TAX AND TRANSFER POLICY, AND FAMILY FORMATION: MARRIAGE AND COHABITATION

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I. Introduction

The American family has gone through major transformations over the past 4 decades. Over this period, the age of first marriage, the rate of divorce, and the rate of out-of-wedlock births have risen dramatically. Not only have individuals delayed marriage, they have increasingly forgone marriage altogether: the proportion of those of those reporting never having married has increased at older ages, especially among the less educated.

Several explanations have been given for this transformation, including declining labor market opportunities for less skilled males, rising employment of women, legalization of abortion, changing norms and the welfare system. In fact, these changes have sustained the popular criticism that public assistance programs 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).

Less recognized is the potential effect of the tax system on family formation. Unlike most other industrialized countries, the U.S. federal income tax code is based on family rather than individual income (Engelhardt and Pechman 1990). Because the tax schedule is progressive, it is not marriage neutral. By non-marriage neutrality, it is meant that the tax liability for a married couple differs from the total tax liability of 2 unmarried individuals with the same total income and family size. Unlike the transfer system, the federal (and state) income tax code can either tax or subsidize marriage depending on the size and earnings of the family. Recently, there has been renewed interest in the impact of the tax system on the so-called "marriage penalty". Proposals to address this "penalty" include increasing the size of the 15 percent tax bracket for married couples, a deduction for secondary earnings in the households and increasing the maximum income for a married couple to be eligible for the Earned Income Tax Credit .

An extensive body of work evaluating the effects of transfer programs and federal income taxes on marriage has examined each in isolation (see review in Moffitt 1998, Alm and Whittington 1995a). Recent work has shown that evaluating the tax or transfer cost of marriage in isolation can be misleading because the cost depends on both the income tax and the welfare systems. This is especially the case after recent expansions of the Earned Income Tax Credit introduced large numbers of previously non-working single mothers into the labor force and therefore into the income tax system. Relatively little empirical work, however, has examined the impact of the combined tax and transfer system on the family (Dickert-Conlin and Houser 1998b, Eissa

and Hoynes 2000b). While DCH find no effect of taxes and transfers on female headship, EH find a modest effect on the propensity of females to be married. The later estimate that reducing the marriage income tax penalty by $1000 would raise the probability of marriage by about 1.3 percentage points. Two problems mar this work. First, partners of unmarried individuals are not observed, and therefore must be imputed to calculate a marriage tax cost. This imputation introduces noise. Second, the cost of marriage is assumed to be fully characterized by the difference in the total taxes and transfers of the couple in the married and single states. For this cost to be appropriate, couples must maintain the same housing arrangement upon separation or marriage.

In this paper, we extend previous work examining the impact of the tax and transfer system in the United States by examining the choice between marriage and cohabitation. Census data suggest that about 4.2 million couples of opposite sex live together in the United States, about 8 times that in 1970 (Waite 2000). Estimates from various data suggest the overall rate of cohabitation rates is approximately 9 percent, but as high as 17 percent among those below 30 years of age (Moffitt 1998). Cohabitation improves our previous work in two ways. First, we observe directly the characteristics of partners for unmarried individuals, This information generates a better measure of the tax-transfer cost of marriage. The tradeoff is that the analysis conditions on the choice of a mate, and ignores a potentially important margin along which taxes might affect behavior. Second, the cost of marriage is measured with far less error because cohabiting couples continue to take advantage of shared living arrangements.

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 are shown to be driven primarily by tax laws.

We examine the impact of these changes to the tax-transfer consequences of marriage on individual behavior by estimating a discrete choice model of the propensity to be married, where the alternative is cohabitation. Our results suggest that the tax-transfer consequences of marriage do affect marriage behavior, but that the overall effect is quite modest. We estimate that reducing the marriage income tax penalty by

$1000 would raise the probability of marriage by about 0.4 percentage points. This effect is quite consistent across various specifications and definitions of the total cost of marriage, but exhibits some variation across groups defined by race and education. When we incorporate public assistance transfers, we estimate that the probability of marriage rises only slightly. We also find that the marriage behavior of young and childless individuals most responsive to the total tax-transfer cost.

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 5 percent for the lowest-income families ($10,000 - $15,000), and reduced marriage by 2 to 3 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. Section 3 presents the data and descriptive evidence on the tax and transfer consequences of marriage. The conceptual and empirical frameworks typically used for marriage analysis are presented in section 4. Our regression results are in section 5. We present our conclusions in section 6.

2. Taxes and the Family

2.1 Tax Treatment of the Family

The appropriate tax treatment of the family has been a topic of discussion in the United States since the adoption of joint filing in 1948.[1] 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. A further desirable feature of the tax code is that be marriage neutral. By marriage neutrality, it is meant that the total tax burden for a couple with the same total income should not change upon marriage. It has been shown, however, that any tax system will violate at least one of these principles (Rosen

[1] In fact, joint filing was adopted to equalize the treatment of married couples in community property and non-community property states.

1977). In the United States, the federal income tax code is progressive, and maintains horizontal equity based on family income, and therefore is not marriage neutral. It is interesting to note that the tax treatment of the family in the United States is quite different from that in other industrialized nations. Most other countries base their tax on the individual and not on the family, and thus maintain progressivity and marriage neutrality but not horizontal equity across families (Engelhardt and Pechman 1990, Congressional Budget Office [CBO] 1997).

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, married couples benefit from economies of scale deriving from sharing resources. On these grounds, marriage should be taxed because it raises ability to pay.[2] The benefits of economies of scale accrue to any group of individuals residing together, however, and are not taxed if they accrue to cohabiting couples, adult children living with parents, or group-home residents. Taking this view seriously then requires taxing these other arrangements. On the other hand, the tax system is used to alter behavior along many dimensions, and it is not obvious that marriage should be treated differently. Marriage generates social benefits primarily in the form of child well-being. If, as is likely, individual ignore the social benefits, a strong argument for government intervention emerges.

The question that arises here is whether marriage confers social benefits that are different from cohabitation. Empirical evidence on the difference between marriage and cohabitation, while not conclusive, is informative (See Waite 2000). Cohabiting couples seem to exhibit a greater tendency to behave in ways that have social costs. For example, cohabiting couples are 3 times more likely to engage in domestic violence (National Survey of Households and Families)[3], have higher rates of eventual marital disruption, engage in riskier and more socially-costly sexual behavior (National Survey of Women), report being worse off emotionally, are less likely to investment in relationship. From a social welfare perspective, we might care more about the impact of adult behavior on child well-being. If the negative effects of cohabitation on adult behavior (and therefore) child well-being are causal, the argument for government intervention is maintained. Here, the tax code should subsidize marriage. In addition, the strong correlation between poverty and single-parent

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

[3]This result is not found among cohabiting couples planning to marry.

families suggests that marriage may be viewed as a cost-effective poverty alleviation policy.

2.3 The Federal Income Tax

While 61 provisions of the federal income tax code alter tax liability by marital status (GAO, 1998), 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.

The Earned Income Tax Credit (EITC) also plays an important role in generating marriage non-neutrality. 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. There are three regions in the credit schedule. The initial phase-in region transfers an amount equal to the subsidy rate times their earnings. In the flat region, the family receives the maximum credit. In the phase-out region, the credit is phased out at a some phase-out rate. 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. Other, less-prominent, provisions in the tax code that generate marriage non-neutrality include those related to the child-care tax credit and the taxation of social security benefits.

