

**GOOD NEWS FOR LOW-INCOME FAMILIES?
TAX-TRANSFER SCHEMES, AND MARRIAGE**

Nada Eissa
University of California, Berkeley and NBER
eissa@econ.berkeley.edu

and

Hilary Williamson Hoynes
University of California, Berkeley and NBER
hilary@econ.berkeley.edu

Department of Economics
549 Evans Hall
University of California, Berkeley
Berkeley, California 94720-3880

This Draft: March 2003

We wish to thank Alan Auerbach, Richard Blundell, Steve Bronars, Clair Brown, David Card, Don Fullerton, Jon Gruber, Darren Lubotsky, Anne Piehl, Jim Powell, John Quigley and Doug Schwalm for useful discussions and comments; seminar participants at Chicago, Northwestern, UC Berkeley, UC Davis, UCLA, Wisconsin, and NBER for suggestions. Darren Lubotsky and Doug Schwalm provided excellent research assistance. Eissa received financial assistance from the Institute for Industrial Relations at U.C. Berkeley. Hoynes received financial assistance from the NICHD and the Sloan Foundation. Computing support is provided by the Econometrics Laboratory at UC Berkeley.

1. Introduction

A long standing and popular criticism of public assistance programs is that they undermine the traditional family through their adverse incentives for creating and maintaining two-parent families. Indeed, empirical evidence supports the view that welfare has some role in family structure decisions (Moffitt 1998, Hoynes 1997b). This argument resonates because marriage is highly correlated with health status, lower mortality, wealth, and children's well-being (Waite 1995). Of all these correlates, children's well-being is perhaps the most powerful in terms of the potential impact on social welfare. Children in two-parent families are less likely to live in poverty, drop out of high school, bear children out-of-wedlock, or engage in criminal activity (McLanahan and Sandefur 1994).

This and other criticisms have led to dramatic changes to the public assistance system in the United States, including time limits to Aid to Families with Dependent Children (AFDC) and expansions of the Earned Income Tax Credit (EITC). The EITC is a refundable credit for lower-income families with children. By transferring money to lower-income taxpayers, the credit has partially taken on what has traditionally been the role of the welfare system. The EITC is fundamentally different from traditional welfare, however, because it is transferred only to working individuals and because it is administered through the tax system.

Advocates of the EITC argue that, unlike traditional welfare, the credit helps "promote both the values of family and work."¹ Indeed, empirical evidence consistent with economic theory suggests that the EITC promotes employment among eligible unmarried women with children (Eissa and Liebman 1996, Meyer and Rosenbaum 1998). To target benefits to lower-income families, however, the EITC is based on family income, leading to a very different set of incentives for married taxpayers. As a result, traditional welfare-type disincentives lead secondary earners in married couples to *reduce* labor force participation (Eissa and Hoynes 1998a) and to work fewer hours if in the labor force (Attanasio and MaCurdy 1997).

Because the EITC is based on family income and because the same credit schedule applies to all taxpayers with children regardless of marital status, the EITC is not neutral with respect to marriage. By non-marriage neutrality, it is meant that the credit for a married couple differs from that for 2 unmarried individuals with the same total income and family size. In the extreme case of a married couple with 4 children and \$24,700 of earnings, the maximum EITC marriage penalty for tax year 1998 is \$6517 (26.4 percent). Non-marriage neutrality is not unique to the EITC, however. Both federal and state taxes (Feenberg and Rosen 1995) and traditional transfer programs generally are not marriage neutral (see Moffitt 1998).

¹Remarks by the President at Income Tax Credit Event, White House Press Office, December 4, 1998.

In this paper, we examine the impact of both the tax and transfer systems in the United States on marriage decisions. We first calculate and document changes to the cost of marriage in terms of taxes and transfers over the past decade in the United States. We then evaluate the effect of these changes in the tax and transfer cost of marriage on individual marriage decisions.

Evaluating the marriage effects of the comprehensive tax and transfer system is important in several respects. Recent work has shown that evaluating the tax or transfer consequence of marriage in isolation can be misleading because the consequences depend on both the income tax and welfare systems (Dickert and Houser 1998). Historically the population affected by the welfare system was not subject to the income tax and therefore the approach in the empirical work of evaluating transfer programs and federal income taxes in isolation was valid². The EITC, however, has introduced large numbers of single mothers into the labor force and therefore into the income tax system. While the EITC is administered by the Internal Revenue Service (IRS), it is considered part of the overall transfer system in the United States. In fact, the EITC is the largest cash-transfer program at the federal level for lower-income families with children. While our primary interest is to evaluate the EITC, we account for all taxes and transfers in characterizing the (dis)incentives for marriage. A striking observation about the EITC is that essentially nothing is known about its effects on family formation decisions. This observation is important because, unlike other transfer programs, the EITC taxes marriage among some taxpayers but subsidizes marriage among other taxpayers. In addition, like transfer programs, EITC marriage (dis)incentives can work in the opposite direction to the positive effects of transferring dollars to needy families. Understanding the marriage response is therefore essential to evaluating the effectiveness of the EITC as a transfer program, and to the design of tax-transfer schemes more generally.

The tax and transfer consequences of marriage in the United States have changed dramatically over the past decade. CPS data show that the likelihood of facing a marriage-tax penalty (subsidy) is rising (falling) so that marriage is more likely to be taxed in 1997 than it was in 1984. They also show substantial differences in the *change* in the tax consequence of marriage by income class. The marriage tax is increasing most substantially for taxpayers with incomes between \$30,000 and \$50,000, but declining for taxpayers with incomes below \$20,000 (1997\$). The substantial time variation in the overall tax consequences, as well along the income distribution are shown to be driven by tax laws, especially expansions to the EITC.

We examine the impact of these changes to the tax-transfer consequences of marriage on individual

²Only one paper has attempted to evaluate the effect of the comprehensive set of tax and transfer schemes on marriage (Dickert-Conlin 1996).

behavior by estimating a discrete choice model of the propensity to be married. Consistent with the bulk of existing work on marriage, we focus on the marriage decision of females. We model the marriage decision as a function of individual and marriage market characteristics, and the tax-transfer cost of marriage. While this paper could be considered part of the literature attempting to explain the dramatic changes to marriage behavior over the past three decades (Schultz 1991, Wood 1995, Brien 1997), we note at the outset that the objective of this paper is not to explain marriage trends. This paper uses changes to marriage tax consequences and marriage propensities over time to evaluate the impact of the EITC, and tax-transfer schemes more generally on marriage decisions.

Our results suggest that the tax-transfer consequences of marriage do affect marriage behavior, but that the overall effect is relatively modest. We estimate that reducing the marriage income tax penalty by \$1000 would raise the probability of marriage by about 1.3 percentage points. This effect is remarkably consistent across various specifications and definitions of the total cost of marriage, but exhibits notable variation across groups defined by race and education. When we incorporate public assistance transfers, we estimate that the probability of marriage rises by between 2.4 and 3.3 percentage points for every \$1000 reduction in marriage costs. We find that the marriage behavior of blacks and the least educated is most responsive to the total tax-transfer cost. When we decompose the total cost of marriage into the tax and the transfer components, we find stark differences among blacks and whites: whereas the transfer component is more relevant for blacks, the tax component is more important for whites. This result is not surprising given the location of these groups along the income distribution.

We then use these results to simulate the effect of the EITC and tax changes from 1984 to 1997, and find that EITC expansions between 1984 and 1997 raised marriage rates by 1 percentage point for the lowest-income families (\$10,000 - \$15,000), and reduced marriage by 0.4-0.8 percentage points for middle-income families (\$25,000 to \$50,000). Separate simulations of welfare and non-EITC federal taxes between 1984 and 1997 show that their effects on marriage are comparatively small.

This paper is organized as follows. Section 2 presents a brief overview and discussion of tax and transfer schemes and the implications of marriage. Both the federal income tax and the traditional welfare system are discussed, although separately. The data and descriptive evidence on the tax and transfer consequences of marriage are discussed in section 3. Section 4 reviews empirical literatures relevant to this paper. A small body of work evaluating income taxes and marriage and the substantial work on welfare and marriage are also reviewed separately. Section 5 presents the conceptual framework typically used for marriage

analysis. Our empirical framework is presented in section 6, while regression results are in section 7. We present our conclusions in section 8.

2. Tax and Transfer Schemes

2.1 Tax Treatment of the Family

Notions of vertical and horizontal equity are central to the design of income tax code. There is general agreement that the tax code should be progressive, although disagreement exists on the degree of progressivity. There is also general agreement that the tax code treat equals equally, defined on the basis of *family* income. Together, however, these two principles of taxation imply that the tax code will not be marriage neutral (Rosen 1977).³ A married couple is likely to have a different tax liability than 2 unmarried individuals with the same total income and family size. Although marriage neutrality of the tax code has been espoused by some, it is not at all clear that the tax system should treat marriage neutrally. On the one hand, the notion of horizontal equity suggests that marriage should be taxed because couples benefit from economies of scale deriving from sharing resources.⁴ The benefits of economies of scale accrue to any group of individuals residing together, however, and are not taxed generally if they accrue to cohabiting couples, adult children living with parents, or group-home residents. On the other hand, marriage confers social benefits primarily in the form of child well-being. To the extent that the relationship between marriage and child well-being is causal, and to the extent that individual marriage decisions ignore the social benefits, a strong argument for government intervention emerges. Here, the tax code should subsidize marriage. In addition, the strong correlation between poverty and single-parent families suggests that marriage may be viewed as a cost-effective poverty alleviation policy.

2.2 The Federal Income Tax

While 59 provisions of the federal income tax code alter tax liability by marital status (GAO, 1997), it is primarily the combination of a progressive income tax schedule and taxation on the basis of total family income that generates marriage non-neutrality. Features of the tax code most often discussed include the different statutory federal income tax schedules and standard deductions depending on family (i.e., filing) status. Less-prominent provisions include those related to the child-care tax credit and the taxation of social security

³ Marriage neutrality is attainable if horizontal equity is defined on the basis of individual instead of family income.

⁴ Other benefits that accrue to married couples include family coverage in employer-provided health insurance. Such benefits create additional justifications for taxing marriage.

benefits. Together these features operate to tax marriage in some cases and subsidize it in other cases. In tax year 1996, approximately 42 percent of couples filing a joint federal tax return faced a marriage penalty (averaging 2 percent of income), while 52 percent received a marriage bonus (averaging 2.3 percent of income) (CBO, 1997).⁵

These modest overall penalties mask substantial heterogeneity in the population. Penalized married taxpayers with less than \$20,000 in earned income face an average marriage penalty of 8 percent of income. A significant share of marriage penalties and subsidies incurred by lower income families is caused by the loss of the EITC (CBO 1997). A taxpayer's eligibility for the EITC depends on the taxpayer's earned income (or in some cases adjusted gross income), and the number of qualifying children who meet certain age, relationship and residency tests.⁶ The amount of the credit depends on the tax unit's earned income, adjusted gross income, and, since 1991, the number of EITC-eligible children in the household. The credit is refundable, so that any credit exceeding the family's tax liability is returned in the form of a cash refund. In tax year 1998, the maximum credit amount is \$3,756 for a family with two or more children, and \$2,271 for a family with one child.

Table 1 presents calculations to illustrate the potential size of the EITC and income tax marriage penalty using 1997 tax law (the most recent year used in the paper). Each panel represents calculations for hypothetical couples differing by the number of children and the distribution of earnings within the couple. We present the taxpayers' gross federal income tax liability, their EITC and net federal tax liability. The last column of the table presents the marriage tax consequence, calculated as the difference between the couple's joint tax liability and the sum of their individual tax liabilities if not married.⁷ A positive value in column 5 corresponds to a tax penalty while a negative value corresponds to a tax subsidy.

