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Elliott Isaac
Tulane University and IZA

Haibin Jiang
Tulane University

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Tax-Based Marriage Incentives in the Affordable Care Act*

The Affordable Care Act (ACA) introduced a premium tax credit to help low-income families purchase insurance and an individual mandate penalty to encourage purchasing insurance, but a couple's total tax credit and mandate penalty may differ depending on whether they are married. We use a sample of married and cohabiting couples in the 2012–2017 American Community Surveys and leverage variation in the marriage subsidy created by the ACA's premium tax credit, individual mandate, and Medicaid expansion. Using an instrumental variables approach, we estimate a significant though small positive marriage response that is robust to extensive controls and a placebo sample.

JEL Classification: J12, I18, H24

Keywords: marriage, affordable care act, premium tax credit, individual mandate

Corresponding author:
Elliott Isaac
Department of Economics
Tulane University
6823 St. Charles Avenue
New Orleans, LA 70118
USA

E-mail: eisaac@tulane.edu

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1 Introduction

The Affordable Care Act's (ACA) primary policy goal was to increase the number of individuals in the United States with health insurance, and it originally did so using the "three legged stool": overhauling private insurance regulation, imposing an individual mandate, and expanding policies to make health insurance more affordable. The far-reaching goals of the ACA necessarily mean that the law interacts with several facets of public policy, such as Medicaid eligibility, the federal poverty level, and the tax code.

However, the United States' progressive, family-based system of taxation necessarily creates inequalities between married and unmarried couples, leading to the "marriage tax" where two couples with the same total earnings between them can face different tax liabilities upon marriage depending on how those earnings are split between the partners (Rosen 1977; Alm and Whittington 1995; Dickert-Conlin and Houser 1998; Friedberg and Isaac, Forthcoming). Two of the ACA's key provisions, the individual mandate and the premium tax credit, operate through the tax system and, as such, can exacerbate the existing marriage incentives in the United States tax code. In this paper, we estimate the effect of marriage incentives created by the ACA's Medicaid expansion, individual mandate, and premium tax credit on marriage decisions.

We make two key contributions. First, although we primarily focus on the premium tax credit and the individual mandate, this is one of the first papers, to the best of our knowledge, to identify marriage effects by leveraging variation in all three legs of the ACA's "three-legged stool": the Medicaid expansion, the individual mandate, and the premium tax credit. Other early studies of the ACA's marriage effects include Chaterjee (2021) and Hampton and Lenhart (2022), who both only estimate the effect of the ACA-induced Medicaid expansion on marriage and divorce, and Barkowski and McLaughlin (2022), who examine the ACA dependent health insurance mandates on marriage rates of young adults ages 19–25. In a contemporaneous paper, Jones, Wang, and Yilmazer (2021) also estimate marriage effects from the ACA premium tax credit and Medicaid expansion, but do not consider the individual mandate and use a different identification approach, which we discuss further below. As reviewed by Gruber and Sommers (2019), much of the literature on the effects of the ACA has focused on health insurance coverage (e.g., Antwi, Moriya, and Simon 2013; Frean, Gruber, and Sommers 2017; Buchmueller et al. 2016), health care utilization (e.g., Barbaresco, Courtemanche, and Qi 2015; Simon, Soni, and Cawley 2017; Ghosh, Simon, and Sommers 2019; Maclean and Saloner 2019), or health provider responses (e.g., Cole et al. 2017; Neprash et al. 2018). We add to this literature by examining a novel outcome, marriage, that has not been extensively explored and by leveraging variation from multiple aspects of the ACA.