Together these features operate to tax marriage in some cases and subsidize it in other cases. In tax year 1999, approximately 48 percent of couples filing a joint federal tax return faced a marriage penalty averaging $1141, while 41 percent received a marriage bonus averaging $1274 (Bull *et al* 1999). These modest overall penalties mask substantial heterogeneity in the population. Penalized married taxpayers with less than $20,000 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). In tax year 2000, the maximum credit amount is $3,888 for a family with two or more children, and $2,371 for a family with one child. 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).

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

3.1 Data Construction and Sample Characteristics

Our work is based on data from the 1985-1998 March Current Population Survey (CPS) covering tax years 1984 to 1997. While the CPS lacks the longitudinal feature that is natural for this analysis, it does offer a large sample and cover an extensive time period. We present preliminary transition results using the National Longitudinal Survey of Youth (NLSY) later.

Our main selection criteria are based on age. The sample includes individuals between the ages of 18 and 47.[4] 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.[5] Although the CPS identifies cohabitors after 1993, we identify cohabiting couples using the relationship to head information that is provided over the entire time period. We classify those with "non-relative partners/roommates" as possible couples, dropping units with more than 2 members and same-sex room-mates. A comparison of imputed and CPS cohabitors from 1994 to 1997 shows they look strikingly similar in age, education , race, children and employment (Table 1) The main difference is that CPS cohabitors report lower annual earnings.

Eliminating observations with incomplete information and pooling over 14 years generates 292,043 observations: 269,876 married couples and 22,167 unmarried (cohabiting) couples. The marriage model is estimated using females only.

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 and that conditioning on the employment is preferred to a pure population ratio (Brien 1997). 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).

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[4]We expand the age selection slightly if an individual is married to someone beyond the age restriction, but restrict . The age difference to be less than 5 years. 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).

[5] The relevant unit for the federal tax and the EITC is the tax-filing unit, constructed by separating related subfamilies from primary families.

Overall our data suggest that about 60 percent of males and 56 percent of females in the CPS sample are married. Among the remaining 40 percent, about one-quarter are "predicted" to be cohabiting, leading to an overall cohabitation rate of about 11 percent for both males and females. Table 2 presents summary statistics for the sample of married and cohabiting men and women respectively. Those who are married are on average older, more educated (with higher earning partners) and much more likely to be white and have children. On the other hand, married and cohabiting women have similar current labor market participation and annual earnings, suggesting that the effect of children offsets the education and age differentials. Women look similar to their partners in education and race but tend to be somewhat younger and earn less than their partners. Finally, married women also live in states that have better "marriage markets", that is with higher male to female population ratios.

3.2 The Tax Cost of Marriage

While the definition of the marriage tax is fairly clear, its calculation is not straightforward. The tax cost of marriage is defined as the difference between the tax liability of the family if legally married and the sum of their individual tax liabilities if unmarried. This cost is generally calculated as the difference between their married joint-tax-return liability and the sum of their individual tax liabilities if they file the appropriate tax returns as unmarried individuals. Because transfers uniformly tax marriage, we focus here on the income tax cost of marriage, defined as above:

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

where $\boldsymbol{T}$ 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. The tax liability for married couples is calculated assuming they file a married joint income tax return (S_m), and accounts for the earned and unearned income of both partners as well as the number of children (if any). The tax liability of single individuals is calculated using either the single filer or the head of household tax return.

The difficulty in calculating this marriage tax cost is that it requires making assumptions about tax liabilities in a counterfactual state: separation for married couples and marriage for cohabiting couples. For married couples, this requires making assumptions regarding the subsequent allocation of children, earned and

unearned income. We assume that the wife receives custody of the children, so that she files the head-of-household schedule (S_{hh}) and the husband files the single tax schedule (S_s) if not married. We also assume that unearned income is equally split between the husband and wife.[6] Finally, we use actual earnings and therefore do not adjust for changes in labor supply with separation or marriage.[7]

Our findings, in Table 2, show that the federal income tax system subsidizes married couples on average (-$432), but taxes cohabiting couples ($119). The transfer system on the other hand taxes both groups, with married couples facing the higher penalties. The anomalous result that married couples face higher total tax-and- transfer costs ($1215 versus $1086) can be explained by the effect of children on the marriage tax cost and the distribution of couples with and without children. Breaking the samples by the presence of children shows that married couples with children face lower total tax-transfer costs ($1516) than cohabiting couples ($2073). The same pattern holds for childless couples, although the differences are substantially smaller.

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). Appendix Table 1 presents federal income tax parameters for 1984-1997and shows the changes in the tax schedule over the period at the very bottom and top of the income distribution. Along with the number of tax brackets, these numbers suggest a decline in the statutory progressivity from 1984 to 1988, followed by an increase that is substantial especially after OBRA93. The most notable feature of the 1993 tax for our purposes is the expansion of the EITC, which dramatically altered the tax schedule at the bottom of the income distribution. The EITC expansions

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[6] 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.

[7] Our tax model calculates federal income, and payroll taxes from tax year 1984 to 1997. We assume that all taxpayers take the standard deduction 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. See Eissa and Hoynes (2000a) for more details on the tax and transfer calculator.

through tax acts in 1986, 1990 and 1993 were such that the associated marriage tax cost (including federal taxes) could be as high as $2,733 for a working couple with two children. This occurs because of 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 (see Appendix Table 1 for EITC parameters). As a result, 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 1984.[8]

Figure 1 presents the marriage tax cost among our CPS sample of married and cohabiting couples. While the overall tax cost of marriage for all couples shows substantial variation over time (Panel A), it masks even more changes for penalized couples (Panel B) and for subsidized couples (Panel C). For almost the entire period the tax system on average has subsidized marriage by 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 the fact that the marriage penalty among couples facing a marriage penalty *and* the marriage subsidy among couples receiving a subsidy have been increasing over this time. In addition to higher penalties and subsidies over time, the tax system is increasingly more likely to penalize couples and less likely to subsidize them.[9]

Figure 2 substantial interactions between time and income in the marriage tax cost. While the marriage tax cost

fell for lower-income groups (below $20,000), it rose for higher-income groups. In fact, the rise in the marriage tax cost for taxpayers with incomes between $35,000 and $50,000 is such that their subsidy becomes a tax by 1994. Eissa and Hoynes (2000b) show that changes in the marriage tax cost over time within income classes is also driven by the EITC. Marriage by lower income couples was increasingly subsidized, largely because of expansions of the EITC would have made it attractive for partners to combine their income in the phase-in region. At middle incomes, however, separating a married couple generates a larger EITC since some individuals (with children) become eligible.

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[8]Eissa and Hoynes (2000a) 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.

[9] 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.