The calculations highlight several important determinants of the tax consequence of marriage. Most notable is that the employment status of the secondary earner implies very different tax consequences: whereas two-earner couples face marriage tax penalties, single-earner married couples receive marriage tax bonuses [Panel 1 vs Panel 2]. In fact, a married couple's tax penalty (subsidy) is increasing (decreasing) with the share

⁵These estimates are very similar to the simulated distribution of marriage penalties and subsidies using our CPS data of married couples.

⁶ See Eissa and Hoynes (1998b) for a discussion of eligibility rules.

⁷ Assuming a model of cohabitation allows one to interpret these estimates as net gains or losses from marriage. The assumption allows us to ignore costs associated with physical separation, and raises the question of whether the correct estimate of the marriage tax consequence should be based on the minimum alternative tax liabilities. We will address this issue in future work.

of 'secondary-earnings' in the family (Table 2). In either case (penalty or subsidy), the EITC exacerbates the marriage-tax consequences. In addition, marriage tax penalties increase with family size (number of children) among EITC-eligible couples. Panel 1 shows that a dual-earning couple with two children faces a sizeable marriage tax penalty of \$2,733 (11.4 percent of income). A similar childless couples on the other hand faces a tax penalty of \$210 (1 percent of income).

2.4 *Traditional Welfare Programs*

Transfer benefits can change dramatically with family structure. Needy families are eligible to receive cash transfers through AFDC, and in-kind transfers through Food Stamps, health insurance through Medicaid and Housing Assistance. Participation in most of these programs requires satisfying two types of eligibility conditions: resource restrictions (means tests) in the form of an income and asset test, and categorical restrictions.

AFDC cash assistance is provided to households with children less than 18 years of age with sufficiently low income and assets that are determined at the state (income) and federal (asset) level. While eligibility has historically been limited to single-parent households, starting with selected state expansions in 1961 and eventually with a federal mandate in 1990, states have extended eligibility to two-parent families through the AFDC Unemployed Parent (AFDC-UP) program. Nonetheless, participation rates are very low, in part because of the additional eligibility requirements (Hoynes 1996).⁴ Thus, the AFDC program benefits primarily unmarried parents.

Food Stamps is the only program that has no explicit bias against married couples. Eligibility is based on the individuals sharing meals and is extended to all needy families, regardless of family structure and regardless of the presence of children. Cohabiting and married couples are therefore treated equally.

Medicaid is available primarily to recipients of cash assistance, including families with children receiving AFDC. Historically, losing AFDC eligibility implied losing Medicaid eligibility. Beginning in 1984, however, expansions weakened the link between cash benefit receipt and Medicaid eligibility, and extended Medicaid to all poor children regardless of family composition (e.g. presence of two parents). Nonetheless, in some cases, married couples can lose Medicaid benefits if their joint income exceeds the poverty level.

Housing assistance is administered primarily at the local level and takes several forms that span public

⁴Two-parent families must satisfy two additional conditions. The primary wage earner in the family must work less than 100 hours per month and display previous "significant" attachment to the labor force.

housing and subsidized private housing. Unlike each of the programs discussed above, housing is not an *entitlement* program, in that eligibility does not guarantee the receipt of benefits. Although all AFDC recipients are categorically eligible, only about 30 percent receive benefits (U.S. House of Representatives, 1998).

3. Descriptive Analysis of the Tax-Transfer Cost of Marriage

3.1 Data Construction and Sample Characteristics

We use data from the 1985-1998 March Current Population Survey (CPS) that cover tax years 1984 to 1997. The CPS data have the advantage of large samples and cover an extensive time period, allowing us to use changes in the tax-transfer consequences of marriage from recent EITC expansions.

We first create tax-filing units (the relevant unit for the federal tax and the EITC) by separating related subfamilies from primary families⁵. Our main selection criteria are based on age. The sample includes individuals between the ages of 18 and 47.⁶ We classify observations as married if the individual reports being married and residing with his (her) spouse; and as unmarried if the individual reports being never married, separated, divorced, married spouse absent, or widowed. Eliminating observations with incomplete information and pooling over 14 years generates 677,697 observations: 269,265 married couples and 408,432 unmarried individuals. The marriage model is estimated using single and married women (476,746 observations).

We also use the CPS sample to create a measure of the marriage market in which each individual participates: the male to female population ratio. Evidence suggests that defining this ratio at the state level is preferable to more dis-aggregated levels (Brien 1997). In addition, Brien finds that conditioning on the employment of the men in calculating the ratio was preferred to a pure population ratio. We therefore calculate male to female population ratios within cells defined by year, state, age, and race using several alternative definitions for males (all men, all men working full time [over 35 hours per week last year], all men with earnings over the poverty line).

Table 3 presents summary statistics for the sample of married men and women, and unmarried men and women respectively. It shows that about 60 percent of males and 56 percent of females in the sample are married. Those who are married are on average older, more educated (and higher earning) and more likely to

⁵Individuals under 24 residing with their parents and attending school are considered dependents for the federal tax and qualifying children for the purpose of the EITC. This coding removes these individuals from the pool of unmarried persons in our sample. They represent XX percent of the sample.

⁶We expand the age selection slightly if an individual is married to someone within the age restriction. However we only allow this for couples with ages less than 5 years apart. Data for 1990 show that the median age differential between men and women is 1.9 years for first-marriage, and 3.2 years for remarriage by divorced individuals (Statistical Abstract of the United States 1998).

be white and have children. Those that are married also have better “marriage markets”. That is, the male/female population ratios (assigned based on year, state, age and race) are higher for married women than single women. Higher earned income for married men most likely reflects differences in age (experience) and education. Married and single women have similar current labor market participation and annual earnings even though married women are on average 5 years older and have slightly higher education levels. Comparing actual (and potential) spouses, we observe that while married women are younger and slightly less educated than their spouses, unmarried women are older and only slightly more educated than unmarried men. Unmarried women are also much more likely to be nonwhite and to have children than unmarried men. The table also presents mean predicted spouse earnings and suggests one story of why unmarried women remain single. Recall that spouse earnings are predicted using *own* (female) characteristics from the sample of married couples. As such, predicted spouse earnings essentially represent the value of own characteristics in the marriage market. The table shows that single women’s own characteristics are worth (much) more than actual earnings of single men.

3.2 Cost of Marriage, Definition and Calculator

The tax-transfer cost of marriage is defined as the difference between the net-of-tax transfer to the family if legally married and the sum of their individual net-of-tax transfers if unmarried. Because public assistance uniformly taxes marriage, we focus on the income-tax-cost of marriage, defined as the difference between the family’s income tax liability if married and the sum of the couple’s individual tax liabilities if unmarried:

$$(1) \quad T = L(E_m + E_f, U_m + U_f, N, S_m) - [L(E_m, (U_m + U_f)/2, 0, S_s) + L(E_f, (U_m + U_f)/2, N, S_{hh})]$$

where T is the marriage tax cost, and L is the tax liability as a function of earnings (E), unearned income (U), number of children (N), and the relevant tax schedule (S). The subscripts m and f refer to male and female. A complication that arises in calculating this marriage tax cost is that we observe individuals in only state (married or single).

To calculate counterfactual tax liabilities for married individuals, we simulate marital dissolution. This simulation requires making assumptions regarding the subsequent allocation of children, earned and unearned income. Upon separation, we assume that the wife receives custody of the children and therefore faces the (more generous) head-of-household schedule (S_{hh}), while her ex faces the single tax schedule (S_s). We also assume that unearned income is equally split between the husband and wife; and that labor supply is

unchanged with separation.⁷ Our method of imputing spouses for single individuals is discussed in section 6.

Our tax model calculates federal income, and payroll taxes from tax year 1984 to 1997.⁸ We assume that all taxpayers take the standard deduction⁹ and that all married couples file jointly. We do not model state income taxes and therefore do not account for state supplements to the EITC (currently available in nine states). While growing in importance, state EITC's continue to be small relative to the federal credit. Nonetheless, we are currently incorporating state EITC's and more generally state income taxes into our calculator.

The transfer calculator models AFDC and Food Stamps. AFDC eligibility criteria are based on an income and a federally set asset test. The income test varies by state and family size, while the asset test is constant across states. Transfer benefits depend on family income and a maximum AFDC benefit, which varies by state, family size and year. Because not all eligible families take up welfare benefits, we examine the sensitivity of the results to alternative definitions of AFDC benefits. We assume that only single mothers can receive AFDC, however, and calculate benefits using state of residence, year, and family size. We also assume a 100 percent tax rate on earned and unearned income. One set of alternative benefit measures maintains the 100 percent take-up assumptions. A second set of measures drops the 100 percent take-up assumption and adjusts benefits by the average rate of AFDC participation by state, education and race. Similar measures are constructed for food stamp benefits, which are assigned using year and family size, and a 30 percent tax on income.

Table 3 also presents the mean marriage tax and transfer costs for married and single individuals. For married couples, we present the figures for the cost based on actual spouse's earnings and on predicted spouse's earnings. To link our work to the existing literature, we present three measures of the cost of marriage: the total tax and transfer cost of marriage, the income tax cost only, and the transfer cost only. On average, both single and married women are subsidized by the tax system, with higher subsidies for married women. Both groups, however, are penalized by the transfer system, also with larger penalties for single women. Overall, the very large transfer penalties dominate leading to large penalties for the combined tax and transfer system.

⁷ The assumptions regarding the allocation of children and unearned income ignore any strategic behavior by the couple. If the couple's objective is engaging in arbitrage to minimize their total tax liability, the allocation of children and unearned income would be endogenous. In a related paper, we evaluate the sensitivity of the marriage tax consequence to these assumptions (Eissa and Hoynes 2000).

⁸ See Eissa and Hoynes (1998a) for more details on the tax calculator.

⁹ We are currently incorporating information on itemized deductions by income class.

3.3 *Tax Consequences of Marriage Across Families and Over Time*¹⁰

Starting with the Tax Reform Act of 1986 (TRA86), several tax acts between 1984 and 1997 changed dramatically the income tax code in the United States. TRA86 collapsed the income tax schedule from 11 to 2 nominal brackets, reduced the highest marginal tax rate from 50 to 28 percent, increased exemption amounts and the standard deduction, and indexed tax brackets. By reducing the progressivity of the income tax, TRA86 reduced the overall marriage penalty (Feenberg and Rosen 1995). The EITC was expanded through tax acts in 1986, 1990 and 1993 such that the associated marriage penalty from the income tax in 1997 could be as high as \$2,733 for a working couple with two children (see table 1). The changes relevant to the tax cost of marriage include the increase in the size of the maximum credit, the introduction and sharp increase in additional benefits for a second child and the expansion of eligibility to individuals earning nearly \$30,000.

In the remainder of this section, we document changes in the tax cost of marriage from 1984 to 1997 using the sample of married couples (to avoid simulating spouses for single taxpayers). Because it represents average penalties for married couples, the observed patterns may not be representative of single individual's overall marriage tax costs. Further, we choose to focus on the tax (as opposed to tax-transfer) consequences of marriage because much less is known about the tax system in this regard. It is well known that the transfer system creates unambiguous penalties to marriage.

While the overall average tax-cost of marriage is negative (-\$248, 1997\$) in the sample, this average for the entire sample sheds little insight into the marriage tax cost, however, because it varies substantially by income, the distribution of earnings and the presence and number of children in the tax unit. To highlight this variation, this section provides an overview of changes to the tax consequences of marriage from 1984 to 1997.