Second, we follow Frean, Gruber, and Sommers (2017) and combine data on health care premiums from the federal and state-based exchanges with the American Community Survey to quantify individual mandate penalties and premium tax credits at the household level. We thereby expand upon one strand of the ACA literature that focuses on the aggregated effect of ACA (e.g., Duggan, Goda, and Li 2021) or the aggregated effect of the ACA-induced Medicaid expansions (e.g., Gooptu et al. 2016; Goodman 2017; Kaestner et al. 2017; Simon, Soni, and Cawley 2017; Leung and Mas 2018; Aslim 2019; Duggan, Goda, and Jackson 2019; Borgschulte and Vogler 2020; Chaterjee 2021; Hampton and Lenhart 2022). Some researchers who, as we do, leverage variation in the ACA's premium tax credits or mandates have found significant effects on health insurance coverage (Antwi, Moriya, and Simon 2013; Frean, Gruber, and Sommers 2017; Hinde 2017; Saltzman 2019; Lurie, Sacks, and Heim 2021), income or labor supply (Kucko, Rinz, and Solow 2018; Heim et al. 2021), and marriage (Jones, Wang, and Yilmazer 2021), while others have not found significant effects on labor market outcomes of young adults (Heim, Lurie, and Simon 2015) or on labor supply of households near the 400% $\frac{\text{AGI}}{\text{FPL}}$ notch (Magne 2019). Our approach allows us to leverage the rich policy variation in the individual mandate penalty and premium tax credits across households for identification. This variation is driven by the couple's adjusted gross income, the number of family members, and the cost of health insurance in the couple's health insurance rating area. This approach also allows us to explore the potentially separate roles of the premium tax credit and the individual mandate in influencing marriage decisions, which is a novel contribution to this literature.

We use the 2012-2017 waves of the American Community Survey (ACS), which spans the

2014 enactments of the ACA premium tax credits and individual mandate as well as the initial Medicaid expansion. The ACS is advantageous in this context because it reports both cohabitation and marriage, thereby enabling us to construct a sample exclusively of different-sex couples in a relationship, although we are only able to measure marriage stocks (as are, for example, Alm and Whittington 1995; Sjoquist and Walker 1995; Ellwood 2000; Eissa and Hoynes 2003; Fisher 2013).[1]

We quantify a household's ACA marriage subsidy using self-reported household income from the ACS and the NBER TAXSIM simulator, taking into account Medicaid eligibility and assuming that the partners would have the same earnings whether they are married or unmarried. However, there are several key endogeneity concerns if we were to use this measure directly in estimation. First, couples may change their labor supply in response to marriage or marriage-induced tax changes (Isaac, Forthcoming). Second, couples may report earnings with error, introducing (possibly non-classical) measurement error into the ACA marriage subsidy measure. We therefore use a simulated instruments approach to overcome these challenges and identify the causal effect of the ACA's tax-based marriage incentives on marriage.

We follow the general methods of Gruber and Saez (2002), Dahl and Lochner (2012), Isaac (Forthcoming), and Friedberg and Isaac (Forthcoming) to predict earned income for each partner using a machine learning LASSO approach. We use the 2012 ACS sample to estimate the coefficients and use the LASSO coefficients to predict the partners' income in the years from 2012 to 2017. We use predicted earned income to calculate each couple's predicted ACA marriage subsidy, which we then use as an instrument for the observed ACA marriage subsidy for identification.[2] The main sources of variation in the instrument originate from changes in ACA policy parameters and variation in insurance premiums at the local rating area level, allowing us to leverage plausibly exogenous policy variation for identification.

We estimate highly significant, but very small, effects of the ACA marriage subsidy on mar-

1. Note that it is not straightforward to identify cohabiting couples from other roommates in tax return data because there is no information on the relationship of taxpayers who live at the same address. In addition, tax return data lacks many demographic covariates that we use as controls and to predict individual earned income as part of our identification strategy.

2. Friedberg and Isaac (Forthcoming) first used this approach in an instrumental variables framework with a simulated instrument.

riage. Our baseline specifications indicate that a \$100 monthly increase in the ACA marriage subsidy increases the probability of being married by 0.29 percentage points ($p < 0.01$), implying a significant elasticity of only 0.0059. We find larger effects among couples living in states that expanded Medicaid, couples with children, couples with less than a high school education, younger couples, and couples who are eligible for premium tax credits in only one marital status. In contrast, we do not estimate a significant effect of Medicaid expansions on marriage, although the coefficient is negative which is consistent with both Chaterjee (2021) and Hampton and Lenhart (2022).

To our knowledge, these are among the first ACA-based marriage elasticity estimates and also among the smallest significant marriage-tax elasticities in this literature.[3] Other researchers, using tax reforms, have either estimated larger elasticities (Alm and Whittington 1999; Herbst 2011; Fisher 2013; Bastian 2017; Michelmore 2018; Gayle and Shephard 2019; Friedberg and Isaac, Forthcoming) or found little to no effect of taxation on family structure (Sjoquist and Walker 1995; Ellwood 2000; Dickert-Conlin and Houser 2002; Light and Omori 2008; Isaac 2020). Our estimates suggest that the ACA does exacerbate existing tax-based marriage incentives in the United States tax code but our small effects may reflect low salience of the ACA's marriage incentives, which we discuss in more detail below.

