \quad (\text{Equation 2})$$

The addition of the “ $\gamma_t w_{it}$ ” term represents the effect of each time (t) family structure variable on the outcome in question at time (t) for each i th individual. In other words, each $\gamma_t w_{it}$ represents a perturbation from the latent earnings trajectory caused by a change in family structure at a specific point in time. By regressing each $\gamma_t w_{it}$ on subsequent measures of earnings (i.e., y_{it+1}) the analysis is also able to assess the lagged effects of time-specific transitions on multiple observations of earnings, wage rates, and hours. Note that this model specification estimates the effect of the family structure variables on earnings, hours, and wage rates controlling for a father’s underlying latent trajectory.

The second level of the growth model allows the random intercepts (α_i) and slopes (β_i) defined above to be a function of variables that change across individuals (i) but do not change across time (t). This represents between-individual change over time. The level two equations are as follows:

$$\alpha_i = \alpha_0 + \alpha_1 X_{i1} + \alpha_2 X_{i2} + \dots + \alpha_k X_{ik} + u_i \quad (\text{Equation 3})$$

$$\beta_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_k X_{ik} + v_i \quad (\text{Equation 4})$$

For the purposes of this paper, the x's are the controls as well as time-invariant versions of family structure change. The intercept and slope for each outcome are directly regressed on these characteristics to assess for potential group differences in the means of the growth factors (i.e., intercepts and slopes).

All growth models are estimated using Mplus, Version 4.1 (Muthén and Muthén 2006) using full information maximum likelihood (FIML) which incorporates respondents with missing data. Specifically, fathers with incomplete data contribute only to those portions of the model where data are available.

Fixed Effect Models. In addition to the growth models outlined above, fixed effect models attempt to assess the association between family structure change and fathers' earnings, wage rates, and hours net of unmeasured, stable characteristics. Here we focus specifically on fathers who are unmarried and not in co-residential relationships at the time of the birth but who later marry or cohabit, allowing us to focus on entry into marriage and cohabitation.

The classic fixed effect model assumes that differences across units, in this case individual fathers, can be captured in differences in the constant term. In Equation 5, each $i\alpha$ is an unknown parameter to be estimated, y_i and X_i are T observations for ith unit/individual and ε_i is a vector of error disturbances:

$$y_i = i\alpha + X_i\beta + \varepsilon_i \quad (\text{Equation 5})$$

This is equivalent to giving each father his own dummy indicator and subsequent intercept, which in cases of small sample sizes may be easily estimated. At large sample sizes however, this process becomes unwieldy and the model can be rewritten as:

$$y_i = \alpha_0 + X_i\beta + v_i + \varepsilon_i \quad (\text{Equation 6})$$

where the estimated unit specific term is removed from the intercept and becomes ν_i . This term may vary across, but not within fathers. In this specification, a common intercept exists for all units/individuals. We are primarily interested in estimating β , which in this case refers to movement into marriage or cohabitation. To do so, the estimation procedure assumes the following to be true:

$$(y_i - \bar{y}_i) = (x_i - \bar{x}_i)\beta + (\varepsilon_i - \bar{\varepsilon}_i) \quad (\text{Equation 7})$$

This procedure is known as the fixed effects estimator. By differencing the dependent and independent variables, and the error, we are able to control for a single, unique fixed effect belonging to each individual that captures the unchanging characteristics of that individual.

The samples for the fixed effects estimates are limited to observations with no missing data on earnings, hours worked, and wage rates. In other models, complete case samples and samples using FIML estimation yield similar results and we report the latter because sample sizes and power are greater. For change models, utilizing fathers with incomplete data introduces serious extra errors into the data and is therefore inappropriate.

RESULTS

Table 1 reports information on the earnings, wage rates, hours worked, and other characteristics of fathers who were married and unmarried at the time of their child's birth. Married fathers' annual earnings are more than twice as high as those of unmarried fathers at birth and up to five years later. Similarly, the wage rates of married fathers are more than one and half times higher than those of unmarried fathers at birth and increase over time. Finally, married fathers work about 400 more hours per year than unmarried fathers. Although unmarried fathers increase their work hours by 200 hours, the wage gap with married fathers widens over time.

