Towards a Unified Theory: Understanding the Associations of Earnings with Marriages and Births

Christina M. Gibson-Davis

Duke University

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Abstract

This study examines the conventional assumption that marriage and fertility are interconnected by comparing the effects of earnings on marriage to the effects of earnings on fertility. Data come from the Survey of Income and Program Participation, a nationally representative sample of American adults. Employing individual fixed effects, results indicate that changes in male earnings was more strongly related to marriage than to fertility, as male earnings were positively correlated with marriage, but had no effect on childbearing. The positive association between male earnings and marriage held only for childless men, suggesting that childbearing moderated the association between earnings and marriage. Females were also more sensitive to changes in earnings for marital than for fertility decisions. Effects differed from men, as female earnings had no significant correlation with marriage, but were negatively correlated with fertility. Results are interpreted in light of traditional economic models and the Financial Expectations and Family Formation theory, which suggests that economic standards are a prerequisite for marriage, but not childbearing. Though neither approach fully explained the results, the findings confirmed that earnings has a differential effect on marriage than it does on fertility, and suggest that theoretical models should recognize the disconnect between the two.

The well-documented changes in the American family landscape, particularly the dramatic rise of non-marital fertility, have not been matched by changes in our theoretical understanding of family formation patterns. Arguably the most influential theory of marriage behavior, Becker's specialization model (1981), makes no allowance for out-of-wedlock births by implicitly assuming that marriage and fertility are indistinguishable decisions. Yet unmarried parents account for one-third of all births, with even higher fractions for parents of color (Martin et al., 2007). Additionally, the disconnect between the timing of first births and the timing of first marriage, particularly for those with less education (Ellwood & Jencks, 2004a, 2004b), suggests that many individuals regard marriage and fertility as two separate decisions, governed by different factors.

The disconnection between marriage and fertility largely reflects the emergence of norms that sanction sexual intimacy and childbearing outside the bounds of marriage. Specifically, because individuals no longer face social censure if they have an out-of-wedlock birth, the once strong connection between marriage and fertility has been weakened considerably. Yet Becker's model, and others that have followed (Oppenheimer, 1997, 2003; Oppenheimer, Kalmijn, & Lim, 1997; Wilson, 1987; Wilson & Neckerman, 1986), have not addressed why marriage and fertility may be unrelated decisions, and have not attempted to incorporate the "separateness" of marriage and fertility decisions into one theoretical framework. As a result, several issues remained unexplored, including why earnings negatively affect marriage, but not childbearing rates, and why it is that adults with children marry, sometimes several years after they have had their first birth. These issues are more than just theoretical; current policy efforts to promote marriage among low-income individuals, particularly those who have already had children

(Dion, 2005), presuppose a clear understanding of how Americans decide to become both spouses and parents.

This study examines the validity of one theory, the Financial Expectations and Family Formation Theory (FEFFT) that seeks to unify our understanding of marriage and fertility patterns. The FEFFT, derived from qualitative studies (Edin & Kefalas, 2005; Gibson-Davis, 2007; Gibson-Davis, Edin, & McLanahan, 2005), focuses on the differential role that earnings plays in marriage and fertility decisions, and uses that differential as a means to explain the disconnect between the two. Specifically, the FEFFT posits that contemporary American adults have different economic expectations about marriage than about childbearing. Marriage, with its connotations of middle-class respectability, is associated with the attainment of economic stability (Dixon, 1978; Oppenheimer, 1994), which requires sufficient earnings from both members of the couple (Edin & Kefalas, 2005; Gibson-Davis, 2007; Gibson-Davis et al., 2005). The decision to bear a child, on the other hand, is not subject to an earnings test; it is, instead, a natural part of the life course that demonstrates one's worth, particularly for those who feel they have few other opportunities (Edin & Kefalas, 2005).

In order to test the FEFFT, and compare its validity with traditional economic models of family formation, this study analyzes the effect of earnings on the transition to marriage and parenthood for a sample of unmarried and childless adults. Data come from the 1996 and 2001 panels of the Survey of Income and Program Participation (SIPP), a nationally representative sample of the non-institutionalized adult population. Using individual, state, and year fixed effects to control for unobserved heterogeneity, I regress first marriage and first births on male and female earnings. Analyzing both male and female earnings is important, as a central contention of the FEFFT (and a contrast with Becker's model) is that both male and female

earnings will be significantly associated with marriage. Additionally, I consider if the associations between earnings and marriage differs between parents and non-parents, and if the associations between earnings and fertility differs between the married and unmarried. Understanding if the associations between earnings and marriage obtain for those with and without children (and likewise, if the associations between earnings and fertility obtain for those with and without spouses) provides a more comprehensive account of earnings' effects than would a more narrowly focused study. Moreover, the differences between those with children and those without, as well as the differences between the unmarried and the married, are potentially informative as to how marriage and fertility decisions are made.

Though the association between earnings and family formation decisions is well traveled territory (see Ellwood & Jencks, 2004a; 2004b, for recent reviews), previous studies have not explicitly examined the potentially differential effects of earnings on marriage than on fertility. Yet the paucity of studies that have considered the role of earnings in both marriage and childbearing decisions limits our ability to provide a comprehensive understanding of contemporary family formation patterns. It is my contention that by comparing earnings effects on marriage to the earnings effects on childbearing, we will gain insight into the how of American spouse- and parent-hood, and begin to understand why those may represent distinct decisions for many individuals.

Background

The Traditional Economic Model of Marriage

The most prominent theories of marriage stem from Becker's (1981) seminal work on marriage as a form of utility maximization. Under Becker's view, people derive utility from the

amount of goods that they can obtain. These goods include not only traditional market goods, such as food, clothing, and shelter, but also household goods, such as children. In order to maximize their utility, people engage in a marriage contract if such a marriage means they can obtain more goods married than single. Marriage is most likely to occur if each partner specializes in the area in which he or she has a comparative advantage: traditionally, men in market work, and women in home production. Within a marriage, the partners can then trade on their respective specializations, and procure goods that they otherwise would lack (e.g., men, household goods, and women, market goods). Becker's model leads to straightforward predictions about the associations between earnings and marriage. Higher male earnings increases the need for a man to find a wife who can provide household goods, while higher female earnings undercuts the benefits women receive from marriage, and are therefore likely to decrease marriage rates.