We also explore the robustness of our results in two ways. First, we find that our estimates are robust to including more flexible state-by-year fixed effects, which still allows us to identify the effects of the ACA's tax-based marriage subsidies in our context because we leverage rich variation across health insurance rating areas and couples rather than state-level measures. This differs, for example, from Jones, Wang, and Yilmazer (2021) who use Marketplace Average Benchmark Premiums within each state, meaning that state-by-year fixed effects would absorb much of their identifying variation from premiums. Second, we also find that our specification passes a placebo test in which we use a placebo sample of couples where both partners report receiving employer sponsored health insurance, and therefore would not be expected to respond to incentives originat-

3. Friedberg and Isaac (Forthcoming) list the smallest marriage-tax elasticities being 0.004 (from Eissa and Hoynes 2003) and 0.012 (from Alm and Whittington 1995; Friedberg and Isaac, Forthcoming).

ing from the ACA marketplaces or individual mandate.

Finally, we examine the potentially separate roles of the premium tax credit and individual mandate in driving marriage responses, which is a novel contribution to this literature even though we are limited in our ability to separately identify their effects for the entire sample. However, we continue to estimate positive and significant effects of each component, which support our baseline estimates.

2 Premium Tax Credits, Individual Mandates, and the Marriage Subsidy

As part of the 2014 Affordable Care Act (ACA) legislation, families who are not eligible for Medicaid and who have adjusted gross income between 100–400% of the federal poverty level (FPL) can be eligible for a refundable premium tax credit (PTC) to purchase health insurance through marketplace exchanges.[4] The ACA also instituted a penalty for lacking health insurance coverage, known as the individual mandate. Both the individual mandate and the PTC operate through the tax code and manifest as part of the individual's tax liability.

2.1 Premium Tax Credits

The PTC value a family can receive depends on local health insurance premiums, the family's adjusted gross income (AGI), and the family's relevant FPL, which varies by family size. For the purpose of calculating a family's maximum PTC, local health insurance premiums are pinned to the premium of the second-lowest-cost Silver plan (SLCSP) in the family's health insurance rating area.[5] Within a health insurance rating area, the total SLCSP premium depends on family size and the ages of the family members, but the SLCSP premium does vary across health insurance rating areas. Figure 1 displays representative variation in SLCSP premiums across health insurance rating areas and years to give a sense of this source of identifying variation.[6] The PTC formula also computes the family's expected annual contribution to health insurance premiums as the product

4. As of 2014, the FPL was $11,670 for one-person families and increased by $4,060 for each additional family member.

5. Note that we do not directly observe the couple's actual health insurance plan or the PTC they claim, so we calculate the family's maximum PTC instead. This also motivates our instrumental variables approach for identification, which we discuss below.

6. Appendix Figure A1 displays the geographic boundaries of health insurance rating areas within each state.

of AGI and a contribution rate schedule that is an increasing function of AGI as a percent of the FPL (i.e., an increasing function of $\frac{\text{AGI}}{\text{FPL}}$). Specifically, the maximum PTC is equal to the difference between the SLCSP premium and the expected annual contribution:

$$\text{Maximum Premium Tax Credit} = \text{SLCSP Premium} - \underbrace{\text{AGI} \times \text{Contribution Rate}}_{\text{Expected Annual Contribution}}. \tag{1}$$

Appendix Figure A2 shows the 2014 schedule of the contribution rate and the PTC value as a function of $\frac{\text{AGI}}{\text{FPL}}$ using the national average cost of the SLCSP and assuming both partners are 30 years old. The contribution rate increases gradually from 2% of the family's income for families with an income less than 133% of the FPL to 9.5% of the family's income for those with income above 300% of the FPL. In this situation, the PTC decreases from around $4,000 gradually to zero for childless families, or the credit decreases from around $7,500 to zero for families with two children.