Table 1 shows that unmarried fathers, on average, are very different from married fathers in terms of their basic demographic and human capital characteristics. They are younger, less educated and less likely to be white. They also have more mental health problems and higher rates of drug and alcohol use, anti-social behavior, impulsivity and incarceration. The marital status difference in incarceration is especially striking and underscores the fact that unmarried fathers have been disproportionately affected by changes in penal policy since the early 1980s. How much of the differences in earnings, between married and unmarried fathers are due to these other stark differences between the two populations is examined below.

Table 2 presents data on fathers' relationship status at birth and over the first five years following birth. For fathers who enter or exit a relationship, table 2 also reports information on the year in which the transition occurred. About a quarter of the fathers in our sample are married at birth. The low proportion of married fathers is due to the fact that unmarried fathers were over-sampled in the Fragile Families survey. About half of unmarried fathers are cohabiting at birth, and another third are romantically involved with their child's mother but not cohabiting. Less than 20 percent of fathers are not in a romantic relationship with their child's mother at birth.

The next set of numbers in the table reports the proportion of fathers who fall into each of the summary relationship groups. Fathers who are married at birth have the fewest transitions—21% of the sample is continuously married, whereas only 4% move from marriage to single. Cohabitation is much less stable. Only 8% of fathers are continuously cohabiting, whereas 12% move from cohabitation to singlehood, and 7% move from cohabitation to marriage. Some cohabiting fathers also have multiple transitions. Similarly, while 13% of fathers remain

continuously single, roughly 7% enter marriage, and another 6% enter cohabitation. Finally, 18% of fathers experience multiple transitions.

Figure 1 presents earnings levels and earnings growth for seven groups of fathers, controlling for differences in demographic characteristics. In panel A the earnings differences are purged of differences in age, education, race/ethnicity, and nativity status, while in panel B, they also are purged of differences in mental and physical health, impulsivity and anti-social behavior, and incarceration history [Results for the full model are reported in Appendix A, Model 1.]

Several findings in Figure 1 are noteworthy. First, a large part of the difference between the earnings of married and unmarried fathers is due to differences in demographic characteristics. For example, at baseline (reflected in the intercepts) the difference between the continuously married and continuously single fathers is about \$10,000 in panel A and \$8,000 in panel B. By way of comparison, in Table 1, the difference in earnings between married and unmarried fathers at baseline is \$18,000.

Second, even after controlling for all differences in observable characteristics—including those variables that may overcorrect—fathers who are stably married have the highest earnings, unmarried fathers who never marry or cohabit have the lowest earnings, and fathers who move into or out of marriage or cohabitation fall in-between. Note that fathers who enter marriage earn no more at birth than fathers who are continuously cohabiting, but they have the highest growth in earnings of any group. Five years after birth, only continuously married fathers have higher earnings than unmarried fathers who marry after birth. Finally note that fathers who divorce not only earn substantially less than fathers who are continuously married, but they also experience

the least growth in earnings. (Indeed, when we estimate this model in logs, as reported in Appendix B, the exit marriage group, experiences no growth in earnings.)

While Figure 1 indicates that marriage is associated with higher earnings, even after controlling for observed differences between the married and unmarried, it is possible that there are unmeasured differences between the groups. Table 3 presents results from an additional set of analyses designed to address this issue. Here we narrow our focus to the differences in earnings between fathers who remain unmarried and fathers who enter marriage and cohabitation. (We collapse fathers who are single or cohabiting at birth and later enter marriage into one group in order to increase sample size and power. Differences between the groups are not statistically significant.) The columns show differences in the log of earnings between fathers who never marry and fathers who enter marriage 1, 3, and 5 years after the birth of the child. Differences in post-marriage and post-cohabitation are bolded and black, while differences prior to entering marriage and cohabitation are not bolded and appear more grey than black. Because earnings are logged, the differences reflect percentage differences. The three rows indicate the year in which the father married.

The earnings gap between fathers who marry and those who remain single increases over time. For fathers who marry between baseline and the first year, the difference increases by 29% at one year, by 44% at three years, and by 66% at 5 years. Similarly, for the group that marries between the first and third year, the difference increases from 38% to 58%. The earnings difference between fathers who enter cohabitation and fathers who are continuously single also increases over time, suggesting that cohabitation may have some of the same beneficial effects of marriage. Although the earnings gain is larger for those who enter marriage as compared to those who enter cohabitation, the difference between these two groups is not statistically

significant. Note that even before they marry, fathers who enter marriage after birth show higher earnings gain than fathers who are continuously single. This growth in earnings prior to marriage indicates that those who eventually marry are on a different, more positive trajectory. This is evidence of selection.