Ellwood and Jencks (Ellwood & Jencks, 2004a) have termed Becker's model the traditional economic model (TEM) of marriage behavior. Another dominant theoretical construct of marriage, Wilson's marriageable man hypothesis (Wilson, 1987; Wilson & Neckerman, 1986), can be seen as an extension of the TEM to African Americans. Wilson accepts Becker's basic premise that couples are more likely to marry when the male is firmly attached to the labor force, but notes that shifts in the location and skill requirements of jobs, as well as dramatic increases in incarceration, have meant that many black women cannot find economically viable spouses-to-be. Therefore, the erosion of economic opportunities, particularly for low-skilled, urban blacks, has resulted in few black men that are "marriageable", and has depressed marriage rates.[1]

[1] A third influential construct of marriage – Oppenheimer's "career maturity" thesis – departs from the TEM insofar as Oppenheimer rejects the benefits of marriage as arising chiefly from specialization. She notes that a changing

The TEM has been critiqued extensively elsewhere (see Ellwood & Jencks, 2004a; 2004b, for a recent review), as it has not been fully supported by empirical evidence. Although higher men's earnings do hasten the transition to marriage (Clarkberg, 1999; Lichter & Graefe, 2007; Xie, Raymo, Goyette, & Thornton, 2003) and the proportion of fully employed black men correlates well with the marriage rate (Harknett & McLanahan, 2004; Kiecolt & Fossett, 1998; Tucker & Mitchell-Kernan, 1998), the decline in marriage rates has been far greater than these theories would predict (Bumpass, Sweet, & Cherlin, 1991; Ellwood & Jencks, 2004b; White & Rogers, 2000). Additionally, evidence regarding the association between female earnings and marriage has been decidedly mixed. Most studies report no association (Brown, 2000; Carlson, McLanahan, & England, 2004; Lichter, Qian, & Mellott, 2006; Smock & Manning, 1997; Xie et al., 2003), though a few have found a positive correlation association (Clarkberg, 1999; Oppenheimer, 1997; Sweeney, 2002).

Empirical problems aside, the biggest limitation to the TEM is that it does not address the weakened connection between marriage and fertility. Changing societal norms about the suitability of single mothers to raise children, and the necessity of marriage to "legitimize" an out-of-wedlock birth, have meant that the assumption that childbearing is inexorably linked to marriage no longer holds. This is most evident by the non-marital birth rate, which stands at 25% for non-Hispanic whites, 70% for non-Hispanic blacks, and 48% for Hispanics (Martin et al., 2007). Additionally, though having a nonmarital birth decreases the odds of marriage, most unwed mothers will eventually marry; Lichter and Graefe (2000), with data from the National

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economic climate, in which both men and women participate in large numbers in the labor force, have undercut any returns to specialization that may have arisen in an era when husbands were the primary breadwinners and wives the homemakers. She argues instead that the economic characteristics typically valued in a male spouse are becoming increasingly valued in a female spouse. Couples are most likely to marry when each has a sufficient level of career maturity, which to Oppenheimer meant that each partner can reassure the other of their long-term financial stability. Though her theory cannot be included in the TEM, I note that her model has many of the same limitations of the TEM, insofar as it does not address out-of-wedlock childbearing or the increased disconnection between marriage and fertility choices.

Survey of Family Growth, estimate that by the age of 40, 72% of unmarried mothers will have wed. Many of these mothers will marry several years after the birth of their first child; based on Lichter and Graefe's calculations (Graefe & Lichter, 2002), nearly three quarters of all teen mothers who marry do so after they age of 20. The disconnection between marriage and fertility is most pronounced for women at the bottom of the socioeconomic spectrum, as women with less education are more likely than their well-educated peers to have a child and then marry, rather than the other way around (Ellwood & Jencks, 2004b).

The assumption that marriage and fertility are inexorably linked is assumed implicitly by the TEM. The theory presupposes that fertility accompanies marriage; it does not consider nonmarital fertility, nor can it explain why several years may pass between a first birth and a first marriage.[2] As a result, the TEM's predicted associations between earnings and marriage carry over to the predicted associations between earnings and fertility. Increased male earnings increase the gains to marriage for men, and will be positively correlated. Given that those gains obtain primarily from childbearing (Ellwood & Jencks, 2004b), it follows that the same positive correlations will be found for fertility. For women, increased earnings decrease potential marriage benefits, and should be negatively correlated with marriage.[3] Again, this is closely tied to female fertility, as the opportunity costs of a birth are typically higher for women than for men, and women would have increased need for the earnings of their partner (Hotz, Klerman, & Willis, 1997).[4] These associations are presumed to hold regardless of marital or fertility status.

[2] See Willis (Willis, 2001) for an extension of Becker's model to nonmarital fertility. Willis' model also assumes that marriage and fertility are closely connected.
[3] Though Wilson's model is an extension of the TEM, he does argue that female wages will be insignificantly related to marriage, a point of departure from the TEM as laid out here.
[4] Becker (Becker, 1960; Becker & Lewis, 1973) thought the high opportunity costs of a birth for women arose because increased income increased the value of female time. The value of female time increased either because of higher female wages, or higher male earnings, which raised the premium on the non-market value of female time. See also Hotz et al., 1997.

But presupposing that marriage and fertility are connected leaves several questions unanswered. First, if marriage and fertility are intertwined, then why is it that negative economic circumstances depress marriage, but not childbearing, rates? Are earnings only important for marriage, but not for fertility? Second, why do people who already have children marry? Are they influenced in the same way by earnings as are non-parents? Third, why might years pass between a first birth and a first marriage? Fourth, and finally, what explains the pronounced class differences seen in marriage and fertility patterns?

In the section that follows, I shall lay out an alternative theory of family formation, the Financial Expectations and Family Formation theory, which seeks to address the questions unanswered by the TEM. I will argue that only a theory that recognizes the separateness of marriage and childbearing is adequate to explain patterns of American family formation.

The Family Formation and Financial Expectations Theory

The Financial Expectations and Family Formation theory (FEFFT) suggests that cultural attitudes toward the perceived economic prerequisites for marriage, in combination with the non-pecuniary determinants of fertility, govern family formation choices. A series of qualitative studies of poor and lower middle class couples has found that respondents delayed marriage because they believed marriage required meeting a financial threshold, a threshold which they themselves had not achieved (Edin & Kefalas, 2005; Edin, Kefalas, & Reed, 2004; Smock, Manning, & Porter, 2005). For example, analyses of 75 couples participating in the Time, Love and Cash Among Couples with Children (TLC3) project has shown that couples believe that marriage requires steady incomes, significant assets, and the ability to pay for a middle-class-type wedding (Gibson-Davis et al., 2005). These attitudes regarding the importance of economic

stability prior to marriage are not limited to less well-educated individuals; a national survey of adults ages 20 to 29 found that more than two-thirds thought it was "extremely important" to be "economically set" before marrying (Whitehead & Popenoe, 2001).

The idea that marriage connotes financial respectability is, by itself, not a new one, as sociologists have long pointed out that there are strong cultural expectations that married households should be able to maintain a certain standard of living (Clarkberg, 1999; Dixon, 1978; Easterlin, 1987; Oppenheimer, 1994). What is unique about the FEFFT, however, is that it further hypothesizes that these same financial standards do not adhere for childbearing. The economic calculus applied to marriage – can we "afford" to get married? – may not apply to fertility. Childbearing decisions, instead, are governed by a host of other factors, including the desire to pass along one's genes, the opportunity to love and nurture another human being, and the provision of meaning and organization to daily life (Morgan, 2003; Morgan & King, 2001). The timing of having a child may therefore have very little to do with economic circumstances. The differences in economic standards required for marriage and childbearing are emerging now because of the disconnection between marriage and fertility; to be economically prepared for marriage has traditionally meant being economically prepared for having children (Easterlin, 1987), but that is no longer necessarily the case.