4. Conceptual Framework and Empirical Model

4.1 Conceptual Framework for Marriage

The standard approach to examining marriage behavior is to use preference theory to model the determinants of marriage and the equilibrium in the marriage market (Becker 1973, 1974). The theory posits that individuals marry if the associated utility exceeds that of not being married, where utility is in the consumption of household-produced goods. Marriage must therefore confer 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 also marry for non-pecuniary (psychic) reasons which could be incorporated into this framework. 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 not based only on the gains from that union but 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 (marital) state:

$$(2) \qquad U = U(M, Z^M, \boldsymbol{T}^M; X);$$

where M is marital status, Z represents a measure of household output and depends on marital status, $\boldsymbol{T}$ 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 is meant to capture that marriage confers gains and associated with those gains are tax and transfer consequences. One issue that arises here is whether $\boldsymbol{T}$ 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-$\boldsymbol{T}$) 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. It is possible, however, to eliminate the marginal tax rate under some conditions on the cost function. This occurs because the marginal hour is taxed at the same rate for both spouses. Our empirical analysis takes the tax-transfer liability as a valid approximation of the

effect on marriage decisions. We address the implications of this assumption in the results section.

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. We should note that stylized facts about cohabitation might suggest an alternative framework that incorporates search theory. Data suggests the following three observations (Brien *et. al.).* First, many relationships begin with cohabitation: about 30 percent of whites in the National Longitudinal Survey (NLS72) report cohabiting the first time they started a relationship. Second, cohabitation is short lived relative to marriage. One year survival rates for first cohabitations (marriages) are 50 percent (97 percent) for whites. Blacks report higher survival rates for cohabitation and lower rates for marriage. Finally, many cohabitations end in marriage. About 60 to 70 percent in the NLS 72 report marrying, while 20 percent separate. Brien et al. (1999) develop and estimate a structural model of family formation (including cohabitation, marriage and divorce) motivated by these stylized facts. While we recognize the validity of modeling marriage in a matching framework, we choose to maintain the simpler Becker framework at this stage.

4.2 Empirical Framework

Our analysis conditions on the choice of a partner. If we define M^* as the difference in the maximal utility between the two states, then the woman will marry her partner if M^* is greater than zero:

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

(4) $M = 1$ *if* $M^*>0$; and $M=0$ otherwise

Assume initially that couples use the same sharing rule in legal and common law marriages Suppose also that legal marriage generates no additional psychological or social benefits. In that case, the marriage decision would be based only on the difference between the tax-transfer cost of marriage. Because all the information about the partner is observed, this approach generates a far better measure of the true cost of marriage and eliminates the measurement error bias in the standard approaches. Of course, couples are likely to behave differently in legal and common law marriages, so that non-tax gains to marriage and observable characteristics affect the decision.

Assuming a linear form for the indirect utility function and adding an error term, the difference in utility becomes:

(5) $M^* = \alpha + \beta Z + \delta T + \gamma X + \nu;$

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 capturing the expected gains from marriage, including income and "local" marriage market characteristics (male-female sex ratios). Under simple assumption on the structure of the error, this setup leads in a straightforward way to the following specification:

$$(6) \qquad P(M_{ist}=I) = f(\alpha + \beta Z_{ist} + \delta \tau_{ist} + \gamma X_{ist} + D^{r}_{t} \lambda_{y} + D^{k}_{s} \gamma_{k})$$

where λ_t are year effects, and γ_s are state fixed effects. 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. Assuming normality of the error term allows us to estimate this model as a probit.

One concern about this model relates to the appropriate outcome measure. While we use a stock concept in evaluating the *percent* currently married, the conceptual 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 decision[10]. The stock concept relates current marital status to current economic variables and therefore misrepresents relevant variables for some couples. To render this a valid empirical model, however, we can assume that individuals re-optimize each period. In each period then, all individuals are assumed to be in the marriage market.[11] A second advantage of examining 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

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

[11] This 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.

extend this in future work by exploring the flows into and out of marriage.[12]

4.3 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 along a number of dimensions, including family size, non-labor income and total earned income (wages and hours worked, and by the distribution of earnings within the family. Tax rates also 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 marriage penalty. Figure 3, reproduced from Eissa and Hoynes (2000a) presents evidence on the variation in marriage tax costs driven by changes in tax laws versus changes in individual behavior. Panel A shows that the time pattern in tax costs is driven primarily by tax changes. Demographic characteristics raise the tax cost of marriage gradually. Eissa and Hoynes show that the non-tax changes in the marriage tax over this period can be explained almost entirely by the changing share of secondary (wife) earnings and not be family size or total income.

This findings suggests that our main concern should be the endogeneity of labor supply by the secondary earner to 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

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[12] Appendix Table 6 presents results of transitions models using NLSY data. We estimate models that relate the likelihood of cohabiting at time t+2 conditional on cohabiting at time t.

$$P(m_{i,t+2}=1 \mid m_{i,t}=0) = f(\alpha + \beta Z_{i,t} + \delta \tau_{i,t} + \gamma X_{i,t})$$

The results suggest effects in the expected direction, but that are statistically insignificant.

unmarried men. Second, married women without children work slightly less than cohabiting women, while women with children work substantially less than other women (although the gap is declining over time) – see figure 4 –. 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 this version of the paper, we use actual earnings for all women. One extension would be to 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.

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 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.[13]

To identify the tax effect, we assume that cohabiting couples are comparable to married couples after controlling for observable characteristics. We noted earlier that empirical evidence suggests some differences in the behavior of these two groups in domestic violence, marital disruption, sexual behavior and investment in relationship. No research has established causal links between this behavior and marital status, however. A more formal test of the comparability of the two groups could be based on labor market outcomes. We can test whether married and cohabiting females are rewarded equally in the labor market. To do so, we estimate a standard wage equation, controlling for selection into the labor market.[14] Our results suggests a marriage premium of 3.5 percent that is statistically not different from zero (Appendix Table 2). Married and

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[13] Eissa and Hoynes (2000b) find the effect of a10 percent improvement in the marriage market to be almost 8 percentage points on the marriage-single choice compared to 0.3 percentage points in the cohabitation choice. Because 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.

[14]The selection equation is identified by the presence of children.

cohabiting women seem to be relatively equally treated in the labor market.

5. Results

5.1 Basic Results

We first present results using only the federal income tax cost of marriage for the sample of females 18 and 47 years old in Table 3. The regression controls for individual and family characteristics, unrestricted year effects separately for three education groups (less than or equal to high school, some college, college graduate or more), and unrestricted state effects. The dependent variable is equal to 1 if the individual reports being married, and 0 if cohabiting. We report throughout probability derivatives (dP/dX) and their associated standard errors. The evidence here suggests that marriage is more likely to occur among more educated and younger individuals, although in a nonlinear way. Clearly, the strongest effect on the marriage decision operate through race and the presence of children. Black females in the sample are 5 percentage points less likely to be married than white females, while those with children are percentage points more likely to be married (we discuss the role of children below). Residing in an MSA outside a central city is coincident with a 1.4 percentage point higher probability of marriage than living in the central city. In addition, we do not find much evidence that the marriage market matters; the effect is small and statistically insignificant. This result may suggest that the marriage market is more important for finding a mate than for the choice between cohabitation and marriage.[15]

Our results also suggest that taxes modestly depress the likelihood of marriage. The coefficient on the marriage tax cost is negative and statistically significant, and suggests that raising the tax cost of marriage by $1000 lowers the probability of marriage by 0.4 percentage points. This effect of the tax system is statistically significant, with a standard error of 0.02 percentage points.

5.2 Sensitivity Checks

Because cohabitation in the United States is a relatively recent phenomenon and because it is more common among younger populations, we might expect different sensitivities to the tax-transfer system. To explore this possibility, we split the sample by age and estimate separate regressions for women younger and older than 35.