The next two panels of Table 3 present similar results for hours worked and wage rates. The difference in hours worked between those who enter marriage and those who remain single increases before marriage, substantially at the time of marriage and a bit thereafter, whereas wage rate differences do not increase before marriage, increase only a little bit at the time of marriage, but increase steadily thereafter. This pattern is consistent with anticipation of marriage and marriage leading to an increase in hours worked which then gets rewarded in the form of higher wage rates. This pattern is consistent with the Nock story of a marriage script. The differences in hours worked and wage rates between fathers who enter cohabitation and fathers who remain single as compared to the difference between those who enter marriage and those who remain single, is much weaker and less consistent.

It is still possible that unmeasured differences between fathers who do and do not marry or cohabit are driving the differences found in Table 3. Thus we also estimated fixed effect models which are limited to only unwed fathers at birth who eventually marry or cohabit. These estimates are based on the change in earnings for each father before and after marriage or cohabitation. We find, as reported in Table 4, after entering marriage, fathers work an additional 150 hours per year, earn 9% more per hour, and earn 14% more per year. The increases associated with entering cohabitation are dramatically smaller—77 more hours per year, only 1% more per hour, and 6% more per year.

In short, we find evidence for a marriage benefit for unmarried fathers that is as strong as the previous evidence of a positive marriage effect for all men (most of whom are not fathers when they marry). Even after controlling for previously unobserved variables, large differences remain between the fathers who remain single and those who marry or cohabit. Moreover, the difference in earnings between fathers who remain single and those who enter marriage and cohabitation is associated with the entrance into those states. Work hours increase just before and coincident with marriage and increase little thereafter, whereas wage rates continue to increase at higher rates each year after marriage as compared to before marriage. These results for marriage hold up in fixed effects models. The results for cohabitation, while similar in direction are weaker and estimated with less precision. While it is still possible that the fixed effect estimates are picking up nothing more than an unobserved change in the fathers who marry—the “settling down” phenomenon, it is just as possible that the institution of marriage causes the “settling down.”

CONCLUSIONS

The findings from the Fragile Families Study provide some support for the argument that marriage increases earnings. Fathers who marry after birth show a steeper growth in earnings than fathers who remain single. The effects for entering cohabitation are in the same direction but much weaker. Part of the steeper growth in earnings is due to an increase in work hours which begins before (and possibly in anticipation of) marriage. But another part of the growth is due to increases in hourly wages that appear to accrue after marriage.

These results provide some support for the marriage initiative. The Fragile Families data also suggest that a substantial number of unmarried parents may be motivated to participate in

the new marriage programs. About half of unmarried parents are in a cohabiting union at the time their child is born and another 30 percent are romantically involved but not living together. Previous research indicates that many of these parents have plans to marry (McLanahan et al. 2003). On the other hand, the data also highlight several potential weaknesses in the new marriage programs. First, they show that unmarried fathers are very different from married fathers in terms of age, race/ethnicity and education. Although marriage and cohabitation may provide some economic benefits to unmarried fathers, they are unlikely to dramatically alter the education disparities that are fundamental to earnings disparities. Thus policy makers should be careful not to oversell the extent to which the new marriage programs can overcome the fundamental human capital deficiencies of unmarried fathers. Second, the statistical analyses of the association between marriage and men's earnings suggest there may be a causal effect, but cannot be definitive. Modest claims are appropriate.

Finally, as noted, a non-trivial proportion of unmarried fathers have serious mental health and behavior problems. Although marriage alone might lead some men to adopt healthier life styles, it is unlikely to eliminate these problems. To the extent that the new marriage programs address these problems directly, they are much more likely to be successful both in increasing earnings and encouraging marriage and cohabitation. Further, not dealing with these problems may put some mothers and children at greater risk. Research indicates that living with an anti-social father is more damaging for children than living with no father (Huston and Melz 2004, Jaffee et al. 2003).