2.2 Individual Mandates

Families or individuals who are uninsured are potentially subject to the individual mandate penalty (a tax) if they are not eligible for exemption.[7] Between 2014–2018, the mandate penalty could equal a flat dollar value, a percent of the tax unit's taxable income, or the national average of a Bronze plan premium:[8]

$$\text{Individual Mandate} = min\{\text{BPP}, max\{\text{Flat Amount, Percentage Amount}\}\}, \tag{2}$$

where BPP is the national average Bronze plan premium.[9] Appendix Figure A3 displays the individual mandate penalty schedule for a married couple based on $\frac{\text{AGI}}{\text{FPL}}$ and number of children over

7. Families are exempt from the individual mandate penalty if 1) family income is below the federal tax-filing threshold, 2) family income is below 138% of the FPL in a state that did not expand Medicaid, 3) family members are native American, or 4) the lowest-cost health insurance premium exceeds 8% of family income. We incorporate all of these exemption categories in our empirical strategy below.

8. Note that the individual mandate was effectively repealed at the federal level beginning in 2019, although five states and Washington, D.C. retained their state-level individual mandate.

9. The national average premium for a bronze plan is $204 in 2014, $207 in 2015, $223 in 2016, and $272 in 2017, based on HIX Compare data. The flat dollar value penalty for an adult is $95 in 2014, $325 in 2015, and $695 in 2016 or later, and is half of those values for a dependent child. The maximum flat dollar value penalty for a family is capped at $285 in 2014, $925 in 2015, and $2085 in 2016 or later. The percentage penalty is 1% of taxable income in 2014, 2% in 2015, and 2.5% in 2016 or later.

time. In general, families with higher incomes or with more children are subject to higher mandate penalties.

2.3 The Marriage Subsidy

A family's combined PTC and mandate penalty can differ considerably depending on whether the partners are married or unmarried because they operate through the tax code, and are therefore dependent on the partners' legal filing status. For example, two couples with one child and the same total income between them can still face different PTC amounts depending on whether they are married and file jointly (and their AGI relative to the FPL reflects their combined income) or they are unmarried and file as single individuals (and their tax credits are based on their individual AGIs relative to their individual FPL, conditional on who claims the child for tax purposes). This gives rise to the so-called "marriage penalty," which, despite the name, may also be positive and therefore act as a marriage subsidy.[10]

For each couple, we define PTC_i and PTC_j as the PTC for partner i and j, respectively, assuming they are cohabiting and file individually and define PTC_{ij} as the couple's joint PTC if they are married and file jointly.[11] The difference between the couple's joint credit when married and the sum of their credits when cohabiting is the marriage subsidy from the PTC (or penalty, if negative). Similarly, we define Mandate_i and Mandate_j as each partner's mandate penalty if they are cohabiting and define Mandate_{ij} as the couple's joint mandate penalty if they are married. Based on the above definitions, we measure the total tax-based marriage subsidy coming from the ACA as:

$$\text{ACA Marriage Subsidy}_{ij} = \underbrace{\left[\text{PTC}_{ij} - (\text{PTC}_i + \text{PTC}_j)\right]}_{\text{PTC Marriage Subsidy}} + \underbrace{\left[(\text{Mandate}_i + \text{Mandate}_j) - \text{Mandate}_{ij}\right]}_{\text{Mandate Marriage Subsidy}}. \tag{3}$$

A positive value indicates a marriage subsidy and a negative value indicates a marriage penalty.[12]

10. Although the more well-known term is "marriage penalty," our empirical strategy uses the subsidy form and we will refer to it as a subsidy throughout.

11. We assume that the female partner claims any children as dependents for tax purposes if the couple is unmarried.

12. Since the PTC is a tax credit a larger PTC_{ij} relative to $\text{PTC}_i + \text{PTC}_j$ indicates a larger tax credit when married (i.e., a lower tax liability when married) leading to a marriage subsidy. On the other hand, since the individual mandate is a penalty, a larger $\text{Mandate}_i + \text{Mandate}_j$ relative to

To provide a sense of what this variation can look like, Figure 2 displays a heat map of simulated variation in the full ACA marriage subsidy in 2014 calculated from Equation 3 to demonstrate the nature of the variation we leverage for identification. The orange areas indicate that the couple faces a marriage penalty and the green areas indicate that the couple faces a marriage subsidy, with darker shading reflecting larger penalties or subsidies. Note that Figure 2 does not consider Medicaid eligibility, which would disqualify an individual from receiving the PTC, uses the national average cost of the SLCSP, and assumes that both partners are 30 years old. In practice, a couple's ACA marriage subsidy will vary by Medicaid eligibility status, ages of both partners, year, number of dependents, and health insurance premiums in the couple's health insurance rating area, all of which we incorporate in our empirical strategy and which will provide even richer identifying variation than that displayed in Figure 2.