[15]We 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.

Not surprisingly, we find strong evidence that the effect of taxes is stronger for younger couples.[16]

The tax cost of marriage is a nonlinear function of the determinants of the marriage decision, raising a standard identification problem. To explore the sensitivity of the results to these various controls, Table 4 presents the coefficients on the tax-cost for various specifications. Little effect is found for all controls, except one: children. Controlling for differential marriage trends by education (row 5), marriage market characteristics (row 6), state effects (row 7), and spouse earnings (row 8) has almost no effect on the cost of marriage coefficient. The presence of children nearly halves the effect from 0.9 (row 3) to 0.5 percentage points (row 4). This result is not surprising. Children substantially raise the likelihood of marriage and (in absolute value) the tax cost of marriage. Omitting children from the regression therefore leads to a spurious positive correlation between the cost and the propensity to marry. We discuss the role of children in Section 5.4 below.

Employers, like the government, provide very different benefits to cohabiting and married couples. Whereas spouses are eligible for employer-provided health insurance, unmarried partners typically are not. This differential treatment is relevant here if the availability of health insurance influences the likelihood of marriage and is correlated with its tax cost. Own insurance lowers the gains from marriage but not significantly after controlling for earnings. Own health insurance also lowers the estimated response to taxes to 0.2 percentage points (row 9 of Table 4). The impact of taxes remains statistically significant.

5.3 Treatment of the Gains to Marriage and The Tax-Transfer Cost of Marriage

A 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, partner earnings, as well as own and spouse earnings (separately and combined). We should note that relative to cohabitation, it is not clear that the partner's earnings should matter, especially if couples employ the same sharing rules regardless of marital status. Sociological evidence suggests that the type of cohabiting relationship affects dramatically how couples behave: those who expect to get married look very similar to those who are married. These findings suggest that the effect of earnings on marriage is not clear a priori. Each column in

[16] It is possible that because marriages are "older" among the group over 35, their marriage tax cost is poorly measured. An alternative explanation for the differential responses is measurement error bias for those over 35.

table 5 reports the regression results using the basic model of Table 3, but augmented with the earnings measure(s). Two observations emerge from these results. First, the effect of spouse earnings on marriage is highly nonlinear. At very low earnings, the effect of income is positive but turns negative at higher incomes. This result holds even after controlling for the woman's own earnings (column 4). Second, we note that the estimated effect of the tax on marriage is consistent across the specifications at -0.3 percentage points.

Marriage behavior in the United States differs substantially among different groups. At any age, less-educated individuals are less likely to be married, 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 6, we explore the responsiveness of marriage to the income tax consequence across demographic groups, stratified by education and race. Results show that the average -0.3 percentage point marriage response in fact varies little by race and education. The estimated response rises marginally for the least educated and then declines for more educated females, dropping to -0.015 percentage points for women with at least 16 years of education (Panel B, Column 1 of Table 6).

An important consideration in evaluating these results is that they are based on the tax cost of marriage, which exclude the potentially important marriage transfer penalty. For the sample of women 18 to 47, the evidence suggests this exclusion has little effect on the estimated response. Panel A of Table 6 shows that the effect of the tax on the likelihood of marriage falls only slightly. Given that 76 percent of married and 85 percent of cohabiting females are employed and earn about $15000 on average, this result is not surprising.

Among those likely to be eligible for public assistance transfers, however, their exclusion understates the true marriage cost substantially and biases the estimated coefficients. Panels B and C of Table 6 show the coefficients when the sample is split by education and race. The marriage cost coefficient falls for less-educated females by at least 1.5 percentage points for $1000 of the marriage cost for less-educated individuals, from -0.047 to -0.032 percentage points for the least educated. Adding the transfer component has no effect on the marriage response of those with a college degree. On the other hand, the estimated effect rises for blacks when the transfer component is included. One explanation for this result is that blacks have a greater sensitivity to the tax-transfer system that whites, as has been shown in the welfare literature.

These results suggest that the tax and transfer system affects most black and the least-educated females. Overall the effect remains modest, however.

5.4 Children

Children introduce complications into our analysis for two reasons. In the Becker model of marriage, individuals marry not to take advantage of economies of scale but to have *own* children. Conceptually then, children represent an outcome of marriage, although in practice, childbearing is increasingly taking place outside of marriage.[17] Second, our data show very different propensities to cohabit by those with and without children: while 3 percent of couples with children cohabit, about 19 percent of those without children do so. Given these propensities, one might expect different behavioral responses to the tax system by couples with and without children. To avoid the associated problems, we estimate regressions for childless couples.

Table 7 shows that the cost of marriage is substantially more important for childless couples. Raising the tax cost of marriage by $1000 reduces the likelihood of being married by 1.3 percentage points (with a standard error of 0.1 percentage points). Unlike for the sample of all women 18 to 47 (Table 3), this effect does not vary by age (Panel C of Table 7). It does vary, however, by education. The least educated, childless females exhibit far more sensitivity to the tax system than their more educated counterparts. Raising the tax cost of marriage by $1000 reduces the tax cost of marriage by 2 percentage point for females with 12 years of schooling or less, but by 0.7 percentage points for college educated females.

Because childless couples are not eligible for cash public assistance, this effect is driven primarily by the federal income tax system, including the small earned income tax credit for childless couples.[18] Overall, the conclusion from this section is that the tax system exerts a moderate effect on the marriage behavior of couples without children.

5.5 Imputation of Cohabitants

Our results are based on likely cohabitors, generated based on their reported living arrangements. Although they look similar to the CPS reported cohabitors (Table 1), we examine the sensitivity of our results to our imputation. Table 8 examines the sensitivity of our basic results to our imputation procedure. Because we are restricted to data from 1994 onwards, our identification comes primarily from the OBRA93 tax changes.

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[17] In 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.

[18] Childless individuals are eligible for a maximum credit $332 that is phased out by $1000 (Appendix Table 1).

Several observations emerge from the table. First, the estimated marriage response does not seem sensitive to the time period used (column 1). The basic result suggests one half a percentage point reduction in marriage for $1000 in the cost, compared to 0.4 percentage points for the entire period. The same patterns of stronger responses for less educated and younger individuals is also found in this later period. When comparing these results to the CPS generated sample, we find uniformly smaller marriage responses to the cost (column 2), although the same patterns emerge. Overall, it is noteworthy that the size of the marriage response is of the same order of magnitude. Our result do not seem driven by our imputation of cohabitors.

5.6 Simulated Marriage Incentives and Behavior, and the EITC

Table 9 explores the role of all tax-transfer-generated changes in the cost of marriage between 1984 and 1997. We show the impact on marriage rates of the overall tax and transfer program changes over this period and of the EITC and non-EITC (federal tax and welfare) components. In all cases, simulations are based on the 1997 sample. 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. In the lowest income families ($10,000 - $15,000), tax and transfer changes led to a 4.6 percent increase in the marriage rate. Expansions in the EITC account for 4.3 percent and reductions in other cost led to another 0.3 percent increase. In the higher income groups (e.g. $75,000 to $100,000) the expansions in the EITC reduce marriage by less than 1 percent.