Appendix A. Results from Growth Model of Logged Fathers' Earnings by Relationship Transitions using FIML estimation. (N = 4,891)

	Model 1 ^a		Model 2 ^b	
	α	β	Δ	β
Level 2				
Intercept	6.91***	3.15***	9.30***	3.31***
<i>Relationship Transitions</i>				
Enter Marriage ^g	2.10*	1.49***	1.41	1.36**
Enter Cohabitation	1.13	0.50	0.74	0.46
Stably Married	10.18***	1.47***	8.72***	1.28**
Exit Marriage	5.18***	-0.35	4.46**	-0.44
Stably Cohabiting	2.35*	0.75†	1.61	0.61
Exit Cohabitation	1.02	0.39	0.90	0.41
Multiple Transitions	0.70	0.61	0.52	0.65
<i>Demographic Characteristics</i>				
Age at Baseline	0.50***	-0.04**	0.51***	-0.04*
Education Status				
Less than High School	-3.38***	-0.50*	-2.93***	-0.41†
More than High School, Less College	4.45***	0.82***	4.06***	0.75**
College and Above	16.73***	4.32***	15.76***	4.10***
Immigrant Status ^c	-2.44***	0.24	-3.29***	0.08
<i>Race^d</i>				
Black	-7.72***	-1.28***	-7.74***	-1.17***
Hispanic	-5.72***	-0.88**	-5.82***	-0.83**
Other	-2.78	-1.01*	-2.21†	-0.96*
<i>Health and Behaviors</i>				
Prior Fertility			-0.003	-0.15*
Mental/Physical Health			-3.25**	-0.29
Drug/Alcohol Problem			-2.94**	0.38
Antisocial Behavior			0.41	-0.23
Impulsivity			-0.60†	-0.06
Ever in Incarcerated ^e			-3.13***	-0.57**
Model Fit				
χ^2 (df)	202.29*** (34)		211.32*** (46)	
RMSEA	0.032		0.027	
TLI/CFI	0.966/0.983		0.983/0.967	

Notes: All results use mother report when father data is missing. Models assume that new relationships reported by the mother are marriages. α is the intercept of earnings at baseline. β is the growth (or slope) in logged earnings. Slope at year five is estimated.

^a Model 1 controls for father's age, education, race, immigrant status, and prior fertility at baseline. ^b Model 2 controls for father's age at baseline, education, race, immigrant status, prior fertility, mental/physical health problems at baseline, drug/alcohol problems at baseline, antisocial behavior, impulsivity, and father incarceration status. ^c Father is an immigrant. ^d White is the reference category. ^e Indicates the father was ever incarcerated before the child's first birthday. ^f Stably single is the reference category. ^g Includes cohabitation to marriage group.

† p < .10 * p < .05 ** p < .01 *** p < .001

Appendix B. Growth Model of Observed Fathers' Log Earnings and Time-Varying Family Structure Variables (N = 4,889).

	Observed Earnings		
	<u>One-Year</u>	<u>Three-Year</u>	<u>Five-Year</u>
<i>Family Structure Variables^a</i>			
Continuously Married	0.17***	0.51***	0.68***
Continuously Cohabiting	0.12*	0.34***	0.56***
Enter Marriage ^b			
Baseline to One-Year	0.29***	0.44***	0.66***
One-Year to Three-Year	0.19*	0.38***	0.58***
Three-Year to Five-Year	0.14†	0.45***	0.67***
Enter Cohabitation ^c			
Baseline to One-Year	0.16	0.41***	0.54***
One-Year to Three-Year	0.20	0.23	0.36†
Three-Year to Five-Year	-0.01	-0.10	0.33*
Exit Marriage			
Baseline to One-Year	0.34	-0.14	0.14
One-Year to Three-Year	-0.02	0.24	0.09
Three-Year to Five-Year	0.22*	0.43***	0.46***
Exit Cohabitation			
Baseline to One-Year	0.17†	0.16	0.38**
One-Year to Three-Year	-0.08	0.23*	0.16
Three-Year to Five-Year	0.002	0.30**	0.36**
Multiple Transitions	0.08†	0.21**	0.41***
Model Fit			
χ^2 (df)		179.93*** (35)	
RMSEA		0.029	
TLI		.0932	
CFI		0.976	

Notes: Trajectory intercept is 8.92 ($p < .001$) and slope is estimated at 0.11 ($p < .001$). Model controls for age at baseline, education, race, immigrant status, and stability before a transition (see gray coefficients).

^aContinuously single is the referent category. Zero earnings treated as missing. ^bWith both biological mothers and new partners. Includes cohabitation to marriage group. ^cWith both biological mothers and new partners.

† $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .01$, two-tailed tests

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Table 1. Descriptive Statistics for Married and Unmarried Fathers at Baseline.