The FEFFT gives rise to three main predictions. First, marriage requires a certain threshold of financial well-being (Clarkberg, 1999; Edin & Kefalas, 2005; Oppenheimer, 1994), and once that standard of living has been acquired, additional earnings may have little predictive value.[5] Implicit in this proposition is the idea that both male and female earnings should be

[5] How this standard is defined is unclear. Dixon (1978) believed that economic norms for marriage were defined in relation to one's social class; Easterlin (1987) posited that they were defined in reference to the economic norms of one's parents; and Edin and Kefalas (2005) argued that they were synonymous with a middle-class lifestyle. For the

positively correlated with marriage, especially in circumstances where neither member has sufficiently high earnings on their own. The FEFFT is thus consistent with past work that has shown a threshold effect of male earnings on marriage (Oppenheimer, 2003), and would align with those studies that have found a positive effect of female earnings (Clarkberg, 1999; Oppenheimer, 1997; Sweeney, 2002).

Second, individuals who experience a non-marital birth should exhibit the same positive associations between earnings and marriage as do those without a non-marital birth. Indeed, the FEFFT is derived from qualitative studies of parents (Edin & Kefalas, 2005; Gibson-Davis, 2007; Gibson-Davis et al., 2005) who were nearly unanimous in their insistence that marriage requires economic stability, and suggested that poor economic circumstances were an obstacle to marriage. Notably, little quantitative evidence exists to either support or rebut this claim, as no study to date has compared the effects of earnings on marriage for adults with children to those without. Suggestive evidence refuting this hypothesis, however, does come from the work of Testa and Krogh (1995), who used retrospective data from 424 men who participated in the Urban Poverty and Family Structure (UPFS) in Chicago. They found that monthly indicators of employment were positively related to marriage among childless males, but had no effect on marriage among fathers.[6] Notably, though, Testa and Krogh did not have earnings data, nor did their sample include females.

Third, the achievement of a financial threshold is not a prerequisite for childbearing. Drawing on theoretical frameworks of American fertility (Morgan & King, 2001; Morgan &

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purposes of this study, I will be agnostic as to exactly what this standard is, except to argue that this economic threshold for marriage exists.

[6] In seeming contrast to these results, Testa and colleagues (Testa, Astone, Krogh, & Neckerman, 1989) used data from the UPFS survey and found that employment was positively related to marriage among new fathers. The 1989 study was limited to men who already had a child, and did not compare potentially differential employment effects between fathers and non-fathers.

Taylor, 2006), the FEFFT proposes that individuals have children in order to satisfy desires for personal fulfillment and meaning, but do not rest the timing of those decisions on achieved standards of living. Therefore, earnings should be insignificantly related to fertility for both men and women. A noteworthy exception to this predicted association is for married men, as women may rely on their spouses' high earnings to defray the cost of a birth (Schultz, 1994; Weeden, Abrams, Green, & Sabini, 2006). For unmarried men, however, the FEFFT predicts that that men's earnings are unrelated to fertility, based on evidence suggesting that unmarried women make childbearing choices independent of their partner's earnings (Edin & Kefalas, 2005; Lerman, 1989; Testa & Krogh, 1995). The earnings of both unmarried and married women should likewise be unrelated to fertility, though several quantitative studies have found that female earnings is negatively correlated with the incidence of out-of-wedlock births (Aassve, 2003; Hotz et al., 1997; Wu & Wolfe, 2002).

The FEFFT has several advantages over the TEM. By recognizing the differential effect of earnings on marriage than on childbearing, the FEFFT explicitly acknowledges that marriage and fertility are independent choices, governed by different factors. At the same time, the FEFFT incorporates both marriage and fertility into one theoretical framework, thereby providing a more comprehensive foundation of family formation patterns than theories that focused exclusively on marriage. Relatedly, by considering how childbearing moderates the associations between earnings and marriage, and how marriage moderates the associations between earnings and fertility, the FEFFT provides one theory in which to understand the decisions of married and unmarried individuals, both with children and without.

Additionally, the FEFFT can address the questions unanswered by the TEM. First, the FEFFT can explain why negative economic circumstances depress marriage rates, but not

childbearing rates, as the achievement of financial stability is viewed as a requirement for marriage, but not childbearing. Second, the FEFFT posits that parents are likely to marry when the economic circumstances dictate that it is right for them to do so, thus explaining the elapsed time between first births and first marriages. Unmarried parents face little to no social pressure to marry, and can therefore delay marriage until they feel they have achieved the necessary economic prerequisites.

Third, the theory can explain why the timing of first birth and first marriage differs by socioeconomic status. For those with less education, marriage is an economic aspiration to be undertaken when a couple is financially established, whereas childbearing is an accepted (and expected) part of young adulthood (Anderson, 1991; Edin & Kefalas, 2005). Women, particularly those with few economic opportunities, may feel that they cannot delay childbearing until they have an economically viable partner. With insufficient incomes, poorer individuals therefore delay marriage, but do not delay childbearing. Those with more education likewise desire an economically viable household, and delay marriage until they have achieved financial stability. But because better educated women face higher opportunity costs of fertility than those with less education (Ellwood, Wilde, & Batchelder, 2004), they are more likely to delay childbearing as well.

To date, there has been only one quantitative test of the FEFFT. Gibson-Davis (2008) used data from the Fragile Families and Child Wellbeing Survey and found positive associations between male earnings and subsequent marriage, but no such associations between either male or female earnings and fertility. That study was limited, however, by its small sample size and its reliance on a cohort of individuals who had already chosen to have a non-marital birth. Besides

the work of Gibson-Davis, I am aware of no study has simultaneously compared the effects of earnings on marriage to those on fertility.

Comparison of the FEFFT and the TEM

This study compares the validity of the FEFFT and the TEM in explaining the transitions to marriage and parenthood among a nationally representative sample of unmarried, childless adults. The predictive differences are summarized as follows, and are also illustrated in Figure 1. The figure uses up or down arrows to demonstrate the predicted association between earnings and marriage or childbearing; a "th" in the figure indicates a threshold effect. Predicted associations are presented for both theories, and for both males and females.

As presented in the figure, the TEM suggests that male earnings should be positively related to marriage. These associations should hold regardless of fertility status at the time of the marriage (e.g., for both men with and without children). In contrast, as the FEFFT emphasizes economic standards over specialization, it argues that the effect of male earnings will not be linear, but will instead demonstrate a threshold effect.[7] As for childbearing, the TEM suggests that male earnings will be positively correlated with fertility for both married and unmarried men. Although the FEFFT similarly predicts that a positive correlation will exist between married men's earnings and marriage, it differs from the TEM in that it predicts that unmarried men's earnings will be insignificantly related to births.