6. Conclusions

The tax and transfer consequences of marriage in the United States have changed dramatically over the past decade. CPS data show that marriage is more likely to be taxed in 1997 than it was in 1984. In addition, the transfer system has become far less generous and restrictive. Existing evidence finds that these changes have modest effect on marriage propensities (Eissa and Hoynes 2000a) and on the timing of marriage (Alm and Whittington (1997).

In this paper, we extend previous work examining the impact of the tax and transfer system in the United States by examining the choice between marriage and cohabitation. Data show that cohabitation is increasingly common in the United States, especially among younger populations (Waite 2000, Smock 2000). Using information on cohabitants improves previous work because it generates a better measure of the tax-transfer cost of marriage. This occurs because partners of unmarried individuals are directly observed (not imputed) and because no additional costs of marriage are involved (couples continue to take advantage of shared living arrangements).

Our results using CPS data suggest that the tax-transfer consequences of marriage do affect marriage behavior, but that the overall effect is quite modest. We estimate that reducing the marriage income tax penalty by $1000 would raise the probability of marriage by about 0.4 percentage points. This effect is quite consistent across various specifications and definitions of the total cost of marriage, but exhibits some variation across groups defined by race and education. When we incorporate public assistance transfers, we estimate that the probability of marriage rises only slightly. We also find that the marriage behavior of young and childless individuals most responsive to the total tax-transfer cost.

Simulations suggest that EITC expansions between 1984 and 1997 raised marriage rates by 5 percent for the lowest-income families and reduced marriage by two to three percent for middle-income families. Separate simulations of welfare and non-EITC federal taxes between 1984 and 1997 show that their effects on marriage are comparatively small.

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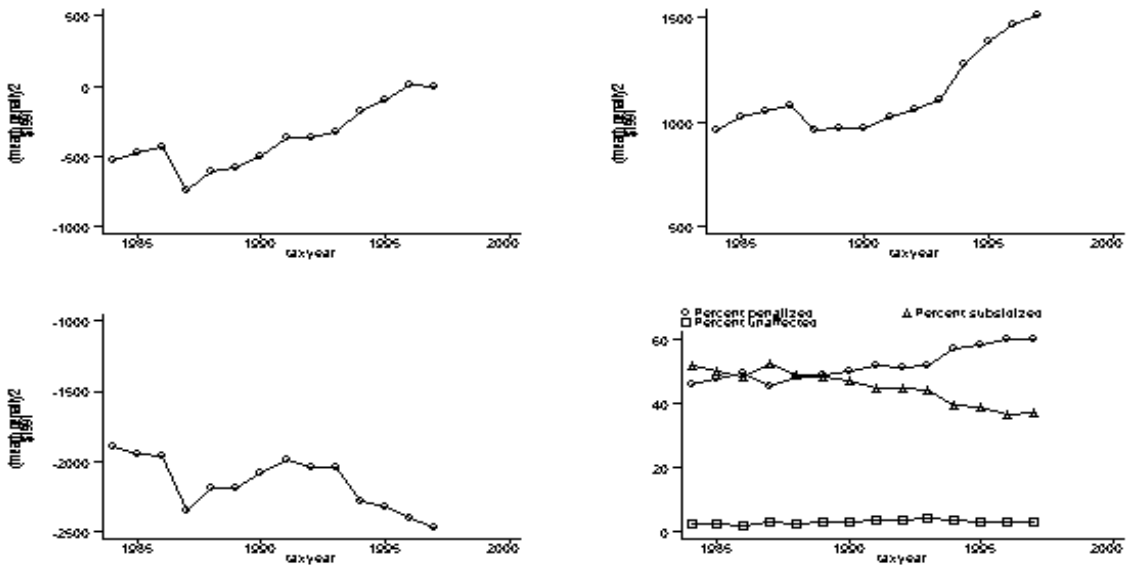
Figure 1
Marriage Tax Cost, 1984-1997
Married and Cohabiting Women

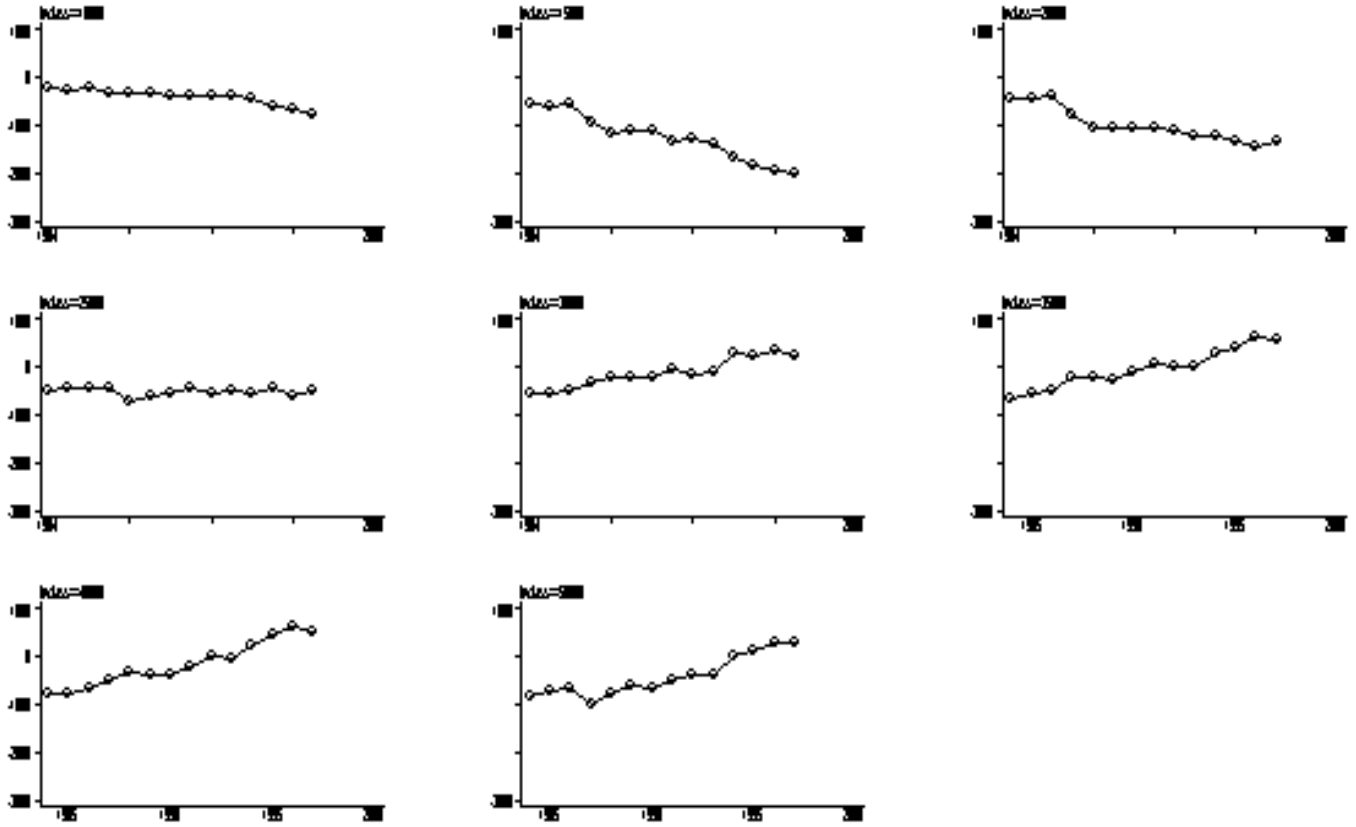


Panel A: All
Panel B: Penalized
Panel C: Subsidized
Panel D: Percent Penalized, Subsidized