	<u>Married</u>	<u>Unmarried^a</u>
<i>Earnings in 2005 \$'s</i>		
Baseline	33,572	15,465
One-Year	39,047	19,219
Three-Year	46,922	20,974
<i>Hourly Wage Rate (in 2005 \$'s)</i>		
Baseline	15.85	9.64
One-Year	17.62	10.24
Three-Year	20.68	11.21
Five-Year	23.83	13.10
<i>Annual Hours Worked (1000s)</i>		
Baseline	2211	1823
One-Year	2209	1915
Three-Year	2268	1947
Five-Year	2223	1980
<i>Demographic Characteristics</i>		
Age	32	27
Education		
Less HS %	17	39
HS %	24	38
More HS/Less Col %.	28	20
College and Above %	30	3
Race		
Black %	27	56
White %	41	11
Hispanic %	24	29
Other %	8	4
Immigrant %	27	15
<i>Health and Behaviors</i>		
Mental/Physical Health %	3	7
Drug/Alcohol Problem %	3	7
Antisocial Behavior (0 - 2)	0.17	0.50
Impulsivity (0 - 3)	0.75	1.35
Incarceration History at Year One %	10.28	41.51
Number of Other Biological Children at Birth	1.13	1.09
N ^b	1,212	3,685

Notes: All results use mother report when father data is missing. ^a Includes cohabiting, romantically involved, and no relationship couples. ^b Sample sizes may vary across variables. Does not account for missing cases.

Table 2. Descriptive Statistics for Time-Varying Family Structure Variables.

	Total		Baseline to One-Year		One-Year to Three-Year		Three-Year to Five-Year	
	%	N	%	N	%	N	%	N
<i>Relationship at Birth</i>								
Married	24.7	1,212						
Cohabiting	38.0	1,859						
Romantic, Non-Resident	23.6	1,157						
None	13.7	669						
<i>Relationship Stability</i>								
Continuously Married ^a	21.0	814						
Continuously Cohabiting ^a	8.4	326						
Continuously Single ^a	13.1	508						
<i>Relationship Transitions</i>								
Single to Marriage ^b	6.9	269	2.5	97	0.9	35	3.5	137
Cohabitation to Marriage ^c	9.5	364	4.0	150	3.3	128	2.2	86
Enter Cohabitation ^d	6.8	246	2.7	106	0.9	34	2.7	106
Exit Marriage ^e	4.6	181	0.7	28	1.2	47	2.7	106
Exit Cohabitation ^e	12.2	478	4.2	164	4.0	155	4.0	159
Multiple Transitions ^a	18.0	700						

Note: Uses both maternal and paternal reports. 1,012 cases missing.

^a Continuously married, continuously cohabiting, continuously single, and multiple refer to cumulative percentages. These fathers are either married or cohabiting to the focal child's biological mother at the time of the birth, or in no co-residential relationship at the time of the birth, and remain married/cohabiting/single for the duration of the study. ^b These fathers are not married to anyone at the birth of the focal child but subsequently marry either the biological mother or a new partner and remain married to her during the duration of the study. ^c These fathers are in cohabiting relationships with the biological mother at the time of the birth, subsequently marry the biological mother, and remain married to her for the duration of the study. ^d These fathers are not in any cohabiting or marital union at the time of the birth but subsequently move in with either the biological mother or a new partner and remain in that cohabiting relationship throughout the duration of the study. ^e These fathers are either married to or cohabiting with the biological mother at the time of the birth, subsequently move out or divorce her, and remain single, in no other co-residential relationship throughout the duration of the study.

Table 3. Growth Model of Observed Fathers' Log Earnings, Annual Hours, and Hourly Wage Rate and Time-Varying Family Structure Variables (n = 4,889).