Figures 1 to 3 present the marriage tax consequences among our CPS sample of married couples along various dimensions. The figures highlight the large changes in these tax consequences over time and across the income distribution. Figure 1 presents the average marriage penalty among married couples for all couples, penalized couples and subsidized couples. For almost the entire period the tax system on average has subsidized marriage among all couples in the sample. The overall average subsidy has been steadily declining, however, with one exception in 1987 (the year TRA86 was first implemented). This overall tax consequence masks an important pattern: the marriage penalty among penalized couples and the marriage subsidy among subsidized couples have been increasing over this time. In addition to greater conditional penalties and subsidies over

¹⁰Eissa and Hoynes (1999) present a more comprehensive description of the impact of the EITC and other federal taxes on the marriage penalty. Here we present a broad overview of trends.

time, the tax system is increasingly more likely to penalize and less likely to subsidize couples (Eissa and Hoynes 2000).¹¹

Figure 1 also isolates the EITC cost of marriage. This separation is important because the EITC expansions over this period have affected an increasing proportion of the population, such that more than three times as many married couples are eligible in 1997 than in 1994.¹² The figure shows the striking result that essentially all of the changes over time in the tax consequences of marriage are due to the EITC. This occurs both for all taxpayers, penalized taxpayers and subsidized taxpayers.

Figure 2 shows that tax acts from 1986 to 1993 altered the tax consequence of marriage differentially across the income distribution. Comparing figures 2 and 3 shows that changes in the marriage tax cost over time within income classes is also driven by the EITC. At very low incomes, the EITC promotes marriage because joint family incomes raises the transfer if the couple has earnings in the phase-in region. At middle incomes, separating a married couple generates a larger EITC since some individuals (with children) become eligible.

3.4 *Marriage Trends*

Preliminary examination of CPS data from 1984 to 1997 shows dramatic changes in the marriage rates of men and women aged 18 to 47. The likelihood that individuals aged 18 to 47 reported being currently married fell from 59 percent to 55 percent. This pattern is explained exclusively by less educated individuals. The rate declined from 54 percent to 46 percent for those with less than 12 years of schooling, but remained constant at about 66 percent for those with more education. Declining marriage is also found within narrowly defined cohorts (figure 4). While the overall trends in marriage are not inconsistent with the trends for the tax-transfer penalties (the penalty is increasing at the same time that marriage rates are declining), it is not a straightforward leap from the figures even at that level for two reasons. First, figures 1 to 4 highlight the marriage penalty by simulating separation for married couples and therefore do not include the patterns for single individuals. Second, the impact of the tax-transfer system on marriage incentives varies along many dimensions (children, earnings of secondary earner, and income). What figure 4 does highlight is the importance of controlling for alternative explanations for the substantial declines in marriage rates over this

¹¹ By 1997, approximately 60 percent of couples in the sample face an average marriage tax penalty of \$1500 and 36 percent receive an average subsidy of \$2500.

¹²Note that the figures showing the EITC marriage penalty is shown for the sample of married couples with children.

time period.

4. Empirical Literature on Taxes, Transfers and Marriage

4.1 Empirical Income Tax Literature

The literature on the marriage tax can be divided into two groups. The first group is concerned with measuring the tax *incentives*, i.e., the size of the marriage tax penalty. Studies have examined how the marriage penalty varies with tax reforms (Rosen 1987, Feenberg and Rosen 1995, Alm and Whittington 1996), across families at point in time (Dickert-Conlin and Houser 1998, CBO 1997) or across families over time (Alm and Whittington 1996). These studies use various household-level data (tax or survey data) and define the tax cost of marriage as the difference between the married joint tax liability and the sum of individual tax liabilities if they file the appropriate tax returns as unmarried individuals (single return if childless, and head-of-household return if parent). Calculations of marriage tax consequences are shown to be sensitive to alternative assumptions regarding the allocation of assets and children, and labor supply behavior upon separation. Because non-custodial parents must file a single tax return (less generous than a head of household tax return), the allocation of children upon separation is critical to tax consequences of marriage (Alm and Whittington 1996). Most studies assume no behavioral response after separation, and assign the children and half of the couple's non-labor income to the wife.¹³

The second group of studies examine behavioral *responses* to the tax incentives. Early work uses aggregate time series data and correlates total marriage rates to the marriage tax cost evaluated at median income (Alm and Whittington [AW] 1995a, 1995b, Sjoquist and Walker [SW] 1995). AW use a *stock* variable (percent of women married) and find a small negative effect of marriage penalties on marriage. SW use the *flow* into marriage (rate of new marriages) in each year and find no effect of the marriage cost. The marriage penalty at median income, however, misses the substantial variation in the tax consequence of marriage across families with different income and sizes (Feenberg and Rosen 1995) and could be picking up a spurious correlation between secular trends and marriage penalties. It is therefore difficult to draw conclusions from these early studies. More recent papers use PSID data and exploit cross-sectional and time variation in the marriage tax consequence to examine the effects on divorce (Whittington and Alm 1997) and the *timing* of marriage between the last quarter of one year and the first quarter of the following year (Alm and Whittington

¹³The assumption of no behavior response to marriage essentially ignores household production motives for marriage.

1997). These studies find tax effects on marriage that are consistent with theoretical predictions but are small in size.

4.2 *Empirical Work on Welfare Programs*

While there is little consensus on the size of the effect, recent reviews of the literature suggest that welfare does have some effect on family structure decisions (Hoynes 1997a, Moffitt 1998). The literature on the effect of welfare programs on marriage is vast, covering a wide range of models, data sets, and time periods. Here, we will discuss the main methodological issues raised in the literature and summarize the estimated effects.

A substantive amount of work in this area examines the determinants of *female headship*, nesting both the marriage and fertility decisions of welfare recipients (Danziger *et. al.* 1982, Hill and O'Neill 1993, Hoynes 1997b, Moffitt 1994). This definition is used because that it is the criterion by which individuals become eligible for welfare benefits. Examining the trends in marriage and fertility between 1940 and 1990, however, Bacrach (1998) shows that much of the rise in female headship is due to a decline in marriage rates.

An additional dimension that is relevant in the analysis of marriage is cohabitation. Various estimates suggest that cohabitation rates are between 8.3 and 9.2 percent among women receiving AFDC, with higher cohabitation rates among less-educated individuals (Bumpass and Sweet 1989, Moffitt, Reville and Winkler 1998). Evidence on the impact of AFDC on cohabitation is not conclusive, however. Winkler (1994,1995) finds no statistically significant impact of welfare on cohabitation, but Edin (1991) finds that cohabiting boyfriends represent an important source of income for AFDC recipients in Chicago. Using various data sources, Moffitt *et.al.* (1998) find only weak evidence that AFDC rules encourage cohabitation.

The empirical literature places considerable emphasis on the validity of alternative sources of variation in welfare benefits. The primary source of identifying variation is across states and over time. The potential for correlation between omitted state factors and welfare generosity has led to the use of models controlling for random or fixed state effects (Ellwood and Bane 1985, Moffitt 1994, Hoynes 1997b). Such models require using either pooled cross-section or panel data sets where the welfare effect is identified from changes within states over time. Estimates from these models show somewhat smaller effects of welfare on family structure than those using cross-sectional data sets (Moffitt 1998).

The general conclusion from this literature is that higher welfare benefits do raise female headship rates, as predicted by simple economic theory. The estimated effects are quite modest in size, however, and do not explain the dramatic reductions in marriage rates seen over the past two decades. In fact, cash welfare

benefits have been declining in real terms since the early 1970s. Over the same time, marriage rates have also declining.

4.3 *Empirical Work on Combined Effect of Tax and Transfer Programs*

Evidence suggests that evaluating the tax or transfer consequence of marriage in isolation can be misleading because the consequences depend on both the income tax and the welfare systems (Dickert-Conlin and Houser, 1998). Yet the extensive body of work evaluating the effects of transfer programs and federal income taxes on marriage has examined each in isolation. Little work has analyzed the combined impact of tax and transfer systems. Dickert-Conlin (1996) used cross-sectional variation and found a positive (although statistically insignificant) effect of tax liability on entry into marriage. The study, however, was essentially cross-sectional and therefore identified the marriage tax effect through differences in earnings and family composition. As we show, that variation may not be exogenous to marriage. Dickert-Conlin and Houser (1998b) examine the effect of EITC and AFDC on female headship decisions over 1990-1993. Their results on the impact of EITC are mixed but suggest insignificant effects for blacks and positive (negative) effects on female headship (marriage) for whites. In this work, the effects of the EITC are identified off of the state level variation in the EITC which is very limited.

5. **Conceptual Framework for Marriage**

Because marriage is a choice, the marriage decision can be modeled using standard preference theory (Becker 1973, 1974). The theory posits that individuals marry if the associated utility exceeds that of remaining single, where utility is defined over the consumption of household-produced goods such as health, children, well-being, etc. Marriage therefore confers some gains. Economists hypothesize several sources of economic gains from marriage, including complementarity of spouses' time in household production, risk pooling and joint consumption of household goods. Individuals may, of course, also marry for non-pecuniary (psychic) reasons (which could be incorporated into this framework).

Equilibrium in the marriage market is characterized by several features. Becker shows that an efficient marriage market assigns individuals with incomes or prices that are then used to assign/match them to partners. A key insight of this framework is that the outcome in any one union is based not only on the gains from that union, but also maximizes the gains over all possible unions.

To consider the determinants of the discrete choice of marriage, define $U(.)$ to be the maximum utility

in each state:

$$(2) \quad U = U(M, Z^M, T^M; X);$$

where M is marital status, Z represents a measure of household output that depends on marital status, T is the tax-transfer consequence of marriage; and X are individual characteristics. Z , the measure of household produced goods, is determined in the equilibrium of the marriage market and therefore depends on market characteristics such as sex-ratios and sex-employment ratios. This representation captures the gains that marriage confers and their association with the tax and transfer consequences.

One issue that arises here is whether T represents the marriage tax liability or the marginal tax rate as well. If we consider that marriage is a discrete choice, it is the net-of-tax and transfer output ($Z-T$) that matters. Because the gains from marriage derive from the complementarity of the spouses' time in household production, the marginal returns to work enter through the cost of producing household goods. Because each marginal hour is taxed at the same rate for both spouses, it is possible to eliminate the marginal tax rate under some conditions on the cost function. Our empirical analysis takes the tax liability (net of transfers) as a valid approximation of the effect on marriage decisions. We address the implications of this assumption in the results section.

If M^* is defined as the difference in the maximal utility between the two states, then the woman will choose marriage if M^* is greater than zero:

$$(3) \quad M^* = U^*(1, Z^1, T^1; X) - U^*(0, Z^0, T^0; X); \text{ and}$$

$$(4) \quad M = 1 \text{ if } M^* > 0; \text{ and } M = 0 \text{ otherwise}$$

This framework is flexible enough to incorporate several explanations for the substantial decline in marriage rates in the United States, which have been raised in the literature. These include Wilson's theory that black marriage rates have declined because of fewer marriageable men (Lichter *et. al.* 1992, Wood 1995, Brien 1997); because of the rise in public assistance transfers; because of the changing labor market opportunities of women, and cultural change (Lichter 1998).

Among the most notable trends in family structure in the United States over the past several decades

are those of cohabitation and out-of-wedlock births (Bacrach 1998, Moffitt, Reville and Winkler 1998). Both cohabitation and out-of-wedlock births raise important considerations for our analysis. Data suggest that cohabitation rates in the population are modest, at about 13 percent. These rates have risen sharply over the past decade and are somewhat higher among younger cohorts. It is important to note that the basic theoretical framework makes no distinction between legal marriage and cohabitation (common-law marriage) and therefore is just as applicable to analyzing cohabitation. The distinction for our purposes is a practical one because the tax system does distinguish between cohabiting and married couples¹⁴. The rising rate of out-of-wedlock births raises the issue of children. A basic motivation for 'marriage' in this framework is the desire to consume services of own children, which are household produced goods that cannot be replicated by single individuals. This consideration implies an alternative framework that posits a demand for children, with marriage as a derived demand. It also raises the question of how out-of wedlock births alter the analysis. We plan to address these issues more fully in the empirical analysis.