The existence of marriage subsidies in the tax code is well documented, and is an inevitable consequence of the United States' family-based, progressive tax system. The PTC and individual mandate add or alter the marriage subsidies faced by couples. Exposed to an additional marriage subsidy or penalty from ACA, couples may change their marriage decision. For example, partners may each be eligible for a considerable tax credit if they are unmarried and file individually, but might lose the benefit upon marriage because their total income rises above the eligible income. Under a different situation, when one of the partners is eligible for a considerable premium credit while the spouse has a relatively high income and does not receive any credit, getting married also causes the lower earning partner to lose eligibility. In these cases, the ACA premium credit introduces a marriage penalty. There exist other cases in which marrying can move the eligibility threshold upward and makes the couple eligible for some benefits from the PTC.

Mandate_{ij} indicates a lower penalty when married, leading to a marriage subsidy.

3 Empirical Strategy

We explore how marriage incentives introduced by the ACA affect the probability of being married. Our specifications take the following form:

$$\begin{aligned}\text{Married}_{cst} = \beta_0 + \beta_1 \text{ACA Marriage Subsidy}_{cst} + \beta_2 \text{Medicaid Expansion}_{st} \\ + \beta_3 X_{cst} + \delta_t + \phi_s + \varepsilon_{cst}.\end{aligned} \tag{4}$$

The dependent variable, Married_{cst}, is an indicator variable equal to one if the couple is married and zero if they are cohabiting. The treatment variables are ACA Marriage Subsidy_{cst}, which is the marriage subsidy introduced by the ACA (or penalty, if negative), and Medicaid Expansion_{st}, which is an indicator for whether the state expanded Medicaid under the ACA. We calculate the marriage subsidy based on the ACA premium tax credit (PTC) and individual mandate penalty under different marital statuses following the description in Section 2.3. X_{cst} is a vector of additional controls, including the oldest partner's age, the difference between the partners' ages, and indicators for whether the couple has children in three age ranges (0-1, 1-5, and 6-18 years old), the most educated partner's education group (high school education, some college, and college or more), and whether the partners are both white, both Black, both Hispanic, both Asian, or different races. δ_t and ϕ_s are year and state fixed effects, respectively, but we replace these with state-by-year fixed effects in some specifications.

To ensure that identification of the effect of the ACA marriage subsidy is driven by ACA policy variation rather than by endogenous variation in earnings, we also control for the marriage subsidy originating from the larger individual income tax code, the couple's joint $\frac{\text{AGI}}{\text{FPL}}$, the couple's joint earnings bin ($10,000 bins), and the couple's joint earnings split bin (5pp bins). Controlling for the marriage subsidy from the income tax code helps eliminate bias due to correlation between marriage subsidies from the ACA and marriage subsidies from income taxes. Including the couple's joint $\frac{\text{AGI}}{\text{FPL}}$, joint earnings bin, and joint earnings split bin effectively controls for the x- and y-axis variables in Figure 2, so that our main treatment effect is identified by variation in ACA policy across couples and over time and variation in premium prices across health insurance rating areas and over time.

Despite the controls above, OLS estimates of β_1 may still be biased for several reasons. First, we use observable information about each couple to calculate their ACA PTC and individual mandate penalty, which is subject to measurement error because we do not directly observe the couple's actual health insurance plan, the PTC they claim, or the mandate penalty they face. We also do not know enough to determine whether the measurement error introduced here is likely to be classical.

Second, the couple's labor supply arrangement is likely determined together with the marriage decision, meaning that their joint earnings are endogenous to marital status. Changes in labor supply in response to changes in marital status will alter the observed marriage subsidy, introducing bias into an OLS estimate of β_1 in Equation 4. The direction of simultaneity bias is ambiguous and depends on the magnitude of the relationship between the marriage subsidy and marriage itself.