<i>Family Structure Variables</i> ^a	Observed Log of Earnings		
	<u>One-Year</u>	<u>Three-Year</u>	<u>Five-Year</u>
Enter Marriage ^b			
Baseline to One-Year	0.29*** ^{de}	0.44*** ^{dg}	0.66*** ^{eg}
One-Year to Three-Year	0.19* ^{df}	0.38*** ^{fg}	0.58*** ^{dg}
Three-Year to Five-Year	0.14† ^{dg}	0.45*** ^{eg}	0.67*** ^{de}
Enter Cohabitation ^c			
Baseline to One-Year	0.16 ^d	0.41*** ^f	0.54*** ^{df}
One-Year to Three-Year	0.20	0.23	0.36†
Three-Year to Five-Year	-0.01	-0.10	0.33*
	Observed Hours		
Enter Marriage ^b			
Baseline to One-Year	239***	320***	319***
One-Year to Three-Year	150* ^g	282***	328*** ^g
Three-Year to Five-Year	165* ^{dg}	344*** ^{fg}	504*** ^{df}
Enter Cohabitation ^c			
Baseline to One-Year	90	158†	246**
One-Year to Three-Year	187	279†	26
Three-Year to Five-Year	151	-41	116
	Observed Log of Wage Rate		
Enter Marriage ^b			
Baseline to One-Year	0.14*** ^d	0.18** ^e	0.37*** ^{de}
One-Year to Three-Year	0.02 ^d	0.10† ^e	0.30*** ^{de}
Three-Year to Five-Year	0.08† ^d	0.11† ^e	0.32*** ^{de}
Enter Cohabitation ^c			
Baseline to One-Year	0.12†	0.15*	0.19*
One-Year to Three-Year	0.02 ^g	0.10	0.27* ^g
Three-Year to Five-Year	-0.05 ^d	0.04 ^f	0.23*** ^{df}

Notes: Models control for age at baseline, education, race, immigrant status, and stability before a transition (see gray coefficients). Zero earnings treated as missing.

^a Continuously single is the referent category. ^b With both biological mothers and new partners. Includes cohabitation to marriage group. ^c With both biological mothers and new partners. ^{de} Indicated coefficients are significantly different at p < .01. ^f Indicates coefficients are significantly different at p < .05. ^g Indicates coefficients are significantly different at p < .10.

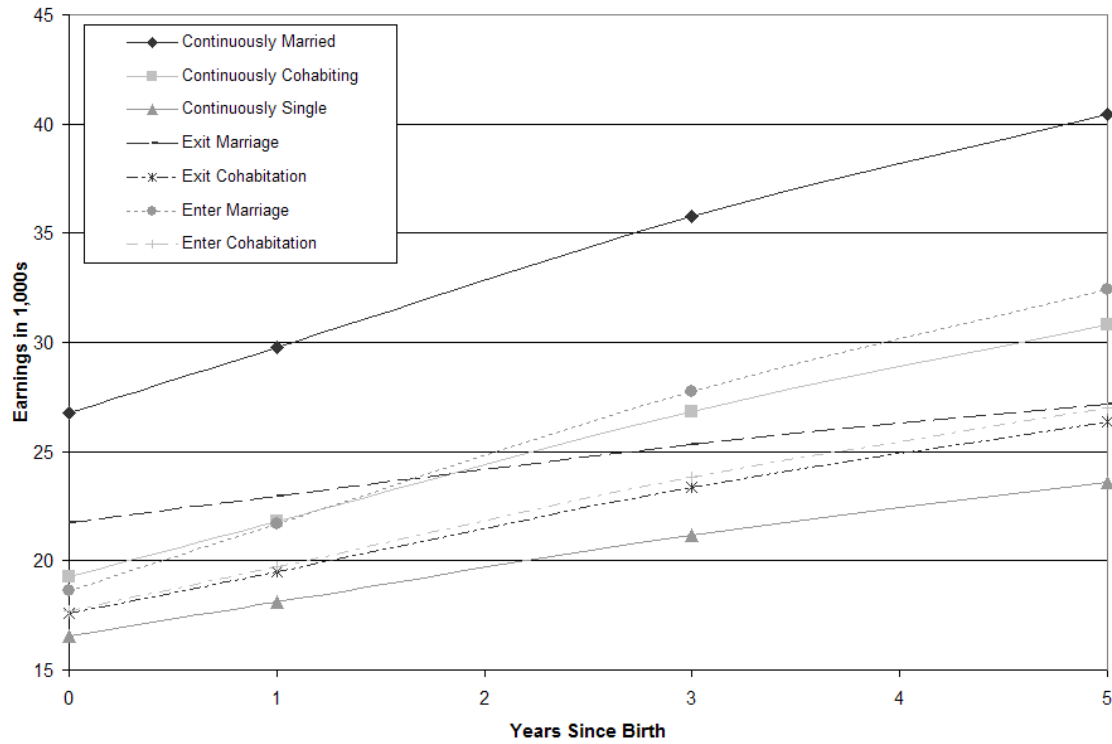
† p < .10 * p < .05 ** p < .01 *** p < .01, two-tailed tests

Table 4. Fixed Effect Models for Fathers' Log Earnings, Annual Hours, and Log of Hourly Wage Rate and Transitions into Marriage or Cohabitation.