6. Empirical Marriage Model

6.1 Specification

Our interest is in estimating the propensity to be married as a function of the tax and transfer consequences of marriage. Assuming a linear form for the indirect utility function and adding an error term, the difference in utility becomes:

$$(5) \quad M_{ist}^* = \delta T_{ist} + \alpha X_{ist} + \beta Z_{ist} + v_{ist};$$

where the error term, $v_{i,s,t}$, is specified as:

$$(6) \quad v_{ist} = \lambda_t + \gamma_s + \epsilon_{ist}$$

We assume ϵ is distributed normally and estimate $P(M_{ist} = 1)$ as a Probit model.

$$(7) \quad P(M_{ist} = 1) = \Phi (\delta T_{ist} + \alpha X_{ist} + \beta Z_{ist})$$

where T is the tax-transfer consequence (cost) of marriage; X is a vector of individual, family and state characteristics (age, number of children, education, race, unemployment rate); Z is a vector of variables

¹⁴ We are currently using data on cohabitators from the CPS to more fully model the set of alternatives.

capturing the expected gains from marriage, including income and "local" marriage market characteristics (male-female sex ratios); λ_t are year effects, and γ_s are state fixed effects. ϵ_{ist} are assumed to be *iid* errors. Year effects are included to capture any common trends in social norms and expectations or other determinants of marital decisions. The state effects capture time invariant factors that influence marriage which are shared by all residents of the state such as state support services or cultural influences.

Additionally, we estimate this model using a sample of married and unmarried women.

6.2 Issues in Implementation

To generate unbiased estimates of the effect of the tax-transfer cost of marriage, a number of issues need to be addressed in implementing the empirical model. The conceptual marriage model suggests that T and Z depend on the earnings of the spouse. The first problem arises because spouses are only observed for married women. We adopt the approach commonly used in the literature and estimate a spouse earnings equation using the sample of *married* women and predict spouse earnings for *all* married and unmarried women (e.g. Danziger *et. al.*, 1982, Schultz, 1994, and Hoffman *et. al.*, 1991).

$$(8) \quad Y_{ist}^h = \gamma X_{ist}^w + \theta K_{ist} + \mu_{ist};$$

Where Y 's is earnings of the husband and X 's is observable characteristics of the wife. Standard covariates are used to estimate the earnings equation and include characteristics of the wife, and local labor market variables (K_{ist}).^{15 16} Using only the wife's characteristics resolves the simultaneity problem from matching of husband and wife traits due to assortative mating. This approach uses women's observable characteristics to match her to a spouse of a given quality, summarized by the spouse's earnings.

A second issue related to spouse's earnings derives from the fact that labor market opportunities for many demographic groups have changed dramatically over the past two decades (Katz and Murphy 1991). The concern is that these changes may be correlated with changes in marriage incentives. In fact, previous studies

¹⁵The prediction of own and spouse earnings are currently based on simple linear earnings models. To better match spouses, however, we are currently working on extending this approach in two ways: introduce an error based on residuals in earnings equation, and randomly draw from cells defined by location and married woman's characteristics.

¹⁶This approach can be problematic. If there are unobservable factors that affect marriage and also affect the earnings of the potential spouse, then this method will yield biased estimates for earnings. For example, if women who are married have better marriage opportunities, then spouses' earnings will be overstated for single women. Future work may explore controlling for selection in this equation.

have found that local marriage market variables (male-female sex-ratio or employment ratios) have been shown to be important determinants of marriage rates (see recent review by Lichter 1995 and the recent studies by Wood 1995 and Brien 1997). We address these concerns by including controls for own and potential spouse's earnings opportunities, as well as controls for local marriage markets.¹⁷

Third, an additional source of bias may be due to possible endogeneity of labor supply and marriage. The economic model of the allocation of time suggests that marriage gains and therefore incentives result from the complementarity of spouses' time in the production of household goods. As such it predicts that labor supply decisions of the husband and wife are endogenous to marriage. Our tabulations of CPS data show two important patterns. First, married men work more and earn more than unmarried men. Second, married women without children work slightly less than single women, while women with children work substantially less than other women (although the gap is declining over time). Any labor supply response by the wife in favor of home production reduces the married couple's tax liability and estimated tax penalty. These patterns therefore suggest that the marriage tax cost is endogenous to household labor supply decisions. As a result of these patterns, we expect the tax-transfer coefficient to be biased upwards. In the current version of the paper, we use actual earnings for all women. We are currently working on an extension whereby we estimate an earnings equation for women to account for selection into marriage and work, and calculate the marriage penalty using predicted rather than actual earnings for the woman.

Fourth, a related problem arises if children are endogenous to marriage. This occurs in the Becker model because individuals marry not to take advantage of economies of scale but to have own children.¹⁸ The endogeneity of children to marriage is a concern because the tax cost of marriage is (positively) correlated with the presence and number of children. If children are correlated with marriage and the tax-transfer consequences of marriage, a standard omitted variable bias arises if children are excluded from the set of controls. We address these concerns by including controls for presence and number of children.¹⁹

A somewhat different concern in the empirical model is the appropriate measure of the dependent

¹⁷Because marriage market variables enter into this analysis, one issue that arises is the appropriate geographic definition of the marriage market. While intuitively one might think of the marriage market as being highly local, recent work suggests that state-level marriage market variables perform better than more locally defined variables (Brien 1997). That result may be explained by measurement error in variables defined at the local level.

¹⁸In the United States, however, nearly two out of every three black children and one of out of every three white children are born outside of marriage. That suggests marriage and children may be treated as nearly independent events

¹⁹A final issue concerns other costs of marriage such as the cost of search, cost of making mistakes and legal fees. Conceptually one can consider the opportunity cost of time and the ease of divorce as important components of this cost. While we do not explicitly account for these costs, we could include variables that could reasonably proxy for them.

variable. While we examine the *percent* currently married (a stock concept), the model is as applicable to examining *flows* into marriage. One clear advantage of the latter approach is the ability to capture the economic and tax environment at the time of the marriage decision²⁰. Using the stock concept typically relates current marital status to current economic variables, which clearly misrepresents relevant variables for some couples. To generate a valid empirical model, we assume that individuals re-optimize each period. In each period then, all individuals are in the marriage market.²¹ Another advantage of the analysis of flows is that it allows for differential responses at entry into and exit from marriage. The problem faced by analysis of flows into or out of marriage is in part one of low power. Available panel data sets are relatively small and therefore include few transitions across states. Primarily for this reason, we use the stock concept of marriage. We plan to extend this in future work by exploring the flows into and out of marriage.²²

6.3 Identification

Our approach in this paper is to use variation in the tax-cost of marriage over time and across individuals to identify the marriage effects of the tax and transfer system. Income tax liabilities vary by marriage because individuals face different tax schedules based on both marital status and the presence of children. Conditional on the tax schedule, a tax unit's liability varies by family size, non-labor income and total earned income (wages and hours worked), and importantly, by the distribution of earnings within the family. While a similar set of factors determine the transfer-marriage penalty, the primary source of that variation is at the state level. Finally, tax rates and transfer payments vary over time as the tax and benefit schedule changes with policy reforms.

The ideal experiment would allow us to estimate the impact of changes in the tax consequence of marriage driven by changes in the tax-transfer *schedule* independent of individual characteristics. The closest such experiment would be policy induced changes to the tax schedule, as with recent expansions to the EITC. Controlling for all observable characteristics should eliminate potentially spurious sources of variation in the

²⁰With uncertainty, one needs to account for both the current and future tax environment.

²¹This assumption ignores the fact that marriage is a long term decisions and therefore simplifies the analysis substantially. For example, it is sufficient to use current earnings of the potential spouse to measure marital output, rather than project a lifetime earnings stream. We plan to relax this assumption in future work.

²²To try to better approximate the relevant tax environment we estimate our marriage models on a sub-sample consisting of young individuals, and use observable characteristics (own, spouse and children's ages, educational attainment) to approximate the time of marriage.

marriage penalty. More generally, by controlling for an extensive list of individual, family and area-level variables suggests that identification will be driven primarily by policy driven changes in the tax-transfer cost of marriage.

7. Results

7.1 Basic Results

We begin the analysis using only the income-tax cost of marriage. Table 4 presents results from a probit model of marriage for the sample of females between 18 and 47 years old. The regressions include a full set of demographic controls. In addition to individual and family characteristics, the regression controls for unrestricted year effects separately for three education groups (less than or equal to high school, some college, college graduate or more) to capture education specific trends in marriage rates over this period (Figure 4), the male/female population ratio, and for unrestricted state effects. The dependent variable is equal to 1 if the individual reports being married, and 0 if not. The marriage cost variable is based on income taxes and thus includes both the federal income tax and the EITC and is calculated using equation (8).

We report throughout probability derivatives (dP/dX) and their associated standard errors. The results here suggest that the likelihood of marriage is increasing in both age and education, although in a nonlinear way. While many observable characteristics seem to affect marriage decisions, race (being black) and the presence of children dominate all other variables. Black females in the sample are 32 percentage points less likely to be married than white females. The presence of a child is coincident with a 27 percentage point higher likelihood of marriage (we discuss the role of children below). Residing in an MSA outside a central city is coincident with a 9.5 percentage points higher probability of marriage than living in the central city. In addition, we find that variables characterizing residential location (the marriage market) are also important. A greater pool of males relative to females raises the likelihood that a female is married. Our estimate implies that an 0.10 increase in the male to female population ratio raises marriage rates by 0.79 percentage points. Our ratio counts only men who have earnings greater than the poverty level, although the results were not sensitive to alternative definitions.²³

Our results also suggest that marriage is less likely to occur when its cost in terms of income taxes is higher. The coefficient on the marriage tax consequence is negative and statistically significant, and suggests

²³We experimented with several population ratio variables, using the definitions in Brien (1997). We did not find the results to be particularly sensitive to which specification was used.

that raising the tax cost of marriage by \$1000 lowers the probability of marriage by 1.3 percentage points, a marriage elasticity with respect to the tax cost of -0.004. We present simulations at the end of this section to show what these estimates imply about the effect of the EITC on marriage.

This estimate of the marriage response to the income tax cost of marriage is remarkably consistent across specifications, once basic demographic characteristics are controlled for. Table 5 presents alternative specifications to explore the sensitivity to various controls for individual characteristics and year and area fixed effects. Only the coefficients on the tax-consequence variable and the pseudo R^2 corresponding to each control set are presented. Controlling for differential marriage trends by education (row 5), marriage market characteristics (row 6), state effects (row 7), and spouse earnings (row 8) has little effect of the cost of marriage coefficient.

Table 5 also shows that the presence of children dominates all other characteristics. Adding controls for children *reduces* (in absolute value) the coefficient from -0.027 (row 3) to -0.012 (row 4). This result is not surprising. Children substantially raise the likelihood of marriage and reduce the tax cost of marriage. Omitting children from the regression therefore leads to a spurious negative correlation between the cost and the propensity of marriage. Children introduce two concerns into the analysis, however. The basic family formation model suggests that a primary motivation for marriage is the desire to have *own* children. Conceptually then children represent an outcome of marriage, although in practice, childbearing is increasingly taking place outside of marriage. This concern suggests that we cannot interpret the children coefficient as a causal effect. The second concern is that childbearing may be endogenous to the tax (and transfer) system. The evidence suggests that childbearing is not very sensitive to taxes, although the timing of childbearing might be (Dickert-Conlin 1999).