Data: Current Population Survey,

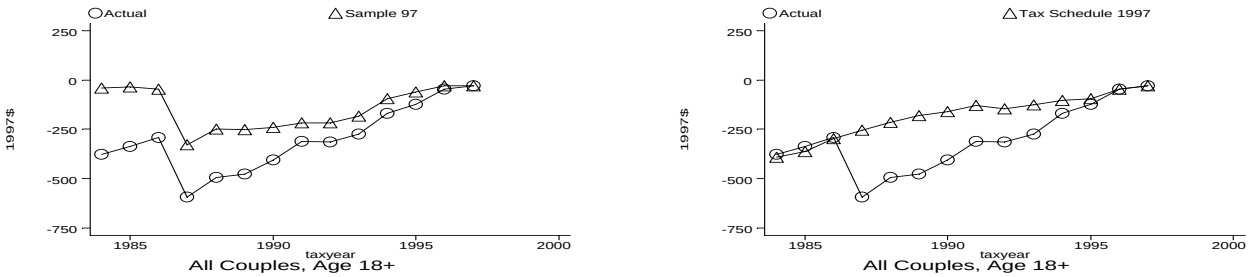
Figure 2

Marriage 1984-1997 Married Cohabiting By Income



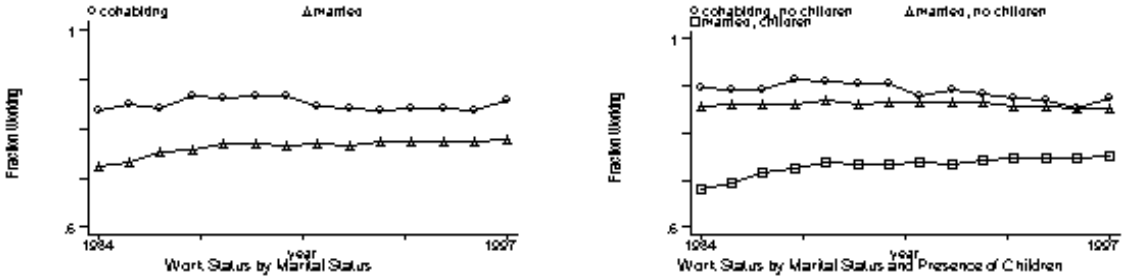
Tax Cost, and Women,

Figure 3
Average Marriage Tax Cost
Actual, Constant Sample and Constant Tax Simulations



Source: Eissa and Hoynes (2000a)

Figure 4
Female Employment
by Marital Status and Children



Work Status of Women with Partners

Figure 5
Tax-Transfer Induced Changes in Marriage
1984-1997

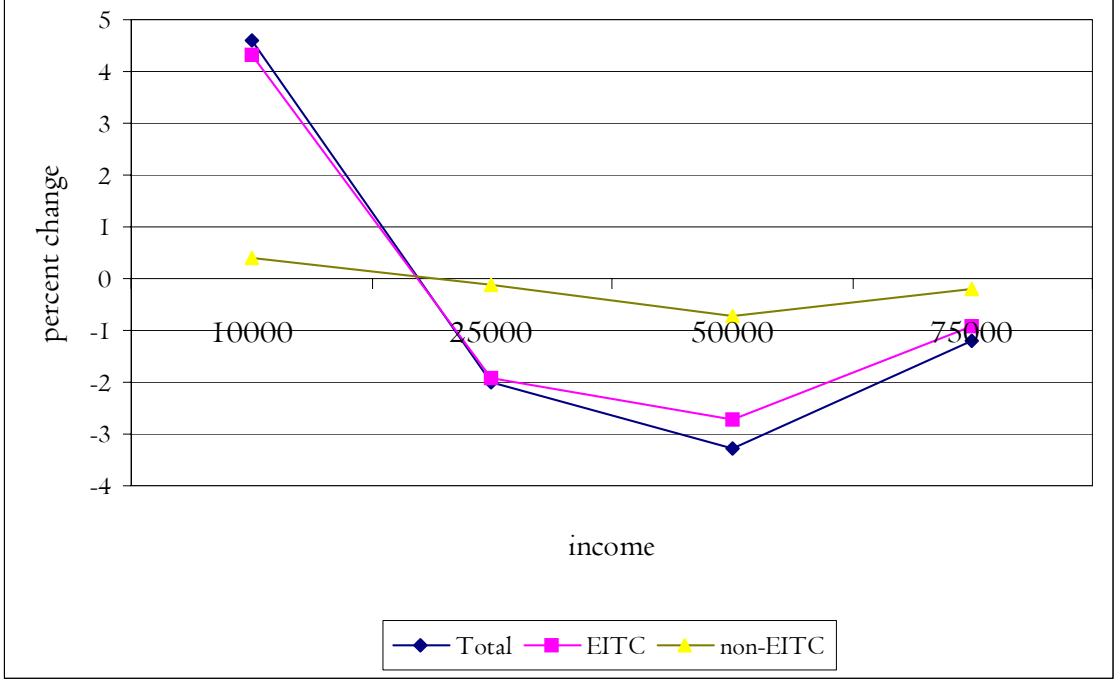


Table 1
Cohabitor Imputation

	CPS Cohabitors	*Our Cohabitors*	*Nonmatched*
		Females, 1994-1997	
Age	30.4 (7.8)	30.4 (7.6)	30.6 (7.7)
Education	12.6 (2.4)	12.7 (2.3)	12.8 (2.3)
Nonwhite	0.16 (0.36)	0.15(0.36)	0.14 (0.42)
Any Children	0.34 (0.47)	0.33 (0.47)	0.31 (0.46)
Number of Kids	0.58 (0.99)	0.57 (0.97)	0.52 (0.91)
Employed	0.83 (0.37)	0.84 (0.36)	0.84 (0.36)
Earnings	14,832 (16,671)	15,761 (17,240)	15,935 (16,358)
Observations	5207	7024	2190

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

Table 2
Descriptive Statistics

	Married		*Cohabitors*	
	Males	Females	Males	Females
Basic Demographic Characteristics				
Age	36.9 (7.7)	34.5 (7.2)	32.4 (8.8)	29.8 (7.4)
Education	13.2 (2.9)	13.0 (2.6)	12.6 (2.5)	12.7 (2.3)
Nonwhite	0.10 (0.30)	0.11 (0.31)	0.16 (0.38)	0.16(0.42)
Any Children	0.76 (0.43)	0.76 (0.43)	0.31 (0.36)	0.31 (0.49)
Number of Kids	1.52 (1.21)	1.52 (1.22)	0.22 (0.61)	0.51 (0.91)
Employed	0.95 (0.21)	0.76 (0.43)	0.93 (0.25)	0.85 (0.36)
Earnings	37,352 (30,060)	14,608 (17,365)	24,942 (23,684)	15,904 (15,852)
Male/Female Pop Ratio[1]		1.059 (0.139)		1.010 (0.163)
Male(FT)/Female Pop Ratio[1]		1.012 (0.146)		0.973 (0.144)
Tax & Transfer Cost of Marriage				
All Couples				
Total	–	$1215 (2560)	–	$1086 (1788)
Tax (Federal & EITC)	–	-$432 (2,228)	–	$119 (1276)
Transfer (AFDC & FS)	–	$1647 (3012)	–	$967 (2,037)
With Children				
Total	–	$1,516 (3,210)	–	$2,073 (2,206)
Tax (Federal & EITC)	–	-$592 (2,414)	–	$80 (1,548)
Transfer (AFDC & FS)	–	$2,108 (3,320)	–	$1,993 (2,811)
Without Children				
Total	–	$276 (1285)	–	$389 (918)
Tax (Federal & EITC)	–	$68 (1391)	–	$146 (1042)
Transfer (AFDC & FS)	–	$207(474)	–	$243 (480)
Observations	269,876		22,167	