The predicted associations between women's earnings and marriage in the TEM are hypothesized to be negative. This prediction contrasts with the FEFFT, as the FEFFT predicts that female earnings, like male earnings, will exhibit a threshold effect. The TEM also predicts

[7] Although Becker (1981) did not explicitly address the idea of thresholds, he would presumably agree that earnings would exhibit diminishing marginal returns. However, his emphasis was on the linear nature of earnings, rather than the obtainment of a pre-defined standard of living.

that female earnings will be negatively correlated with fertility, whereas the FEFFT predicts that female earnings will be insignificantly related to childbearing, regardless of marital status

Data and Methods

Data come from the 1996 and 2001 panels of the Survey of Income and Program Participation (SIPP). The SIPP is a nationally representative sample of the noninstitutionalized civilian population, designed to provide policy makers and researchers with extensive information about individuals' economic well-being. Each panel consisted of approximately 37,000 individuals, interviewed three times a year at four month intervals over a multiyear period (the 1996 panel followed individuals for four years, the 2001 panel, three years). At each interview, individuals were asked to provide demographic and economic information about the past four months, such that individuals can provide up to 48 person-months of data in the 1996 panel or 36 person-months in the 2001 panel. All members of SIPP households over the age of 15 were interviewed, and individuals were tracked even if they left the household.[8] Both the 1996 and 2001 panel oversampled low-income households.

The sample used here is restricted to individuals who, when first interviewed in 1996 or 2001, were between the ages of 18 and 41, had no children, and were unmarried. Data were further restricted to individuals who were interviewed in the first round. Although the SIPP panel includes individuals who moved into a SIPP household after Round 1, these individuals were not included to eliminate bias arising from household formation changes that are potentially endogenous to a household's earnings. The final sample size was 10,190 men and 7,072 women

[8] A household includes all residents who share living quarters, regardless of their relations to each other. Individuals who left the household and moved into an institution or went into the military were not followed.

(known as “reference persons”), representing 303,178 and 213,611 person-months of data, respectively.

Though not without its limitations, the SIPP offers many advantages for this study. Because of its longitudinal nature, the SIPP can be used to follow a cohort of single, childless adults as they make the transition to marriage and parenthood. Though this strategy can be adopted with other longitudinal data sets – notably, the National Longitudinal Survey of Youth (NLSY) or the Panel Study of Income Dynamics (PSID) – the SIPP is much larger than either the NLSY or the PSID, and has sufficient sample size to classify individuals by their marital and fertility status. Also, in contrast with most data sets that collect information yearly, the monthly information gathered from SIPP participants can be used to more precisely link changes in earnings to the timing of marriages and births.

An additional advantage of the SIPP is that I can use individual fixed effects to address the problem of omitted variable bias.[9] Omitted variable bias is of particular concern in studies of marriage and fertility, as it has been well established that more advantaged individuals (either defined in economic or emotional terms) are more likely to marry and less likely to have a non-marital birth (Aassve, 2003; Carlson et al., 2004). Characteristics that are correlated with marriage and fertility status are also likely to be correlated with earnings, and thus the earnings coefficient are likely to be biased (the direction of the bias would depend on the nature of the correlations). Using individual fixed effects, however, I can purge the earnings coefficients of bias arising from unobserved, time-invariant characteristics. Though coefficients may still be biased by unobserved, time-variant characteristics, fixed effects models represent a powerful

[9] An additional benefit of fixed effects is that they can absorb the effect of non-random panel attrition, assuming that factors behind attrition are time-invariant (Ziliak & Kniesner, 1998)

alternative to more conventional regression methods that cannot adequately address the problem of individual heterogeneity.

A final advantage of the SIPP is that I can construct monthly lagged measures of earnings. Lagged values are important because they help avoid the difficulty of simultaneity bias. If, for example, earnings and marriage are measured at the same time point, then it is unclear if the directional effect runs from earnings to marriage, or from marriage to earnings. Using lagged values avoids this problem by relying on independent variables that were collected prior to the dependent variables, and diminishes the possibility that the earnings variables are temporally confounded by either marriage or fertility.[10]

The data set is not without its limitations. SIPP followed individuals for only a few years, so these results may not hold if individuals were tracked for a longer time horizon. Births for men are only observed if the child lives with him, so the sample of fathers is restricted to those who share a residence with the child. This undoubtedly represents a select group, particularly for unmarried fathers, who may have a stronger commitment to the mother than fathers who reside apart from their children (SIPP did not collect information on intra-household relationships, so no data is available on the nature of the mother-father relationship). Unfortunately, the bias of having only resident fathers is unknown, as little prior empirical work has compared the effect of earnings for resident versus non-resident fathers. Nevertheless, readers should be aware that the results presented below pertain only to fathers who live with their children, and do not necessarily pertain to fathers who maintain separate residences.

[10] It is still possible, of course, that individuals may increase their earnings in anticipation of an upcoming wedding or birth, in which case the directional arrow would still run from marriage (or fertility) to earnings. Even though I cannot rule out this possibility, I note that the emphasis of this study is on the differential effect of earnings on marriage than on births. As results will indicate, even if such an anticipatory effect exists, it is found only for marriage, but not for births.

The SIPP relies on self-reported earnings, which is likely reported with error. However, assuming that the error term is constant (that is, that individuals systematically over- or under-report their earnings), then controlling for individual fixed effects should minimize this bias. It is also not possible to discriminate between intended and non-intended births, so not all births were the result of "decisions". Nevertheless, the births were deliberate insofar as mothers made the decision not to terminate the pregnancy but to carry the child to term.

Lastly, the study cannot demonstrate causal links between earnings and marriage and fertility, as findings may be biased by omitted variable bias. Though fixed effects can more adequately address selection issues than can conventional methods such as Ordinary Least Squares, it cannot address bias arising from time invariant, unobserved factors. The study can only demonstrate that earnings have a differential effect with marriage than with fertility, but it cannot comment on the causality of those affects.

Models were estimated using multiple regression, where the dependent variable was first marriage or first birth, and the key independent variable was male or female earnings. All models included individual, state, and year fixed effects.[11] I used multiple regression instead of logistic regression because of the importance of including an individual fixed effect (logistic regression would drop all cases that did not experience a change in marital or fertility status; multiple regression does not drop such cases, though they do not contribute to the estimates). Using multiple regression also allowed me to include the individuals who experienced more than one marriage or birth over the course of the panel. In preliminary models, in which individual fixed effects were not included, I found similar associations in both logistic and multiple regression models between the independent and dependent variables, suggesting that results were not

[11] I included a state fixed effect to control for geographic variation in marital and fertility behavior. For many models, however, the state fixed effects were collinear with the individual fixed effects and were dropped. Results were not sensitive to the inclusion or exclusion of the state fixed effects.

sensitive to the use of multiple regression. All results were weighted to be nationally representative and to correct for sampling and non-response bias. I used Huber-White standard errors to correct for possible non-independence across observations.