A clear prediction of the basic marriage model is that the likelihood of marriage should rise with the non-tax gains to marriage. Less clear, however, is how best to capture such gains. In Table 6, we explore the sensitivity of the results to different measures of the non-tax gains to marriage, which we calculate as own earnings, spouse's predicted earnings, as well as own and spouse earnings (separately and combined). Each column in table 6 reports the regression results using the basic model of Table 4, but augmented with the earnings measure(s). Several observations emerge from these results. First, consistent with theoretical predictions, higher earnings potential spouses raise the marriage propensity (column 2). This result holds even after controlling for the woman's own earnings (column 4). The results also show that *own*, as well as combined *couple* earnings raise the likelihood of marriage, but by less than *potential spouse* earnings. Second, in

the conceptually appealing model that includes spouse's earnings, the results suggest very similar marriage responses to a dollar in spouse's earnings and a dollar in the marriage tax/subsidy (column 2). In other words, a dollar is a dollar is a dollar! Finally, we note that the estimated effect of the marriage tax on marriage rates is consistent across the specifications, ranging from -0.013 to -0.019.

7.2 *Heterogeneous Responses*

Marriage behavior in the United States differs substantially among different groups (see Figure 4). Less educated individuals (less than 12 years of schooling) are less likely to be married at any age, as are blacks relative to whites. Estimating the behavioral response for the average female in the sample potentially masks substantial heterogeneity in the sensitivity to tax costs. In column 1 of Table 7, we explore the responsiveness of marriage to the income tax consequence across demographic groups, stratified by race and education.²⁴ Results show that the average -1.3 percentage point marriage response in fact varies between -1.8 percentage points for whites and +3.1 percentage points for blacks. The anomalous finding for blacks has been found in the empirical literature evaluating public assistance transfers and family formation. We show in the next section that the positive coefficient for blacks is reversed when using a richer definition of marriage costs. Results also show that educational attainment matters for the behavioral response to taxes. The largest effects are among women with the highest education levels.

7.3 *Measures of the Tax-Transfer Cost of Marriage*

We present estimates using several measures for the cost of marriage: (1) the federal income and EITC tax cost (presented above); (2) the combined tax and transfer cost (adjusting public assistance transfers for less than 100 percent participation by state, age and education); and (3) the combined tax-transfer cost (using the asset test in determining eligibility for public assistance). These results are presented in Table 7. The tax and transfer cost of marriage is calculated using the same methods (and assumptions about earned and unearned income) that were described in section 3.2.

Columns 2-4 in table 7 explore the patterns across demographic groups further by repeating the stratified regressions using different measures of the marriage cost. Column 2 presents the marriage cost adjusted for participation, while column 3 uses the asset test for determining eligibility for welfare. Several

²⁴All regressions control individual and family characteristics, spouse's predicted earnings, state, and education by year fixed effects (equivalent to column 2 of Table 6).

patterns emerge from this table. First, adding public assistance transfers reverses the sign on the marriage cost coefficient for blacks. This result suggests that ignoring marriage costs arising from public assistance mischaracterizes the incentives for blacks. For whites, the estimated marriage response becomes stronger and more statistically significant with transfers. In results not reported here, we calculated the marriage cost based only on public assistance and found the positive and significant effect for blacks becomes negative and significant. Also, unlike with the income tax cost, marriage responsiveness is declining with education.

A restriction imposed in the regressions with the total tax and transfer cost of marriage is that a change in the cost of marriage arising from income taxes has the same effect on marriage as a dollar from public assistance transfers. Females of different race and education have different incomes, however, suggesting that they face different costs from the tax versus transfer systems. In addition, these groups exhibit different responses to marriage costs (panels B and C). We therefore estimate our marriage model allowing for different coefficients on the tax and transfer components of the marriage cost (columns 4a and 4b).²⁵ Those results show that blacks are highly sensitive to changes in the transfer-based marriage penalty (with a coefficient of -0.036) but less sensitive to the income tax cost of marriage (with a coefficient of -0.017). Whites, on the other hand, are more responsive to the tax system (coefficient of -0.043) than to the transfer system (coefficient of -0.030). The regressions by education class show larger responses for the transfer system in the lowest education group.

Several features of the data and our methods can explain differences in the size of the coefficients between the tax cost and the transfer cost of marriage. Our transfer calculator in its current form is based on (an income and) an asset test that is fairly stringent, but that assign welfare benefits to many women with very low probabilities of taking up welfare. This group would be disproportionately white and highly educated, the groups with relatively low coefficients on transfer penalty. One approach to address this potential bias is to combine the take-up adjustment (column 2) with the asset test (column 3). A second possibility is that individuals may view marriage costs from the tax system as more permanent (or transitory) than those from the transfer system. To the extent that these views differ by race, different results can emerge. Third, welfare “stigma” may lead to different responsiveness to the marriage cost components and potentially to different relative responses across groups. Our last explanation appeals to a local average treatment effect story. Individuals facing greater marriage transfer costs (and smaller tax costs) may have different elasticities than those with smaller transfer costs (and larger tax costs), leading to different coefficients across the tax and

²⁵Here transfers are calculated using the asset test as in column 3.

transfer components.

7.4 *Different Family Sizes*

Variation in the tax and transfer cost of marriage arises both from cross-sectional differences in income, family size and employment status of the secondary earner in the household (Eissa and Hoynes 1999), and from time variation arising from tax policy and transfer program changes. Cross-sectional differences among individuals in income, family size and employment patterns of the couple are likely to be correlated with underlying preferences towards marriage. Additionally, controlling for these variables directly in a regression may not eliminate the bias if their effect on marriage is nonlinear. To test whether cross-sectional differences bias our results, we estimate regressions conditional on the number of children in the household (no children, one child, and two or more children). Clearly this represents only dimension of marriage cost differences across families. Time variation for each of these groups arises from tax policy changes from 1986 onwards (for all groups), EITC expansions from 1990 onwards (primarily for those with two or more children) and welfare reforms from 1996 onwards (with children). Changes in marriage also arise because of different employment patterns of secondary earners and family income.

Table 8 shows that even within groups defined by the presence and number of children, the cost of marriage reduces the likelihood of females being married. Comparing those without children to those with two or more children, we find that the former group is more responsive to the cost of marriage than the latter.

7.5 *Simulated Marriage Incentives and Behavior, and the EITC*

Our interest in evaluating marriage responses to taxes (and the EITC) is motivated by the observation that the EITC, unlike other transfer programs, can subsidize marriage among some income groups. In this section, we isolate the impact of the EITC on marriage incentives along the income distribution using the 1997 CPS sample. Figure 5a presents EITC-marriage incentives, while Figure 5b presents the simulated effect on marriage using parameters estimated in our basic regression (column 2 of Table 6). Different points in figure 5a correspond to the mean cost of marriage with and without the 1997 EITC using the sample of 1997 CPS females. The difference in the cost with and without the EITC is therefore the “1997 EITC marriage penalty”. Figure 5b presents the mean marriage response to the EITC cost, as a percent of the base percent married in each income class.

Consistent with figure 3, the EITC subsidizes marriage at the lower-end of the distribution and

penalizes marriage by taxpayers with (combined family) earnings over \$25,000 although the penalty fades by \$75,000. We observe a tax for middle-income taxpayers because wives may become eligible for the EITC upon separation. The simulations show that for family income below \$25,000, the EITC increases marriage rates on the order of 1-5 percent, with 5 percent (or 1 percentage point) for the very-poorest taxpayers. This occurs because, by choosing to marry, a single female with children and low earnings could raise her after-tax income by as much as \$3500 from the EITC. For families with income between \$25,000 and \$75,000 the EITC reduces marriage rates by about 1 percent. Because the EITC effect on marriage incentives fades by \$75,000, and marriage rates are quite high at higher incomes, we predict no effect on higher-income taxpayers.

Figure 6 explores the role of all tax-transfer-generated changes in the cost of marriage between 1984 and 1997. We plot the impact on marriage rates of the total tax and transfer program changes over this period and compare it to the impact on marriage rates arising from the expansion in the EITC. The “EITC” simulation is based on the 1997 sample and 1997 EITC parameters, and compares it to the penalty calculated using 1984 EITC parameters, holding fixed 1997 law for all other tax and transfer components. The “total tax and transfer” simulation compares the marriage cost using 1984 and 1997 tax law, using the same 1997 sample. These simulations hold constant all demographic variables in the regression. The results show that the EITC explains most changes in tax-transfer induced changes in marriage behavior. In addition to the EITC, lower real transfer benefits led to higher marriage rates at the lowest income levels, while TRA86's reduction in marginal tax rates at high income levels led to increases in marriage rates at the highest income levels. This pattern can also be seen in Table 9 which decomposes the total tax-transfer induced changes in marriage into EITC, other federal taxes, and public assistance. In the lowest income families (\$10,000 - \$15,000), tax and transfer changes led to a 1.6 percentage point increase in the marriage rate. Expansions in the EITC account for a 1 percentage point decline and reductions in welfare led to another 0.5 percentage point decline. In the higher income groups (e.g. \$75,000 to \$100,000) the expansions in the EITC reduce marriage by 0.2 percentage points, and the flattening of the tax schedule increases marriage by 0.5 percentage points.

8. Conclusion

After a series of major expansions starting in 1986, the EITC has become the largest cash-transfer program for lower-income families at the federal level. As a result, the EITC has partially taken on what has traditionally been the role of the welfare system. Advocates argue that the EITC transfer money to needy individuals without the associated distortion in traditional welfare. Research has established that the EITC has

been particularly successful at raising employment of single women with children. Nothing is known, however, about the effects of this program on family structure. Understanding the marriage effects is an important first step towards filling a gap that is critical to evaluating the overall effectiveness of the EITC, and the design of tax-transfer schemes more generally.

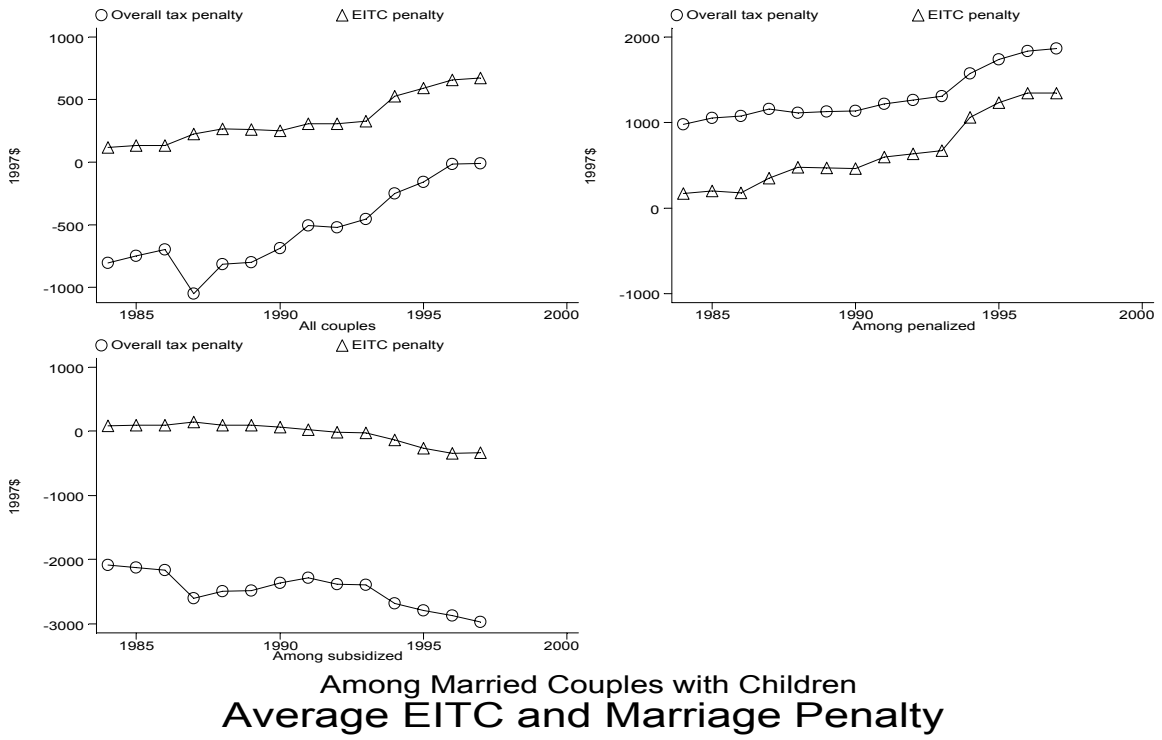
To examine the effect of the EITC, we estimate a model of marriage that depends on demographics, state and time effects, and variables capturing the tax and transfer penalties consequences of marriage. Our results show that tax-transfer penalties affect marriage behavior but the overall effect is relatively modest. We estimate that reducing the marriage income tax penalty by \$1000 would raise the probability of marriage by about 1.3 percentage points. When we incorporate public assistance transfers, we estimate that the probability of marriage rises by between 2.4 and 3.3 percentage points for every \$1000 reduction in marriage costs. We find that blacks and less educated individuals are more sensitive to changes in the tax-transfer penalty.