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 3
Probit Model of Marriage
Basic Results

Sample: Females,			
Variable	*Probability Derivative*		
	ages 18-47	*age<35*	*age≥35*
Education	-0.005 (0.001)		
Education**2	0.004 (0.0000)		
Age	0.0003 (0.0005)		
Age**2	-0.0001 (0.000)		
Age*Education	-0.000 (0.000)		
Black	-0.049 (0.002)		
Other Race	0.003 (0.002)		
Any Children	0.080 (0.002)		
Number of Children	0.019 (0.001)		
MSA, non-central city	0.014 (0.001)		
Non MSA	0.009 (0.001)		
Area not identified	0.007 (0.001)		
Male(FT)/Female Pop Ratio	0.003 (0.0030)		
Tax Cost (1000s)	**-0.004 (0.0002)**	**-0.005 (0.0005)**	**-0.002 (0.0002)**
Other Controls	year*education dummies, state dummies	year*education dummies, state dummies	year*education dummies, state dummies
Pseudo R squared	0.194	0.1900	0.1780
Number of Observations	292,043	150,217	141,826

Source: Author's tabulations of the 1985-1998 March CPS. Dependent variable is equal to 1 if married (0 if cohabiting). Tax cost includes federal tax and EITC. 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 4
Probit Model of Marriage
Alternative Specifications

Specification	*Tax Cost (Probability Derivative)*
Basic Controls	
(1) Constant (C)	-0.010 (0.0002) [0.010]]
(2) C, Year Dummies	-0.009 (0.0002) [0.0134]
(3) C, Year, Demographics	-0.009 (0.0002) [0.087]
(4) C, Year, Demographics, Kids	-0.005 (0.0002) [0.183]
(5) C, Year*Educ, Demographics, Kids	-0.005 (0.0002) [0.184]
(6) C, Year*Educ, Demographics, Kids, M/F Pop Ratio	-0.005 (0.0002) [0.184]
(7) C, Year*Educ, Demographics, Kids, M/F Pop Ratio, State	-0.005 (0.002) [0.194]
(8) C, Year*Educ, Demographics, Kids, M/F Pop Ratio, State, Spouse's earnings	-0.004 (0.0002) [0.203]
Health Insurance	
(9) C, Year*Educ, Demographics, Kids, M/F Pop Ratio, State, Spouse's earnings, Health Insurance	-0.002 (0.0002) [0.202]
Number of Observations	292,043

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 5
Probit Model of Marriage
Treatment of Gains to Marriage

Variable	*Definition of Earnings Variable*			
	Own Earnings	*Spouse Earnings*	*Couple Earnings*	
	(1)	(2)	Combined (3)	Separate (4)
Earn	-0.0002 (0.0000)			-0.0004 (0.0000)
$Earn^2$	0.0000 (0.000)			0.000 (0.000)
SpEarn		0.001 (0.0000)		0.001 (0.0002)
$SpEarn^2$		-0.0001 (0.000)		-0.0000 (0.0000)
CEarn			0.001 (0.0000)	
$CEarn^2$			-0.0001 (0.0000)	
Tax Cost	**-0.004 (0.0002)**	**-0.003 (0.0002)**	**-0.003 (0.0002)**	**-0.003 (0.0002)**
Pseudo R2	0.195	0.206	0.200	0.207
Observations	292,043			

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, Spearn are** *actual* earnings for the female, male respectively. **CEarn** is the couple's total earnings. All earnings figures are in 1000s. Standard errors are in ().

Table 6
Probit Model of Marriage
Treatment of Cost of Marriage

		Alternative specification for cost of marriage	
Sample	Observations	Tax Cost (1)	Tax & Transfer Cost (2)
Panel A: All Females 18-47			
All	292,043	-0.004 (0.000) [.203]	-0.003 (0.000) [.203]
Panel B: Education			
Education<=12	155, 376	-0.0047 (.0004) [0.189]	-0.0032 (.000) [0.189]
Education 13-15	72,572	-0.0044 (0.0004) [0.214]	-0.0027 (0.000) [0.213]
Education 16+	64,095	-0.0015 (0.000) [0.252]	-0.0015 (0.000) [0.252]
Panel C: Race			
Whites	260,116	-0.004 (0.000) [0.211]	-0.003 (0.000) [0.210]
Blacks	18,105	-0.003 (0.001) [0.187]	-0.007 (0.001) [0.189]

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 7
Probit Model of Marriage
Childless Couples

		Total Cost
Panel A: All Females Age 18-47		
	Observations	No Children
All	80,810	-0.013 (.001)
Panel B: Education		
Education<=12	39,000	-0.020 (0.002)
Education 13-15	20,753	-0.011 (0.003)
Education 16+	21,057	-0.007 (0.002)
Panel C: Age		
Age<35	46,122	-0.013 (0.002)

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 table reports probability derivatives and their associated standard errors are in parentheses. The response is to $1000 in the marriage tax. Each of the rows and columns correspond to a separate probit model of marriage. Each of the specifications also include controls for demographics, education specific year effects, state effects, and spousal earnings.

Table 8
Probit Model of Marriage
Imputed versus CPS Cohabitors, 1994-1997

	Imputed Cohabitors	*CPS Cohabitors*
Sample		
(1) All	-0.005 (0.0005)	-0.003 (0.0003)
(2) – Education ≤ 12	-0.006 (0.001)	-0.005 (0.001)
– Education =13-15	-0.005 (0.001)	-0.002 (0.001)
– Education >16	-0.002 (0.001)	-0.001 (0.003)
(3) Age <35	-0.006 (0.001)	-0.003 (0.001)
Observations	7,024	5,207

Source: Author's tabulations of the 1995-1998 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 ().

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

	Implied Change in Marriage Probability		
Family Earnings	Total	EITC	Non-EITC Federal Tax
10,000-15,000	+4.6%	+4.3%	+0.4%
25,000-30,000	-2.0%	-1.9%	-0.1%
40,000-50,000	-3.3%	-2.7%	-0.7%
75,000-100,000	-1.2%	-0.9%	-0.2%

Source: Authors tabulations of 1997 CPS using estimates in column 1 of table 3.