Note that because I used individual fixed effects, the coefficients on the independent variables can be interpreted as representing a change from the individuals' mean values on that variable. I am therefore comparing within-individual differences in the effect of earnings, rather than between-individual differences in the levels of earnings.

Measures

The primary dependent variables of interest are the reference person's marriages and births. Marital status data were collected on a monthly basis, with a dichotomous variable indicating if a person was married.[12] People who married and then had a subsequent change in marital status (e.g., got divorced, or divorced and married again) had the married variable coded as zero in the months in which they reverted to unmarried status, but considering only first marriages (i.e. holding the married variable at one for the rest of the panel) did not change the results. Information on births was not collected directly, but was instead inferred from questions that asked if a person had any of their own children in the household, and the ages of those children. A birth was considered to have occurred if, in the previous month, the person indicated that they did not have any of their own children in the household, but in the next month, they had one child in the household, and that child was less than one year old (a multiple birth was counted as one birth). In less than 1% of the cases, a person had two separate births over the course of the panel. These higher order births were included in the sample, but treating all births

[12] In other analyses, I modeled the event of marriage, rather than the state of being married. Results did not change substantially.

as first births (e.g., ignoring the distinction between first and higher order births) did not affect the results.

The primary independent variable of interest was earned income, which was the sum of gross earnings, including wages and salary, and income from self-employment. An additional variable measured earnings for all others in the household, excluding the reference person's earnings.[13] All earnings amounts were converted to constant 2003 dollars, using the Consumer Price Index. Earnings variables were lagged by six months; lagging by nine months did not substantially change the results

Control variables, assessed on a monthly basis, included hours worked at job, disability status (1 = disabled), educational attainment [no high school diploma (omitted category), high school diploma or GED, some college, bachelor's degree, or graduate degree], and age. These control variables were lagged by six months, to be consistent with the earnings variables. Race and ethnicity, as time invariant characteristics, were not included in the fixed effect regressions, but are reported in the descriptive statistics. All variables were based on participant self-report.

Table 1 presents descriptive statistics on the both the person (top panel) and person-month (bottom panel) level, divided by gender. Females were slightly more likely to marry (20%) and have a child (8%) than were males (16% and 6%, respectively). The sample was predominantly non-Hispanic white, though roughly a third of the sample was non-Hispanic black or Hispanic. About half of all men had a high school diploma or less, as compared to one-third of women. Earnings were higher for men ($1,720 a month for men, $1,460 for women), with approximately 20% of both men and women reporting no earnings in a given month.

[13] Although the SIPP collects data on means-tested unearned income, such as Temporary Aid to Needy Families (TANF), very few women, and almost no men, in this childless sample had such income. Including variables for TANF did not substantially change the results. Because so few individuals received TANF, the TANF estimates were unreliable and not included in the final models.

Results

The first set of results, as presented in Table 2 and Figure 2, regresses male marriage and births on earnings. When marriage was the dependent variable, the sample was divided by fertility status at the time of the marriage (had a child or did not have a child). Similarly, when births were the dependent variable, the sample was divided by marital status at the time of the birth. Table 2 presents the coefficients and Figure 2 the predicted probabilities.

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<< Figure 2 about here >>

The monthly earnings variables were divided into dichotomous indicators [no earnings (omitted category), $1-$1,000, $1,001-$3,000, $3,001-$4,000, $4,001-$5,000, and $5,001 and above]. Dichotomous indicators, rather than a continuous amount, were used to test for threshold effects. Results did not vary substantially if other earning ranges were used; the basic pattern of effects also held if earnings were logged instead of divided into categories. [14]

The results for marriage (Table 2, first set of columns, and Figure 2, panels labeled 2.A and 2.B) indicate a threshold effect of earnings, but only for men without children. For childless men, earnings were positively related to marriage, but significant differences in earnings disappeared at the upper end of the distribution, such that there were no significant differences between earnings categories above the $4,000 mark (the threshold effect is indicated by a

[14] To see if these results were sensitive to either the individuals' educational attainment or to their age, I conducted additional models in which the sample was divided by educational status (those with a bachelor's degree or higher versus those with less than a bachelor's degree) and by age group (18-25 year olds, 25-35 year olds, 35 and above). The results for the educational models indicated minimal differences by the presence or absence of a bachelor's degree (although the negative correlations between female earnings and fertility were greater in magnitude for those without a bachelor's degree). Findings also did not vary substantially by the age group considered, though in a few instances, coefficients were associated with higher standard errors and were no longer statistically significant at conventional levels. Nevertheless, the same pattern of results was seen across age groups.

vertical dashed line on Figure 1). This threshold effect was predicted by the FEFFT, which argued that a certain standard of living was necessary prior to marriage, and is arguably inconsistent with the TEM, which emphasized linear returns to earnings over threshold effects.

This threshold effect was found only for men who did not have a child. Among male parents, earnings were non-significantly related and slightly downward sloping. Neither the FEFFT nor the TEM would have predicted a non-significant association between earnings and marriage for men who have a non-marital birth, as this result suggests a strong moderating role for fertility in determining the associations between earnings and marriage.

The results for births (Table 2, second set of columns, Figure 2, Panels 2.C and 2.D) indicate that male earnings, irrespective of marital status, were unrelated to fertility. These results support the FEFFT contention that unmarried men's earnings would be insignificantly related to fertility. They do, however, run contrary to both the FEFFT and the TEM prediction that married male earnings would be significantly related to fertility.

The lack of correlation between births and male earnings contrasts with the strong positive correlation seen between marriages and male earnings (among childless men), and suggests that male earnings has a differential association with marriage than it does with fertility. These differential associations were confirmed in additional results not shown, in which the earnings coefficients from the model of marriage (2.A in Figure 2) among childless men was compared to the earnings coefficients from the models of births among unmarried (2.C) and married (2.D) men. The earnings coefficient from the marriage models was significantly different than the earnings coefficients in either fertility model, suggesting that, as predicted by the FEFFT and in contrast to the TEM, changes in male earnings have a stronger association with marriage than they do with fertility.

Results thus far indicate a positive correlation between marriage and the earnings of childless men, and insignificant associations between marriage and the earnings of men with children, and between fertility and male earnings. Results have not been fully consistent with either the TEM or the FEFFT, but the differential effect of earnings on marriage and births is more consonant with the FEFFT. The next set of results uses the same models as described above, but limits the sample to women (Table 3 and Figure 3).