We find that, on average, the EITC promotes marriage for families with income less than \$25,000, and it discourages marriage for families with income greater than \$25,000. Expansions in the EITC between 1984 and 1997 raise marriage rates by 1 percentage point for the lowest income families (\$10,000 - \$15,000), and reduce marriage by 0.4 to 0.8 percentage points for middle income families (\$25,000 to \$50,000). We also simulate the effect of changes in welfare and other changes in federal taxes between 1984 and 1997 and find that their effects on marriage are small compared to the EITC.

References

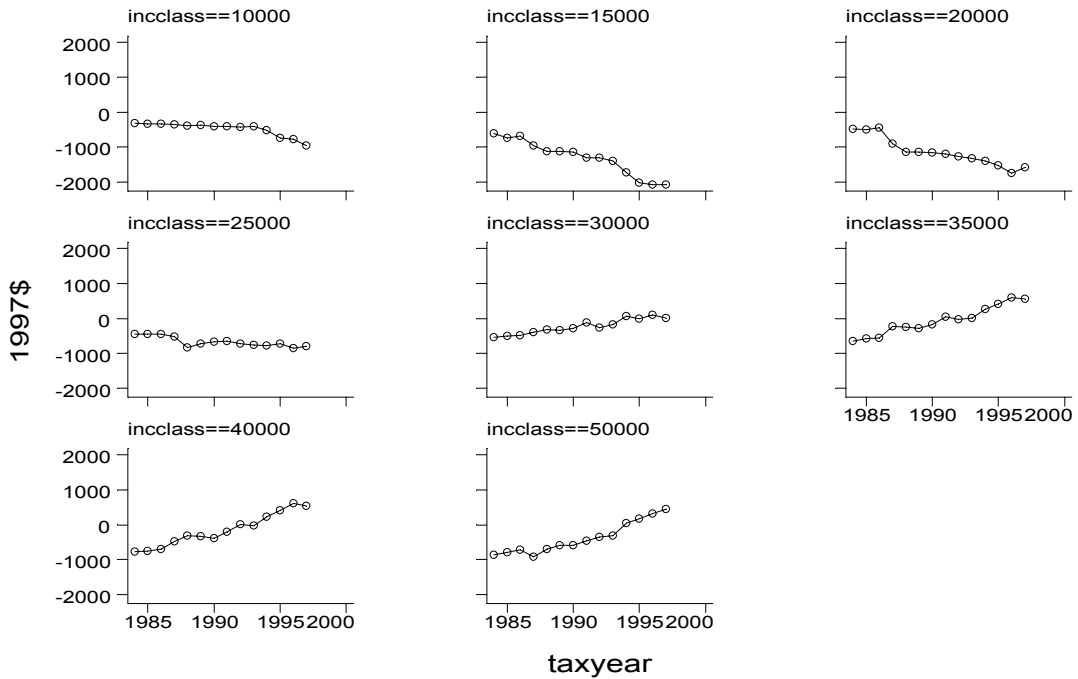
- Akerlof, George, Janet Yellen and Michael Katz and (1996). "An Analysis of Out-of-Wedlock Childbearing in the United States." *Quarterly Journal of Economics* 111(2):277-317.
- Alm, James and Leslie Whittington (1995a). "Income Taxes and the Marriage Decision", *Applied Economics*, 27: 35-31.
- Alm, James and Leslie Whittington (1995b). "Does the Income Tax Affect Marital Decisions?" *National Tax Journal* 48(4):565-572.
- Alm, James and Leslie Whittington (1996). "The Rise and Fall and Rise...of the Marriage Tax." *National Tax Journal* 49(4):571-589.
- Alm, James and Leslie Whittington (1997). "Income Taxes and the timing of Marital Decisions", *Journal of Public Economics*, 64: 219-240.
- Bacrach, Christine (1988). "The Changing Circumstances of Marriages and Fertility in the United States," in ed. Moffitt, Robert, *Welfare and Family and Reproductive Behavior*. Washington D.C.: National Academy Press.
- Becker, Gary (1973). "A Theory of Marriage: Part I", *Journal of Political Economy* 81, 813-846.
- Becker, Gary (1974). "A Theory of Marriage: Part II", *Journal of Political Economy* 82, 511-526.
- Brien, Michael J. (1997). "Racial Differences in Marriage and the Role of Marriage Markets." *Journal of Human Resources*, (32)4:741-778.
- Bumpass, L. and J. Sweet (1989). "National Estimates of Cohabitation." *Demography* 26:615-625.
- Congressional Budget Office (1997). For Better or For Worse: Marriage and The Federal Income Tax, mimeo.
- Council of Economic Advisors (1998). *Economic Report of the President*.
- Danziger, Sheldon, George Jakubson, Saul Schwartz, and Eugene Smolensky (1982). "Work and Welfare as Determinants of Female Poverty and Household Headship." *Quarterly Journal of Economics* 97(3):519-534.
- Dickert-Conlin, Stacy (1996). Taxes, Transfers and Family: Are They Related?, mimeo, Department of Economics, University of Kentucky.
- Dickert-Conlin, Stacy and Scott Houser (1998). "Taxes and Transfers: A New Look at the Marriage Penalty." *National Tax Journal* 51(2):175-217
- Dickert-Conlin, Stacy and Scott Houser (1998b). "EITC, AFDC, and the Female Headship Decision", mimeo.
- Edin, K. (1991). "Surviving the Welfare System: How AFDC Recipients Make Ends Meet." *Social Problems*. V 38.
- Eissa, Nada and Jeffrey Liebman (1996). "Labor Supply Response to the Earned Income Tax Credit." *Quarterly Journal of Economics* 111(2):605-637.
- Eissa, Nada and Hilary Hoynes (1998a). "The EITC and Labor Supply of Married Couples", University of California, Berkeley, mimeo, November.
- Eissa, Nada and Hilary Hoynes (1998b). "The EITC and Labor Supply: Implications for Married Couples." *Poverty Center News, Joint Center for Poverty Research*, Northwestern University.
- Eissa, Nada and Hilary Hoynes (2000). "Explaining the Fall and Rise in the Tax Cost of Marriage The Effect of Tax Laws and Demographic Trends, 1984-1997", *National Tax Journal*.
- Ellwood, David and MaryJo Bane (1985). "The Impact of AFDC on Family Structure and Living Arrangements", in Ronald Ehrenberg, ed, *Research in Labor Economics* 7, 137-207.
- Feenberg, Daniel and Harvey Rosen (1995). "Recent Developments in the Marriage Tax." *National Tax Journal* 48(1):91-101.
- General Accounting Office (1996). "Income Tax Treatment of Married and Single Individuals." GGD-96-175.
- Hoffman, S., G. Duncan, and R. Mincy (1991). Marriage and Welfare Use Among Young Women: Do Labor Market, Welfare and Neighborhood Factors Account for Declining Rates of Marriage Among Black and White Women?, mimeo.
- Hoynes, Hilary Williamson (1996). "Welfare Transfers In Two-Parent Families: The Case of AFDC-UP", *Econometrica* 64(2), 295-332.
- Hoynes, Hilary Williamson (1997a). "Work, Welfare, and Family Structure: What Have We Learned?", in

- Fiscal Policy: Lessons From Economic Research*, edited by Alan Auerbach. MIT Press: Cambridge, Massachusetts.
- Hoynes, Hilary Williamson (1997b). "Does Welfare Play Any Role in Female Headship Decisions?", *Journal of Public Economics*, 65(2):89-117, August 1997.
- Lichter, Daniel (1995). "The Retreat From Marriage and the Rise in Non-marital Fertility," in Department of Health and Human Services, Report to the Congress on Out-of-Wedlock Childbearing: DHHS Pub No (PHS 95-1257).
- Lichter, Daniel, Diane McLaughlin, George Kephart, and David Landry (1992). "Race and the Retreat from Marriage: A Shortage of Marriageable Men?" *American Sociological Review* 57(6):781-799.
- Liebman, Jeffrey (1998). "The Impact of the Earned Income Tax Credit on incentives and Income Distribution." *Tax Policy and the Economy*.
- McLanahan, Sara and G. Sandfeur (1994). *Growing Up With a Single Parent: What Hurts, What Helps?* Cambridge MA.: Harvard University Press.
- McLanahan, Sara (1995). "The Consequences of Nonmarital Childbearing for Women, Children and Society." in Department of Health and Human Services, *Report to the Congress on Out-of-Wedlock Childbearing:* DHHS Pub No (PHS) 95-1257.
- Meyer, Bruce and Daniel Rosenbaum (1998). *Welfare, the Earned Income Tax Credit and the Labor Supply of Single Mothers.* Mimeo, Department of Economics, Northwestern University.
- Moffitt, Robert (1992). "Incentive Effects of the U.S. Welfare System: A Review", *Journal of Economic Literature* 30, pp. 1-61.
- Moffitt, Robert (1994). "Welfare Effects on Female Headship with Area Effects", *Journal of Human Resources* 29(2), 621-636.
- Moffitt, Robert (1998). "The Effect of Welfare on Marriage and the Family" in ed. Moffitt, Robert, *Welfare and Family and Reproductive Behavior*. Washington D.C.: National Academy Press.
- Moffitt, Robert, Robert Reville and Anne Winkler (1994) "State AFDC Rules Regarding the Treatment of Cohabitators: 1993." *Social Security Bulletin* 57(4):26-33.
- Moffitt, Robert, Robert Reville and Anne Winkler (1998) "Beyond Single Mothers: Cohabitation and Marriage in the AFDC Program." *Demography* 35(3):259-78.
- Rosen, Harvey (1977). "Is it Time to Abandon Joint Filing?" *National Tax Journal*, 30:423-428.
- Rosen, Harvey (1987) "The Marriage Tax Is Down But Not Out", *National Tax Journal*, 40: 567-575.
- Schultz, T. Paul (1994). "Marital Status and Fertility in the United States: Welfare and Labor Market Effects", *Journal of Human Resources* 29(2), 637-669.
- Sjoquist, David, and Mary Beth Walker (1995). "The Marriage Tax and the Rate and Timing of Marriage." *National Tax Journal* 48(4):547-558.
- U.S. House of Representatives (1998). *Background Materials and Data on Programs Within the Jurisdiction of the Committee on Ways and Means*. Washington D.C.: Government Printing Office.
- Waite, Linda (1995). "Does Marriage Matter?" *Demography* 32(4):483-507.
- Whittington, Leslie and Alm, James (1997). "'Til Death or Taxes Do Us Part: The Effect of Income Taxation on Divorce". *Journal of Human Resources* 32(2):388-412.
- Winkler, Anne (1995). "Does AFDC Encourage Two-Parent Families?" *Journal of Policy Analysis and Management*. 14(1):4-24.
- Winkler, Anne (1994) "The Determinants of a Mother's Choice of Family Structure: Labor Market Conditions, AFDC Policy or Community Mores?" *Population Research and Policy Review* 13(3):283-303.
- Wood, Robert (1995). "Marriage Rates and Marriageable Men: A Test of the Wilson Hypothesis." *Journal of Human Resources* 30(1):163-193.