We address these issues by instrumenting for the observed marriage subsidy using a simulated instrument. Following the general methods of Gruber and Saez (2002), Dahl and Lochner (2012), Isaac (Forthcoming), and Friedberg and Isaac (Forthcoming), we predict each partner's earnings and use predicted earnings to compute each couple's predicted marriage subsidy from the ACA. We then estimate the following first- and second-stage regressions:

$$\begin{aligned}\text{ACA Marriage Subsidy}_{cst} = \alpha_0 + \alpha_1 &\text{Predicted ACA Marriage Subsidy}_{cst} \\ &+ \alpha_2 \text{Medicaid Expansion}_{st} + \alpha_3 X_{cst} + \delta_t + \phi_s + u_{cst},\end{aligned} \tag{5}$$

and

$$\begin{aligned}\text{Married}_{cst} = \beta_0 + \beta_1 \text{ACA } \widehat{\text{Marriage}} \text{ Subsidy}_{cst} + \beta_2 \text{Medicaid Expansion}_{st} \\ + \beta_3 X_{cst} + \delta_t + \phi_s + \varepsilon_{cst},\end{aligned} \tag{6}$$

where ACA Marriage Subsidy_{cst} is the ACA marriage subsidy derived from reported earnings, Predicted ACA Marriage Subsidy_{cst} is the ACA marriage subsidy derived from predicted earnings, and ACA $\widehat{\text{Marriage}}$ Subsidy_{cst} are the fitted values from Equation 5.

In using predicted earnings to compute a predicted ACA marriage subsidy for each couple, we view the first-stage as "effectively a prediction exercise" (Mullainathan and Spiess 2017, page 100), which makes it well-suited to machine learning methods. We therefore use a machine learning least absolute shrinkage and selection operator (LASSO) approach to predict earnings. The LASSO is a model selection method that uses a penalized regression to select the covariates that best predict earnings using OLS (Tibshirani 2011). This approach considers a large number of covariates and their interactions, while allowing the LASSO to select the subset of variables that best fit the reported earnings of the individuals.[13] The variables that we included, but which the LASSO may have ultimately ignored, include five-year age group dummies, four education level dummies, number of children, dummies for race, sex, two-digit occupation dummies, college major, and state of residence, as well as pairwise interactions between all of these variables. We then use predicted earnings to calculate each couple's predicted ACA marriage subsidy and use it as an instrument for the observed ACA marriage subsidy.

Variation in the predicted ACA marriage subsidy originates from the enactment and amendments of the ACA and variation in premium prices across health insurance rating areas and over time. The exclusion restriction necessary for identification is $E(\varepsilon_{cst}|\text{Predicted Marriage Subsidy}_{cst}, \text{Z}_{cst}) = 0$, where Z_{cst} are the remaining covariates in Equation 6. In other words, we require that Predicted Marriage Subsidy_{cst} is exogenous with respect to marriage decisions in the years after the ACA came into effect.[14] As described in Section 4, to construct our simulated instrument, we only use the 2012 observations to estimate the LASSO coefficients and then predict earnings in all years using those 2012 coefficients. In other words, this process helps satisfy the exclusion restriction by ensuring that the variation in predicted earnings and, therefore, the predicted marriage subsidy is not driven by later endogenous changes induced by the ACA itself.

13. Friedberg and Isaac (Forthcoming) show that basing the simulated instrument on predicted earnings from a LASSO specification has a much greater explanatory power than a simulated instrument based on predicted earnings from a traditional Mincer earnings regression.

14. Since the ACA marriage subsidy is a complicated function of the couple's total earnings and earnings split, it is relatively difficult to determine who the compliers are in order to satisfy the monotonicity assumption required to interpret our estimates as local average treatment effects in the presence of heterogeneous effects. It is also likely that there are defiers in the sample. The existence of the defiers is likely to attenuate the treatment effects of the ACA marriage subsidy on marriage rate, in which case our estimates can be interpreted as lower bounds of the true effect.

4 Data

We use the 2012–2017 waves of the American Community Survey (ACS), which spans the 2014 enactment of the ACA premium tax credit and individual mandate. We include different-sex married or cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance.[15] These sample restrictions allow us to focus on the marriage/cohabitation margin among couples who may be eligible for the premium tax credit (PTC) based on observed earnings. Our main sample includes 579,879 couples (110,298 cohabiting couples and 469,581 married couples).