<< Table 3 about here >>

<< Figure 3 about here >>

In contrast with both the FEFFT and the TEM, female earnings were not significantly related to marriage for either those who had a child or those who were childless (first set of columns, Table 3, and Figure 3, Panels 3.A and 3.B). The individual earnings dummies varied about 0, but did not demonstrate a strong linear pattern either negatively or positively. These results do not support the FEFFT idea that female earnings, similar to male earnings, would exhibit a threshold effect with marriage. Nor are they fully consistent with the TEM, which suggested that female earnings would be inversely correlated with the likelihood of marriage.[15]

Female earnings were negatively correlated with fertility, with particularly strong effects for those who were married at the time of the birth. The results for both unmarried and married women are consistent with the TEM, and indicate that women, as Becker suggested, face a trade-off between additional earnings and the costs of home production. Notably, though, the TEM would not have predicted that the association would necessarily be more pronounced for married women. The regression-adjusted trend line is steeper for married women than for unmarried women, which may suggest that changes in earnings are less important for unmarried women

[15] As noted before, this result is more consistent with Wilson's understanding of the TEM than Becker's.

than for married women. Married women may have more reliable access to the father's earnings, and can more easily pool earnings.

Comparing the earnings coefficients across the marriage and fertility models (e.g., Panel 3.A to Panels 3.C and 3.D, respectively) indicates that the earnings coefficients differ significantly. In contrast to men, though, the implication of these differences is that female fertility behavior is more strongly associated with earnings than is female marital behavior. This result does not support the TEM, which implicitly assumed that changes in earnings would equally affect marital and fertility status, or the FEFFT, which predicted that changes in earnings would have a larger effect on marriage than on fertility.

To summarize, the FEFFT had slightly more accurate predictions than the TEM for men, and the TEM more accurate predictions for women. For men, the FEFFT was validated because it predicted the threshold effect of earnings found for childless males, and the insignificant association between unmarried men's earnings and fertility. For women, the TEM was validated as it predicted the negative associations between female earnings and fertility. The findings for several sub-groups, including male parents who marry, married men who have children, females who marry, and unmarried females who have children, do not align neatly with either theory.

Discussion

American patterns of family formation refute conventional assumptions that marriage and fertility behavior are inexorably linked, as many individuals choose to have children outside the bonds of matrimony. This seeming separation between marriage and fertility decisions suggests that previous theories of family formation, which have implicitly or explicitly assumed that models of marriage incorporate models of fertility, cannot provide a comprehensive

understanding of contemporary family formation patterns, and why the decision, among many individuals, to bear a child is separate from the decision to marry.

This study has examined one theory, the FEFFT, which has sought to address previous theoretical shortcomings by recognizing the independence of the decision to wed from the decision to bear a child, yet also incorporates both marriage and fertility decisions into one framework. The key factor for the FEFFT is earnings, as the FEFFT argues that the separation between marriage and fertility decisions arises because marriage is associated with an expected standard of living, but childbearing is not. Earnings' differential effect on marriage and childbearing, when coupled with societal norms that allow childbearing and sexual intimacy outside of marriage, suggest that individuals, particularly those with fewer economic resources, delay marriage until the appropriate economic standards have been met, but do not apply the same standards to childbearing.

When the FEFFT is compared with traditional economic models of marriage in predicting the associations between earnings, marriage, and fertility, neither theory could fully explain the pattern of results found. The FEFFT was slightly more accurate in its predictions for men, insofar as men's earnings exhibited a threshold effect on marriage, but not on fertility. Earnings coefficients from the married models were significantly different than earnings coefficients from the childbearing models, supporting the FEFFT's contention that marriage and fertility can no longer be considered a joint decision, governed by the same earnings framework (Gibson-Davis, Forthcoming; Gibson-Davis et al., 2005). It is also consistent with past work that has found weaker associations between male employment and out-of-wedlock childbearing (Lerman, 1989; Testa et al., 1989). Instead, men's marriage decisions, as compared to their fertility decisions, were much more sensitive to changes in the earnings distributions. Given that the TEM assumes

that fertility follows from marriage, it predicted that the same positive associations would hold for marriage and fertility, but the lack of association between male earnings and fertility belies this assumption.

A notable caveat to the adequacy of the FEFFT in its understanding of male marriage patterns is that the threshold effect of earnings was only found for men who did not have a child at the time of their birth. Numerous qualitative studies (Edin & Kefalas, 2005; Gibson-Davis, 2007; Gibson-Davis et al., 2005), upon which FEFFT is based, have found that parents see their poor financial standing as a barrier to marriage This quantitative evidence suggests, however, that such individuals' marriage decisions are not sensitive to changes in male (or female) earnings. Instead, these results suggest that a non-marital birth moderates the association between marriage and earnings; it is unknown if this moderation is causal or correlational.

As an example of a causal moderation, having a child may cause individuals to change the calculus upon which marriage decisions are based; for individuals who have had a child together, but have not committed to each other in a marriage, earnings may be less important than other factors such as trust, fidelity, and emotional support. Evidence for this view is found in the work of Carlson, McLanahan, and England (2004), which found no significant associations between earnings and marriage in their study of new parents once relationship quality measures were taken into account. Alternatively, as an example of a correlational moderation, dissimilarities between those who do and do not experience a non-marital birth may result in different tastes and preferences in regards to the expected relationship of earnings with marriage. Future work will need to analyze the causal or correlational role of non-marital births more extensively, and investigate if the insignificant associations also hold for unmarried men who live apart from their children. Nevertheless, these findings highlight the importance of pre-

marital childbearing in determining future marital behavior, and suggest that theoretical frameworks of family formation patterns should account for variation by fertility status.

As for the adequacy of the TEM and the FEFFT in predicting the associations for women, the results were again mixed – neither theory was accurate in the marriage models, but the TEM was more accurate in the fertility models. In the marriage models, the insignificant associations found between female earnings and marriage runs contrary to both the TEM's contention that female earnings undermine the benefits of marriage and to the FEFFT's contention that high levels of female earnings were necessary for marriage. This result is noteworthy in that qualitative evidence has shown that individuals believe both members of a couple must be financially secure prior to marrying, and that women are hesitant to marry unless they have some economic resources to fall back on (Edin & Kefalas, 2005; Gibson-Davis, 2007; Smock et al., 2005). Nevertheless, the results were more consistent with studies suggesting that male earnings are more important in determining marital behavior than are women's (Smock & Manning, 1997; Smock et al., 2005; Xie et al., 2003), and reinforce the idea that men's economic position plays a critical role in marriage formation (Wilson & Neckerman, 1986).

In the fertility models, the negative associations found between female earnings and childbearing are fully consistent with the TEM's contention that the high opportunity costs of a birth for women account for the timing of childbearing. These costs are disproportionately born by women (Hotz et al., 1997), explaining why the negative correlation was found for women, but not men. The results are inconsistent with the FEFFT's assertion that women's earnings would be unrelated to childbearing decisions. Neither theory, though, would have necessarily predicted that married women's fertility would be more responsive to the level of their earnings. Results suggest that unmarried women appear to be less sensitive to gradations in the earnings

distribution, as an unmarried woman earning more than $5,000 was just as likely to have a have a child as an unmarried woman earning less than $1,000. This pattern of effects was not found for married women, where the odds of birth decreased almost linearly as earnings increased. This provides some suggestive evidence that unmarried women's earnings are less important in determining fertility choices than are married women's earnings, an intriguing finding warranting further investigation.