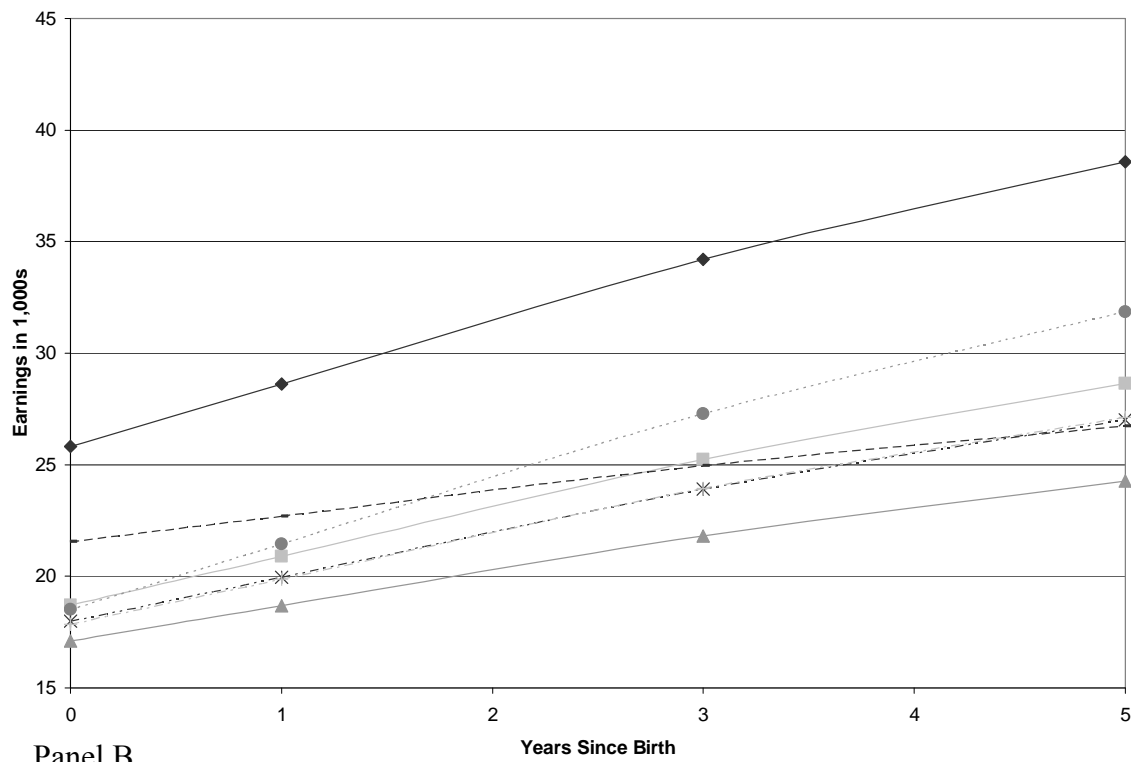
Variable	Log of Earnings		Annual Hours		Log of Hourly Wage Rate	
	β	<u>S.E.</u>	β	<u>S.E.</u>	β	<u>S.E.</u>
Married	0.14*	0.07	1.50*	0.68	0.09†	0.05
Cohabiting	0.06	0.05	0.77	0.51	0.01	0.04
Year	0.07***	0.01	0.26**	0.10	0.06***	0.01
Constant	9.44***	0.04	18.73***	0.38	2.17***	0.03
Number of Observations	2,432		2,432		2,432	
Number of Groups	788		788		788	
Overall R ²	0.05		0.02		0.05	

Notes: Sample includes only fathers with valid information on earnings, annual hours, and wage rates. S.E. refers to standard errors.

† p < .10 * p < .05 ** p < .01 *** p < .01, two-tailed tests



Panel A



Panel B

Figure 1. Growth in Earnings from birth to child's fifth birthday based on a fathers' family structure histories. Panel A controls for father's age at baseline, education, race, and immigrant status. Panel B adds controls for father's fertility, mental/physical health problems, drug/alcohol problems, antisocial behavior, impulsivity, and incarcerated status prior to the focal child's birth.