We combine the ACS with the Robert Wood Johnson Foundation's HIX Compare data to compute the second-lowest-cost Silver plan in each rating area for each year and map couples from public-use microdata areas in the ACS to their rating area (RWJF 2019). We also use state Medicaid eligibility thresholds to calculate the number of Medicaid-eligible adults and children in each household because individuals are ineligible to receive the PTC if they are eligible for Medicaid. We then use the NBER TAXSIM simulator to obtain the couple's $\frac{\text{AGI}}{\text{FPL}}$ (based on either observed or predicted earnings) for each marital status using the relevant FPL.[16] Finally, we follow IRS Form 8962 to calculate the PTC based on Equation 1 and IRS Form 8965 to calculate the individual mandate penalty based on Equation 2 for each marital status.

4.1 Predicted Earnings

We follow Friedberg and Isaac (Forthcoming) and use a two-step LASSO prediction method to address selection into having positive earnings. In the first step, we use the LASSO to estimate a linear probability model for whether each individual has positive earnings. We then set a threshold in the distribution of predicted positive earnings to convert these predicted values into a binary

15. We exclude same-sex couples in this analysis to avoid the confounding effect from changes in same-sex marriage legislation during the same period. We limit age to between 27 and 60 to avoid the influence from the potential eligibility of parental insurance coverage for college students and Medicare coverage and Social Security for the elderly.

16. The FPL depends upon marital status and number of dependent children. We assume that the female partner claims any children as dependents for tax purposes if the couple is unmarried.

variable with the same mean of positive earnings in our estimation sample. In the second step, we use the LASSO to estimate earnings in levels using the subsample of individuals with positive earnings. If the individual is not predicted to have positive earnings then we assign them $0 in predicted earnings. If the individual is predicted to have positive earnings then we assign them their predicted earnings in levels from the second step LASSO prediction. Note that we only use 2012 observations in both steps of the LASSO prediction process to avoid any potential influences on labor supply from the ACA itself, and then use the LASSO coefficients to predict earnings in all survey years.[17]

This machine learning LASSO approach provides us with the precisely predicted earnings of couples that are highly correlated with observed earnings but are not related to their labor supply decision or any subsequent policy changes. We use predicted earnings and the NBER TAXSIM simulator to calculate the couple's $\frac{\text{AGI}}{\text{FPL}}$ under each marital status, which we use to calculate their predicted marriage subsidy from the ACA (including both the PTC and individual mandate marriage subsidies).

Table 1 displays summary statistics of couples' observed and predicted earnings along with the marriage subsidy measures we use in estimation. It is clear that the LASSO tends to overstate earnings relative to the observed values, however we still obtain similar mean values for the ACA marriage subsidy measures relative to their observed values, as described below.

4.2 ACA Marriage Subsidies

We construct the treatment variables of the PTC following Frean, Gruber, and Sommers (2017). This includes calculating the marriage subsidy coming from both the PTC and the individual mandate.

First, as described in Section 2.1, the PTC is the difference between the second-lowest-cost Silver plan (SLCSP) and the expected annual contribution. The value of the SLCSP varies across health insurance rating areas, and a state may contain multiple rating areas. We construct the

17. The LASSO regression output is available upon request.

SLCSP for each rating area using the Robert Wood Johnson Foundation's HIX Compare dataset, which provides the most detailed information at the plan level, and map couples from public-use microdata areas in the ACS to their rating area.[18] We then follow IRS Form 8962 and Equation 1 to calculate the maximum PTC a couple or an individual could receive for each marital status taking into account observed earnings and Medicaid eligibility.[19,20] Finally, we follow the same process using predicted earnings to construct the simulated instrument for the PTC component of the ACA marriage subsidy.