To summarize, neither the FEFFT nor the TEM could fully explain the associations found here. The FEFFT was slightly better at explaining the pattern of effects for men, and the TEM slightly better at explaining the pattern of effects for women. But the findings for certain sub-groups – namely, male married parents and unmarried mothers who have children – did not fit neatly into either theory. This suggests that further theoretical and empirical work is needed to more fully understand why children play a potentially moderating role in the association between earnings and marriage. Nevertheless, the differential effect of earnings on marriage than on fertility, found for both men and women, provides evidence that earnings do not play the same role in marriage and childbearing. This study has therefore highlighted how the disparate effects of earnings on marriage and fertility are inadequately addressed by theories which presuppose that marriage and fertility are joint decisions. We need a better understanding of the theoretical underpinnings of marriage and fertility, and should strive to develop theories that can explain both branches of the family formation tree.

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Figure 1
Predicted Associations between Earnings and Marriage and Childbearing, By Gender According to the FEFFT and the TEM

	Marriage				Births			
	No child[1]		Child[2]		Unmarried[3]		Married[4]	
	TEM	FEFFT	TEM	FEFFT	TEM	FEFFT	TEM	FEFFT
Males	↑	th	↑	th	↑	ns	↑	↑
Females	↓	th	↓	th	↓	ns	↓	ns

Notes:
FEFFT: Financial Expectations and Family Formation Theory
TEM: Traditional Economic Model
th: threshold effect.
ns: no significant association.
Up and down arrows indicate the direction of the predicted association between earnings and the outcome.

[1]Refers to individuals who do not have a child at the time of their marriage.

[2]Refers to individuals who have a child at the time of their marriage.

[3]Refers to individuals who are not married at the time of the child's birth.

[4]Refers to individuals who are married at the time of the child's birth.

Table 1
Descriptive Statistics of Time Invariant and Time Variant Characteristics, 1996 and 2001 SIPP Panels

Person level		
	Males	Females
Family formation		
Gets married	.16	.20
Has infant	.06	.08
Race/ethnicity		
White	.66	.68
Black	.15	.16
Hispanic	.20	.17
Other race/ethnicity	.06	.06
Educational attainment		
Less than HS diploma	.16	.11
HS diploma	.31	.23
Some college	.34	.39
Bachelor's degree or higher	.20	.27
	.53	.66
Age	27.0	26.2
Number of persons	*10,190*	*7,072*

Person-month level		
	Males	Females
Monthly earnings (in $1,000s)		
Individual	1.72	1.46
Total household	2.50	2.53
Had no earnings	.22	.23
Hours worked	126	120
Disabled	.11	.08
Number of adults in household	2.44	2.36
Number of person-months	*303,178*	*213,611*

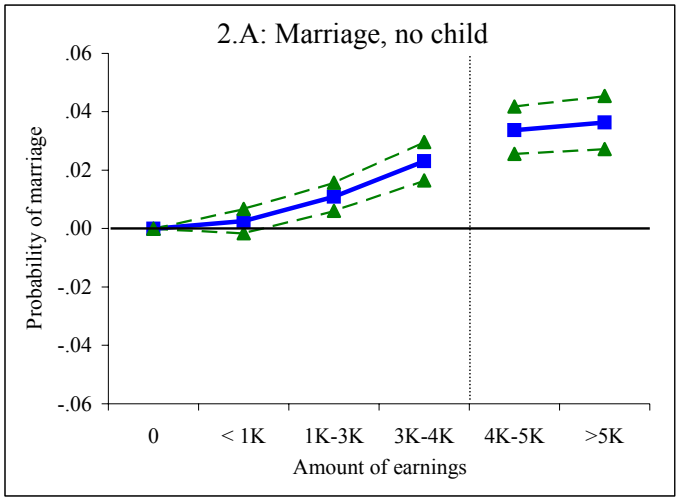
Notes:
All time invariant characteristics were assessed at month 1.
Time variant characteristics vary by month, and were pooled across months.

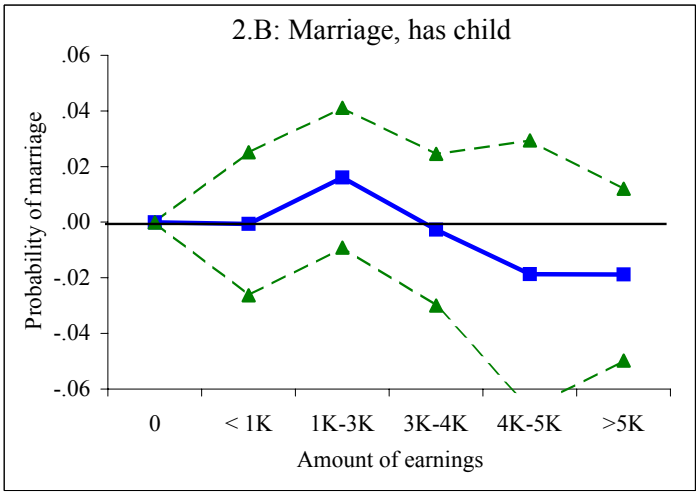
Table 2
Regressions on Marriage and Births, Men

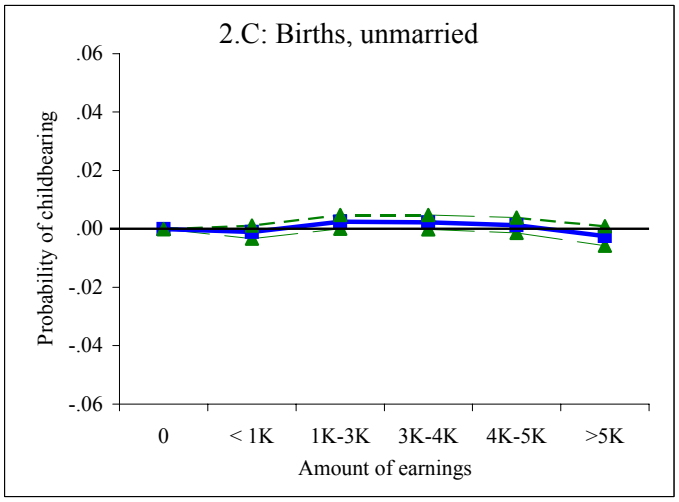
	Marriage		Births	
	No child	Has child	Unmarried	Married
Earnings				
$0	--	--	--	--
$1 - $1,000	.0026	-.0006	-.0011	.0024
	(.0021)	(.0129)	(.0011)	(.0157)
$1,001 - $3,000	.0109***	.0160	.0024*	-.0214
	(.0024)	(.0126)	(.0012)	(.0148)
$3,001 - $4,000	.0231***	-.0027	.0023	-.0221
	(.0033)	(.0136)	(.0012)	(.0164)
$4,001 - $5,000	.0337***	-.0187	.0012	-.0078
	(.0041)	(.0241)	(.0013)	(.0187)
> $5,000	.0363***	-.0189	-.0024	-.0002
	(.0046)	(.0155)	(.0016)	(.0201)
Observations	*156,527*	*4,568*	*144,358*	*16,737*