Appendix Table 1
Federal Income Tax and EITC Parameters
1984-1996

Year	Federal Income Tax Parameters		EITC Parameters		
	[lowest, highest marginal tax rate-%)] (number of brackets)	Personal Exemption, Standard Deduction [1]	Phase-In Rate (%)	Maximum Credit	Maximum Earnings
1984 [2]	[0, 50] (15)	$1000, 0/0/0	10.0	$500	$10,000
1985 [2]	[0, 50] (15)	$1040, 0/0/0	11.0	$550	$11,000
1986 [2]	[0, 50] (15)	$1080, 0/0/0	11.0	$550	$11,000
TRA86					
1987	[11,39] (5)	$1900, 2540/2540/3760	14.0	$851	$15,432
1988	[15,28] (2)	$1950, 3000/4400/5000	14.0	$874	$18,576
1989	[15,28] (2)	$2000, 3100/4550/5200	14.0	$910	$19,340
1990	[15,28] (2)	$2050, 3250/4750/5450	14.0	$953	$20,264
OBRA90					
1991 [3]	[15,31] (3)	$2150, 3400/5000/5700	16.7 [4]	$1,192	$21,250
			17.3 [5]	$1,235	
1992 [3]	[15,31] (3)	$2300, 3600/5250/6000	17.6 [4]	$1,324	$22,370
			18.4 [5]	$1,384	
1993 [3]	[15,39.6] (5)	$2350, 3700/5450/6200	18.5 [4]	$1,434	$23,050
			19.5 [5]	$1,511	
OBRA93					
1994	[15,39.6] (5)	$2450, 3800/5600/6350	26.3 [4]	$2,038	$23,755
			30.0 [5]	$2,528	$25,296
			7.65 [6]	$306	$9,000
1995	[15,39.6] (5)	$2500, 3900/5750/6550	34.0 [4]	$2,094	$24,396
			36.0 [5]	$3,110	$26,673
			7.65 [6]	$314	$9,230
1996	[15,39.6] (5)	$2550, 4000/5900/6700	34.0 [4]	$2,152	$25,078
			40.0 [5]	$3,556	$28,495
			7.65 [6]	$323	$9,500
1997	[15,39.6] (5)	$2650, 4150/6050/6900	34.0 [4]	$2,210	$25,750
			40.0 [5]	$3,656	$29,290
			7.65 [6]	$332	$9,770

[1] The standard deductions are given for single/head of household/married filing joint.

[2] In 1984-1986, there were no standard deductions because of the zero bracket. The 15 brackets include the zero bracket.

[3] Basic EITC only. Does not include supplemental young child credit or health insurance credit.

[4] Families with one qualifying child.

[5] Families with two or more qualifying children.

[6] Taxpayers with no qualifying children.

Source: The Green Book and authors' calculations from OBRA93.

Appendix Table 2
Marriage Premium

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. ******************************************************************;
. *wage regressions for men - is there a marriage premium?;
. *wage regressions for women - heckman selection;
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	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lnwage2						
educ2_2	.0272438	.2619526	0.104	0.917	-.486174	.5406615
educ2_3	.2490193	.2721576	0.915	0.360	-.2843998	.7824384
educ2_4	.2748646	.2887278	0.952	0.341	-.2910315	.8407608
educ2_5	.6495964	.3167494	2.051	0.040	.0287789	1.270414
educ2_6	.6951933	.3355244	2.072	0.038	.0375776	1.352809
age2	.0678805	.0109175	6.218	0.000	.0464826	.0892784
ageXage	-.0009153	.0001443	-6.345	0.000	-.001198	-.0006325
aXed2_2	.0033064	.0070168	0.471	0.637	-.0104462	.0170591
aXed2_3	.0050611	.0065572	0.772	0.440	-.0077908	.017913
aXed2_4	.0092873	.0067546	1.375	0.169	-.0039515	.022526
aXed2_5	.0070526	.0072541	0.972	0.331	-.0071651	.0212704
aXed2_6	.0125146	.0077689	1.611	0.107	-.0027121	.0277414
black	-.0275183	.0317263	-0.867	0.386	-.0897007	.0346642
othrace	-.0496179	.035469	-1.399	0.162	-.1191359	.0199
msanc	.0348482	.0201514	1.729	0.084	-.0046478	.0743442
nonmsa	-.1644601	.0240611	-6.835	0.000	-.2116189	-.1173012
noidmsa	-.0496134	.0260784	-1.902	0.057	-.1007261	.0014992
married	**.0352925**	**.030421**	**1.160**	**0.246**	**-.0243315**	**.0949165**
_cons	.5061389	.3098818	1.633	0.102	-.1012183	1.113496

Appendix Table 3
Probability of getting married, currently cohabiting
*Total Tax and Transfer Cost

Probit estimates — Number of obs = 1049
LR chi2(18) = 97.75
Log likelihood = -555.6445 — Pseudo R2 = 0.0809

coh	dF/dx	Std. Err.	z	P>|z|	x-bar	[95% C.I.]	
totpen	**-.0039411**	**.0068148**	**-0.58**	**0.563**	**2.47679**	**-.017298**	**.009416**
Irace_2*	-.032773	.040666	-0.79	0.429	.265014	-.112477	.046931
Irace_3*	.1090967	.0359318	3.02	0.003	.50143	.038672	.179522
rearn	2.86e-06	1.14e-06	2.50	0.012	15366.3	6.2e-07	5.1e-06
pearn	1.31e-06	7.29e-07	1.79	0.073	24586.4	-1.2e-07	2.7e-06
kids	.0026263	.0099585	0.26	0.792	1.77216	-.016892	.022145
age	.2484067	.0862171	2.87	0.004	31.1687	.079424	.417389
age2	-.0043654	.0013758	-3.16	0.002	980.936	-.007062	-.001669
educ	-.0058139	.0113639	-0.51	0.609	12.5472	-.028087	.016459
ageXed2	.0022831	.0016295	1.40	0.162	14.1802	-.000911	.005477
ageXed3	.0026994	.0023651	1.14	0.254	11.2965	-.001936	.007335
obs. P	.2631077						
pred. P	.2445477	(at x-bar)					

*Tax Cost Only

Probit estimates — Number of obs = 1049
LR chi2(18) = 97.52
Log likelihood = -555.76182 — Pseudo R2 = 0.0807

coh	dF/dx	Std. Err.	z	P>|z|	x-bar	[95% C.I.]	
taxpen	**-.0037008**	**.0116496**	**-0.32**	**0.751**	**.210553**	**-.026534**	**.019132**
Irace_2*	-.0304836	.0405534	-0.74	0.460	.265014	-.109967	.049
Irace_3*	.10831	.0360207	2.99	0.003	.50143	.037711	.178909
rearn	3.25e-06	1.36e-06	2.39	0.017	15366.3	5.8e-07	5.9e-06
pearn	1.29e-06	7.33e-07	1.76	0.079	24586.4	-1.5e-07	2.7e-06
kids	-.000194	.0083916	-0.02	0.982	1.77216	-.016641	.016253
age	.2493126	.086272	2.88	0.004	31.1687	.080223	.418403
age2	-.0043857	.0013769	-3.18	0.001	980.936	-.007084	-.001687
educ	-.0067319	.0113683	-0.59	0.554	12.5472	-.029013	.01555
ageXed2	.0024721	.001615	1.53	0.127	14.1802	-.000693	.005637
ageXed3	.0029462	.0023453	1.25	0.210	11.2965	-.00165	.007543
obs. P	.2631077						
pred. P	.2447067	(at x-bar)					

(*) dF/dx is for discrete change of dummy variable from 0 to 1