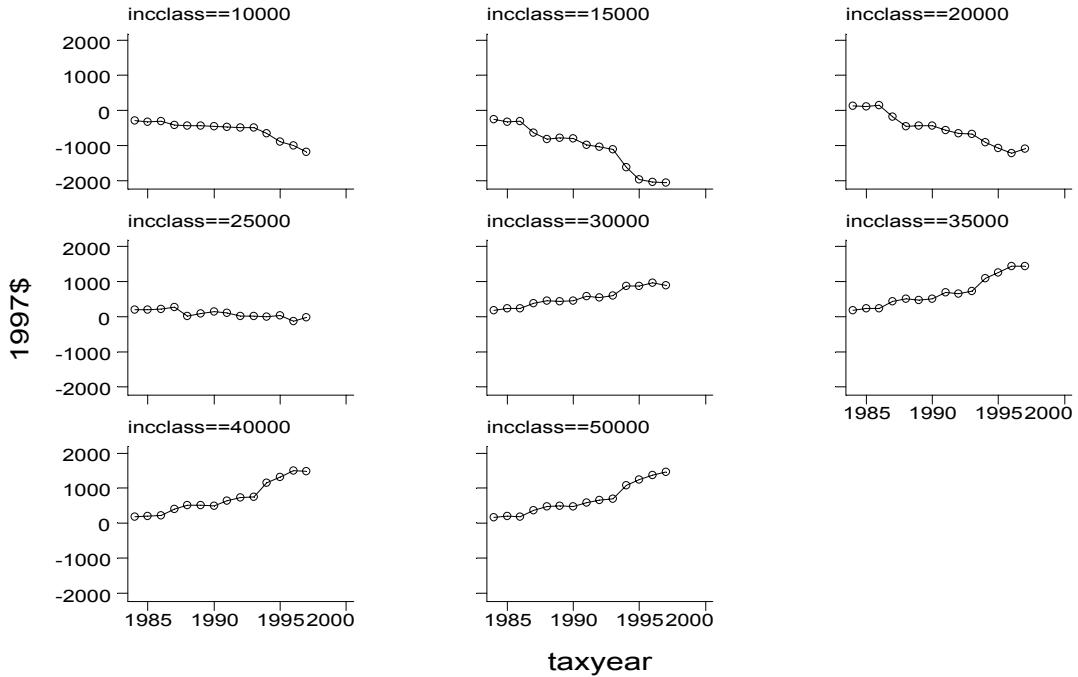
Among Married Couples with Children
Average EITC and Marriage Penalty

Figure 1



Average Marriage Penalty Among Married Couples

Figure 2

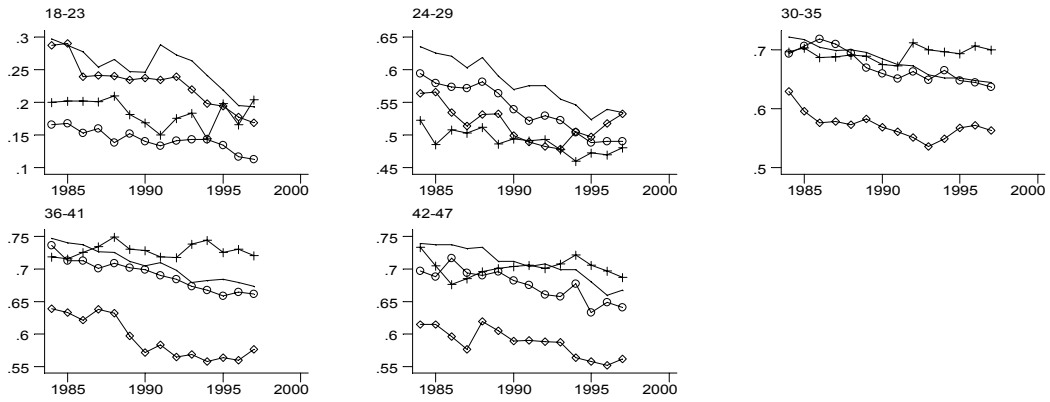


EITC Penalty Among Married Couples with Kids

Figure 3

◇ Less Than High School
○ Some Collage

· High School
+ Collage or More



taxyear
Women's Marriage Rates by Education and Age Groups over Time

Figure 4

Figure 5a
 Average Marriage Penalty Due to 1997 EITC
 (by Family Income)

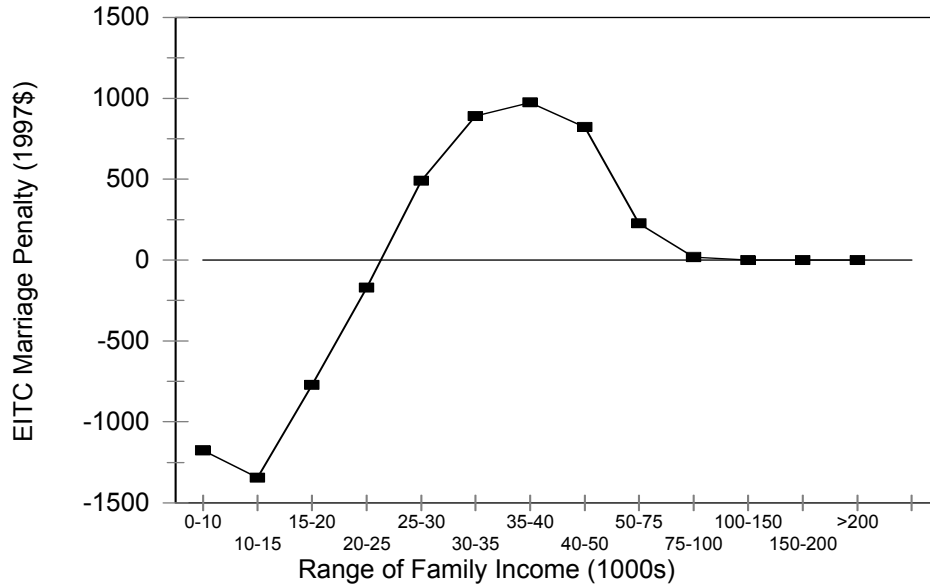


Figure 5b
 Predicted Percent Change in Marriage Rates from 1997 EITC
 (by Family Income)

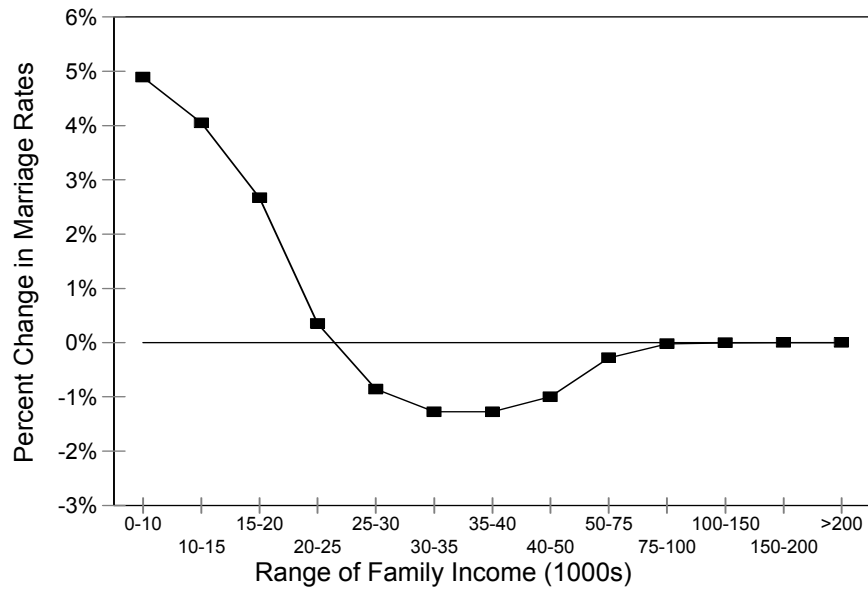


Figure 6
 Predicted Percent Change in Marriage Rates due to
 Tax and Transfer Changes Between 1984-1997

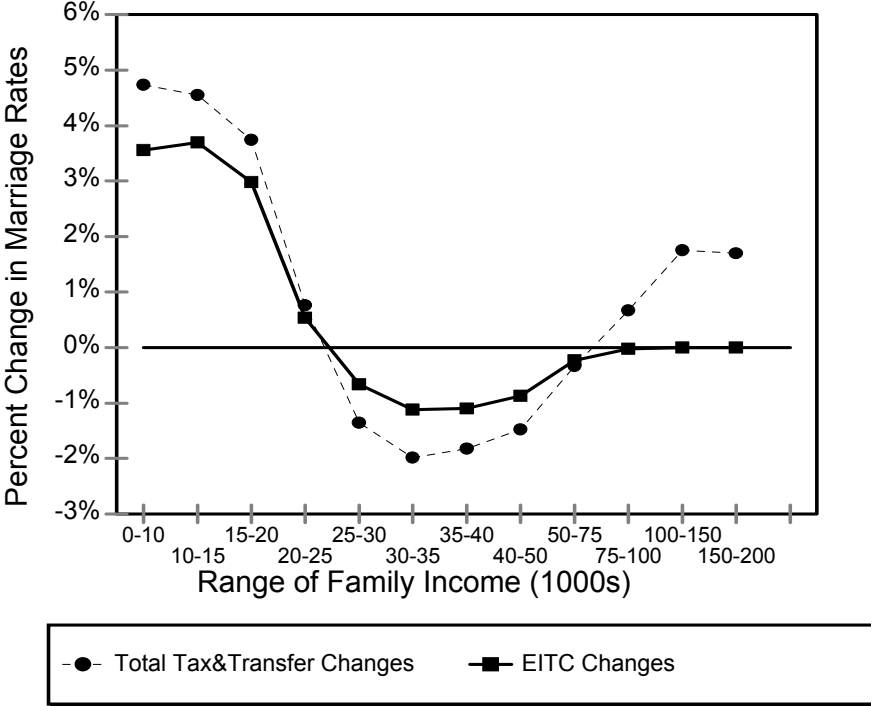


Table 1
Federal Income Tax and EITC Consequences of Marriage
Hypothetical Families, 1997 Tax Year

		Earnings	Gross Federal Tax Liability	EITC	Net Federal Tax Liability	Marriage Tax- Consequence
		(1)	(2)	(3)	(4)	(5)
<i>Panel 1: Two children, Female Custodial Parent, Female Employed</i>						
Married		\$24,000	\$975	\$1,109	-\$134	
Single	Male	\$12,000	\$780	\$0	\$780	+\$2,733 (+11.4%)
	Female	\$12,000	\$0	\$3,647	-\$3,647	
<i>Panel 2: Two children, Female Custodial Parent, Female Not Employed</i>						
Married		\$24,000	\$975	\$1,109	-\$134	
Single	Male	\$24,000	\$2,584	\$0	\$2,584	-\$2,718 (-11.3%)
	Female	\$0	\$0	\$0	\$0	
<i>Panel 3: Two children, Split Between Parents, Female Employed</i>						
Married		\$24,000	\$975	\$1,109	-\$134	
Single	Male	\$12,000	\$98	\$2,203	-\$2,105	+\$4,076 (+17.0%)
	Female	\$12,000	\$98	\$2,203	-\$2,105	
<i>Panel 4: No Children, Female Not Employed</i>						
Married		\$24,000	\$1,770	\$0	\$1,770	
Single	Male	\$24,000	\$2,584	\$0	\$2,584	-\$814 (-3.4%)
	Female	\$0	\$0	\$0	\$0	
<i>Panel 5: No Children, Female Employed</i>						
Married		\$24,000	\$1,770	\$0	\$1,770	
Single	Male	\$12,000	\$780	\$0	\$780	+\$210 (+0.9%)
	Female	\$12,000	\$780	\$0	\$780	
Notes: All monetary values are in 1997 dollars. For all simulations we assume that the family has no non-labor income. A positive value represents a marriage penalty (loss in net income by being married), while a negative figure represents a marriage subsidy (gain in net income by being married).						