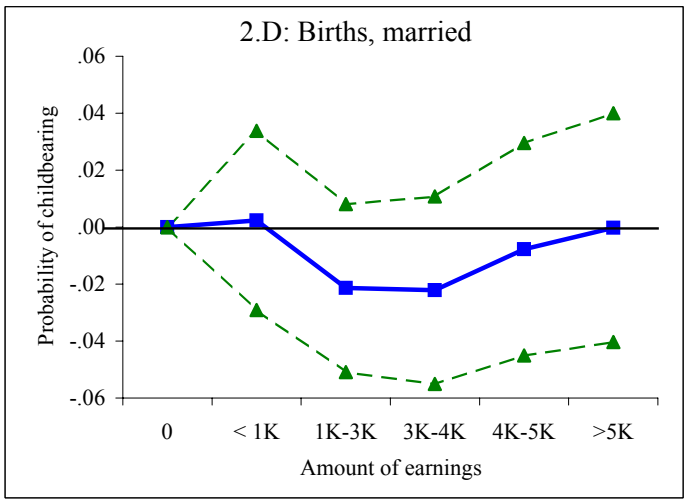
*** p<0.001, ** p<0.01, * p<0.05
Notes:
Models control for hours worked at job, disability status, educational attainment, age, earnings of others in the household, number of adults in the household, and individual, state, and year fixed effects.
All independent variables, except for the fixed effects, are lagged.
All results are weighted.
Robust standard errors in parentheses

Figure 2
Predicted probabilities of marriage and births, men









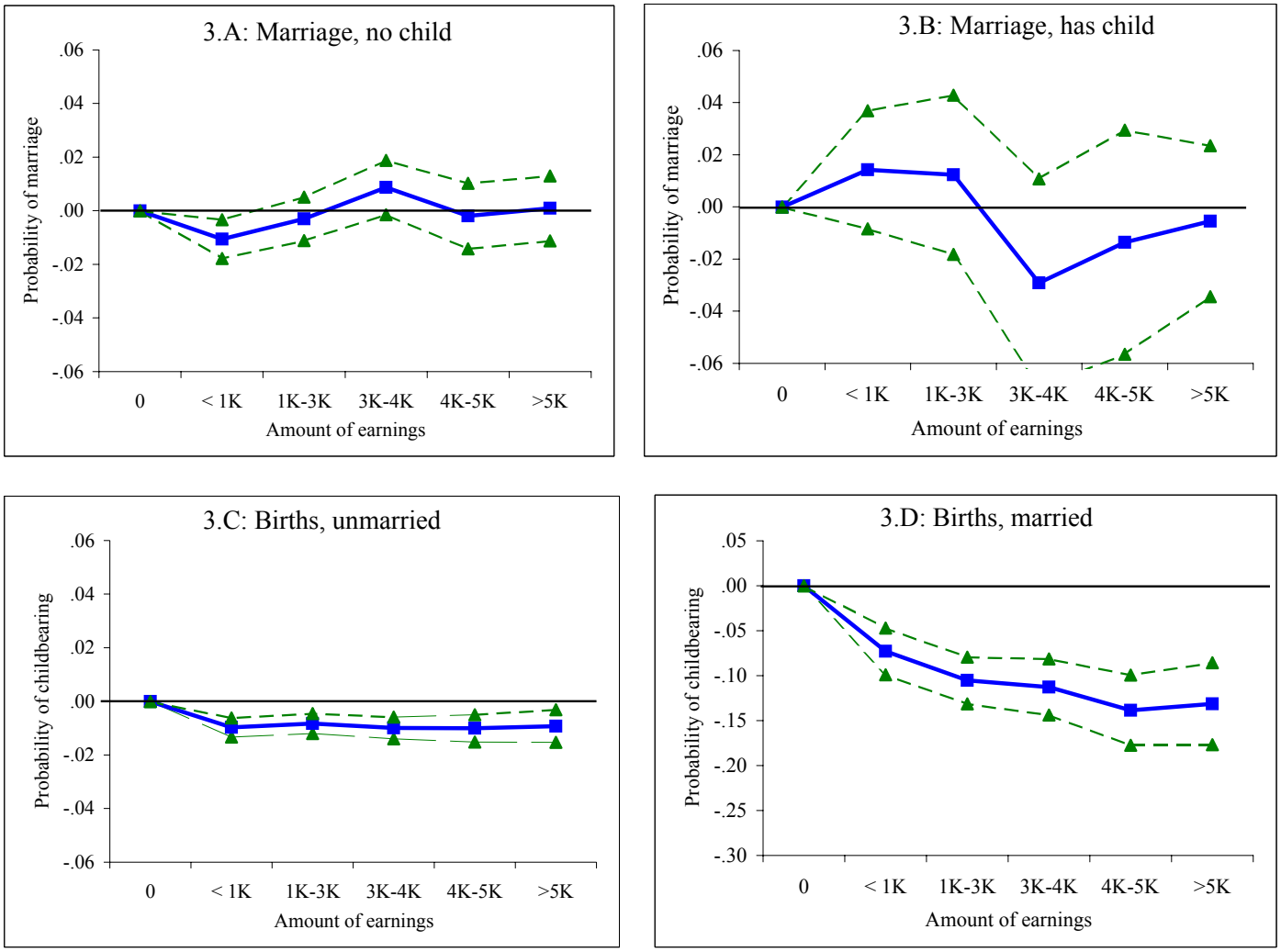
Note:
Dotted lines represent 95% confidence intervals.
Vertical lines for the no child groups represent the threshold effect, above which there were no significant differences in the earnings categories.

Table 3
Regressions on Marriage and Births, Women

	Marriage		Births	
	No child	Has child	Unmarried	Married
Earnings				
$0	--	--	--	--
$1 - $1,000	-.0106**	.0143	-.0097***	-.0730***
	(.0036)	(.0113)	(.0018)	(.0130)
$1,001 - $3,000	-.0031	.0123	-.0083***	-.1054***
	(.0041)	(.0153)	(.0019)	(.0131)
$3,001 - $4,000	.0087	-.0291	-.0099***	-.1127***
	(.0051)	(.0200)	(.0020)	(.0156)
$4,001 - $5,000	-.0019	-.0136	-.0101***	-.1385***
	(.0061)	(.0215)	(.0025)	(.0195)
> $5,000	.0009	-.0054	-.0092**	-.1312***
	(.0061)	(.0145)	(.0030)	(.0227)
Observations	*109,582*	*4,762*	*100,140*	*14,204*

*** p<0.001, ** p<0.01, * p<0.05
Notes:
Models control for hours worked at job, disability status, educational attainment, age, earnings of others in the household, number of adults in the household, and individual, state, and year fixed effects.
All independent variables, except for the fixed effects, are lagged.
All results are weighted.
Robust standard errors in parentheses

Figure 3
Predicted probabilities of marriage and births, women



Note:
Dotted lines represent 95% confidence intervals.