Table 2
 Marriage Tax Consequences by Level and Composition of Family Earnings
 Hypothetical Families, 1997 Tax Year

<i>Scenario: Two children, Wife Custodial Parent</i>				
Wife Share of Total Family Earnings				
Family Earnings:	0	0.25	0.50	1.0
10,000	-4,136 -41.4%	-2587 -25.9%	-1324 -13.2%	0 0.0%
20,000	-3,561 -17.8%	-811 -4.1%	1595 8.0%	-525 -2.6%
30,000	-1,605 -5.4%	2520 8.4%	3504 11.7%	-525 -1.8%
40,000	-2,717 -6.8%	3551 8.9%	2451 6.1%	-525 -1.3%

Notes: For all simulations we assume that the family has two children which both reside with the mother, and no non-labor income. A positive value (shaded in this table) represents a marriage penalty (loss in net income by being married), while a negative figure represents a marriage surplus (gain in net income by being married).

Table 3
Descriptive Statistics

	<i>Married</i>		<i>Single</i>	
	Males	Females	Males	Females
Age	36.9 (7.7)	34.7 (7.4)	28.3 (8.1)	29.3 (8.6)
Education	13.3 (2.9)	13.0 (2.6)	12.6 (2.7)	12.7 (2.5)
Nonwhite	0.10 (0.30)	0.10 (0.31)	0.17 (0.38)	0.22 (0.42)
Any Children	0.75 (0.43)	0.75 (0.43)	0.16 (0.36)	0.42 (0.49)
Number of Kids	1.50 (1.21)	1.50 (1.22)	0.29 (0.80)	0.77 (1.13)
Employed	0.97 (0.18)	0.77 (0.42)	0.87 (0.34)	0.80 (0.40)
Earnings	38,212 (29,857)	14,934 (17,341)	18,454 (21,108)	14,028 (16,425)
Spouse Earnings-Predicted	14,708 (4,864)	37,474 (12,543)	12,490 (5,265)	29,898 (13,446)
Male/Female Pop Ratio ¹		1.059 (0.139)		1.010 (0.163)
Male(FT)/Female Pop Ratio ¹		0.979 (0.144)		0.901 (0.176)
Tax & Transfer Penalty (Pred. spouse's earnings)	–	\$1352 (2560)	–	\$1568 (2316)
Tax Penalty (Federal, EITC)	–	-\$248 (1908)	–	-\$53 (1386)
Transfer Penalty (AFDC, FS)	–	\$1601 (3732)	–	\$1620 (3025)
Tax & Transfer Penalty (Actual spouse's earnings)		\$1653 (2481)	–	–
Tax Penalty (Federal, EITC)	–	-\$531 (2269)	–	–
Transfer Penalty (AFDC, FS)	–	\$1535 (3564)	–	–
% of Sample Married	0.572	0.565		
Observations	269,265	269,265	200,951	207,481

Source: Author's tabulations of 1985-1998 March CPS. Standard deviations are in parentheses. All dollar amounts are in 1997\$.

¹ CPS tabulated ratio of weighted counts of men to women within cells defined by year, age, race, and state. FT men included those with usual hours worked per week last year is greater than or equal to 35.

Table 4
Estimates of Probit Model of Marriage

<i>Sample: Females, ages 18-47</i>		
<i>Variable</i>	<i>Probability Derivative</i>	
Education	0.023	(0.002)
Education**2	-0.004	(0.0001)
Age	0.087	(0.001)
Age**2	-0.001	(0.000)
Age*Education	0.000	(0.000)
Black	-0.321	(0.002)
Other Race	-0.038	(0.004)
Children (0/1)	0.270	(0.003)
Number of Children	0.025	(0.001)
MSA, non-central city	0.095	(0.002)
Non MSA	0.111	(0.003)
Area not identified	0.085	(0.003)
Male(FT)/Female Pop Ratio	0.079	(0.007)
Tax Cost (1000s)	-0.013	(0.0005)
Other Controls	year*education dummies, state dummies	
Pseudo R squared	0.216	
Mean of dependent variable	0.565	
Number of Observations	476,746	

Source: Author's tabulations of the 1985-1998 March CPS. Dependent variable is equal to 1 if married. Tax & transfer cost includes federal tax, EITC, AFDC, Food Stamps in column (1) and only federal tax and EITC in column (2). Each regression includes year dummies for each of three education groups (≤ 12 , 13-15, ≥ 16). The sample includes women ages 18-47. Standard errors are in parentheses.

Table 5
Results for Probit Model of Marriage
Alternative Specifications

<i>Specification</i>	<i>Tax Cost</i> <i>(Probability Derivative)</i>
(1) Constant (C)	-0.017 (0.0004) [0.00]
(2) C, Year Dummies	-0.017 (0.0004) [0.00]
(3) C, Year, Demographics	-0.027 (0.001) [0.15]
(4) C, Year, Demographics, Kids	-0.012 (0.001) [0.201]
(5) C, Year*Educ, Demographics, Kids	-0.012 (0.001) [0.202]
(6) C, Year*Educ, Demographics, Kids, M/F Pop Ratio	-0.013 (0.001) [0.206]
(7) C, Year*Educ, Demographics, Kids, M/F Pop Ratio, State	-0.013 (0.001) [0.207]
(8) C, Year*Educ, Demographics, Kids, M/F Pop Ratio, State, Spouse's earnings	-0.013 (0.001) [0.207]
<hr/>	
Number of Observations	467,746

Source: Author's tabulations of the 1985-1998 March CPS. The sample includes women ages 18-47. Model estimated is a probit where the dependent variable is equal to one if married. The demographic variables include age, education, race and urban location of the mother. Standard errors are in () and Pseudo R2 are in [].

Table 6
Estimates of Probit Model of Marriage
Treatment of Earnings

Variable	Definition of Earnings Variable			
	Own Earnings (1)	Spouse Earnings (2)	Combined (3)	Separate (4)
Tax Cost	-0.015 (0.001)	-0.013 (0.001)	-0.019 (0.001)	-0.016 (0.001)
Earn	0.0004 (0.0001)			0.0004 (0.0001)
Earn ²	0.0000 (0.000)			0.0000 (0.000)
SpEarn		0.014 (0.0005)		0.014 (0.001)
SpEarn ²		-0.0001 (0.000)		-0.0001 (0.0000)
CEarn			0.002 (0.0001)	
CEarn ²			-0.0001 (0.0000)	
Pseudo R2	0.206	0.207	0.206	0.207
Observations			476,746	

Source: Author's tabulations of the 1985-1998 March CPS. Dependent variable is equal to one if married. The sample includes women ages 18-47. Each regression controls for age, education, race, presence and number of children, central city dummies, state dummies, and a set of year dummies for each education group (≤ 12 , 13-15, ≥ 16). **Earn** is the *actual* annual earnings of the woman, **Spearn** is *predicted* annual earnings of the potential spouse, and **CEarn** is the *sum* of the two earnings amounts. All earnings figures are in 1000s. Standard errors are in ().

Table 7
 Estimates of Probit Model of Marriage
 Treatment of Tax-Transfer Cost of Marriage

Sample	<i>Alternative specification for cost of marriage</i>			
	Tax Cost (1)	Tax & Transfer Cost (Take-up Adjustment) (2)	Tax & Transfer Cost (Asset Test) (3)	Tax & Transfer Cost Tax Cost (4a) Transfer Cost (4b)
<i>Panel A: All Females 18-47</i>				
All	476,746 -0.013 (0.001) [.206]	-0.024 (0.001) [0.206]	-0.033 (0.0004) [0.218]	-0.042 (0.001) -0.032 (0.0004) [0.219]
<i>Panel B: Race</i>				
Whites	402,702 -0.018 (0.001) [0.199]	-0.024 (0.001) [0.197]	-0.031 (0.0004) [0.208]	-0.043 (0.001) -0.030 (0.0004) [0.209]
Blacks	51,639 0.031 (0.002) [0.132]	-0.003 (0.002) [0.134]	-0.040 (0.001) [0.145]	-0.017 (0.002) -0.036 (0.001) [0.147]
<i>Panel C: Education</i>				
Education <= 12	128,229 -0.014 (0.001) [0.202]	-0.025 (0.001) [0.176]	-0.035 (0.001) [0.258]	-0.044 (0.001) -0.034 (0.001) [0.259]
Education 13-15	251,914 -0.007 (0.001) [0.245]	-0.018 (0.001) [0.244]	-0.030 (0.001) [0.194]	-0.050 (0.001) -0.032 (0.001) [0.195]
Education 16+	96,603 -0.020 (0.001) [0.236]	-0.021 (0.001) [0.232]	-0.027 (0.001) [0.244]	-0.027 (0.001) -0.026 (0.001) [0.244]

Source: Author's tabulations of the 1985-1998 March CPS. The sample includes women ages 18-47. Model estimated is a probit where the dependent variable is equal to one if married. Marriage costs are in 1000 dollars. Each row and column corresponds to a separate probit model of marriage. All regressions include demographics (including children), education specific year effects, state effects, and spouse earnings. Standard errors are in () and Pseudo R2 are in [].

Table 8
Estimates of Probit Model of Marriage by Presence and Number of Children

	No Children			One Child			2+ Children		
	Observations	Tax&Transfer Cost		Observations	Tax&Transfer Cost		Observations	Tax&Transfer Cost	
<u>Panel A: All Females Age 18-47</u>									
All	187,659	-0.024 (0.001)		110,671	-0.037 (0.001)		178,416	-0.021 (0.0003)	
<u>Panel B: Race</u>									
Whites	161,100	-0.024 (0.001)		91,819	-0.035 (0.001)		149,783	-0.017 (0.0003)	
Blacks	17,966	-0.025 (0.005)		13,708	-0.038 (0.003)		19,940	-0.043 (0.002)	
<u>Panel C: Education</u>									
Education <= 12	82,900	-0.050 (0.003)		64,284	-0.036 (0.001)		104,730	-0.023 (0.001)	
Education 13-15	57,499	-0.024 (0.002)		27,820	-0.046 (0.002)		42,910	-0.022 (0.001)	
Education 16+	47,260	-0.013 (0.002)		18,567	-0.025 (0.001)		30,776	-0.012 (0.001)	

Source: Author's tabulations of the 1985-1998 March CPS. The sample includes women ages 18-47. Model estimated is the dependent variable is equal to one if married. The table reports probability derivatives and their associated standard errors in parentheses. The penalties are divided by 1000. Each of the rows and columns correspond to a separate probit model of marriage. All of the specifications also include controls for demographics, education specific year effects, state effects, and spousal earnings.

Table 9
Effects of Changes in Tax-Transfer Programs on Likelihood of Marriage, 1984-1997
By Family Earnings

Family Earnings	Change in Percent Married			
	Total	EITC	Non-EITC Federal Tax	Public Assistance
10,000-15,000	+1.6	+1.0	+0.1	+0.5
25,000-30,000	+0.1	-0.3	0.0	+0.4
40,000-50,000	-0.3	-0.7	+0.1	+0.3
75,000-100,000	+0.3	-0.2	+0.5	0.0

Source: Authors tabulations of 1997 CPS using estimates in column 1 of table 7.