Second, as described in Section 2.2, a couple's or individual's mandate penalty could equal a flat dollar value, a percent of the tax unit's taxable income, or the national average of a Bronze plan premium.[21] We use the same information to construct a couple's or individual's individual mandate penalty following IRS From 8965 and Equation 2.[22]

Finally, our measure of the full ACA marriage subsidy is the sum of the couple's marriage subsidies from both the PTC and the individual mandate. We use this measure for two reasons that we describe further in Section 6. First, we are unable to separately identify the effects of the PTC and individual mandate marriage subsidies for the entire sample. Second, we are unable to observe the couple's health insurance coverage decision, which will determine which marriage subsidy they ultimately face. For this reason, we use the sum of the PTC and individual mandate marriage subsidies as our main explanatory variable, which provides a measure of the total magnitude of marriage incentives (or disincentives) the couple faces from the ACA.

Table 1 displays the observed and predicted values of our ACA marriage subsidy measures.

18. Public use microdata areas (PUMAs) are mutually exclusive areas within states that are populated with at least 100,000 individuals. PUMAs are the smallest geographical units that offer comprehensive coverage in the public-use ACS. States determine how their rating area boundaries are defined, with most states using existing county boundaries. However, county of residence is only observable in the ACS for counties that are large enough to maintain privacy of respondents. Therefore, we instead match the value of the SLCSP from the rating area to the PUMA in which the household resides and follow Frean, Gruber, and Sommers (2017) by using a population-weighted average of the SLCSP for PUMAs that span multiple rating areas.

19. For married couples, we calculate the PTC based on households' joint earnings and calculate the counterfactual PTC as the sum of both partners' individual PTCs using individual earnings. For cohabiting couples, we do the opposite.

20. Individuals who are eligible for Medicaid are not eligible to receive the PTC. We use Medicaid eligibility thresholds from the Kaiser Family Foundation (Kaiser 2018). Medicaid eligibility is based on income realtive to the FPL, state of residency, marital status, presence of dependent children, and age of the family members.

21. The individual mandate (also called the individual shared responsibility payment) is a part of the original ACA but was repealed at the federal level beginning in 2019. Five states and Washington DC kept their state-level mandate after the repeal of the federal mandate. We focus on 2012–2017 and therefore do not leverage the repeal of the individual mandate for identification.

22. Note that there are several reasons that a couple or individual would be exempt from the individual mandate. These include: 1) family income is below the federal tax-filing threshold; 2) family income is below 138% of FPL in a state that elected not to expand Medicaid; 3) the family is Native American; or 4) there no affordable coverage available, meaning that the cheapest option in the family's health insurance rating area has a premium greater than 8% of family income.

Conditional on having a non-zero value, the full ACA marriage subsidy is $2,033 among married couples and $1,616 among cohabiting couples. The predicted value, which is our simulated instrument, tends to be slightly smaller, on average, but still displays a similar mean and standard deviation relative to the observed values. Table 1 also makes clear that much of the variation the full ACA marriage subsidy is due to the premium tax credit. Conditional on having a non-zero value, the PTC marriage subsidy is $1,953 among married couples and $1,561 among cohabiting couples, whereas the mandate marriage subsidy is only $453 among married couples and $394 among cohabiting couples. The fact that each marriage subsidy measure is larger among married couples relative to cohabiting couples suggests a causal effect that we estimate below.[23]

Figure 3 displays histograms of the observed and predicted values for the PTC and individual mandate marriage subsidies in dollars.[24] Figure 3 shows that our predicted marriage subsidy values follow a very similar distribution to the observed values, which corroborates the summary statistics in Table 1 and provides evidence of the strong fit of the simulated instrument. This also leads to very strong first-stage estimates as we show below.

4.3 Demographics

The sample includes 110,298 cohabiting couples and 469,581 married couples. Table 2 reports couple-level demographic characteristics. On average, married couples are more likely to be the same race, more likely to have children, and are slightly older. Married couples are also more likely to have only one earner, which would tend to increase the marriage subsidy from the ACA and again suggests a causal effect that we estimate below. Appendix Table A1 displays summary statistics for each partner separately and shows that male partners tend to work close to full-year full-time, whereas married women are less likely to work overall and work fewer hours than unmarried women conditional on working.

23. The argument here is that if the marriage subsidy has a causal effect on marriage then we would expect that couples facing larger marriage subsidies will marry. If this is the case, then we should observe that married couples have larger marriage subsidies than cohabiting couples due to this causal effect.

24. Appendix Figure A4 displays similar histograms with the marriage subsidies expressed as a percentage of observed or predicted earnings.

5 Results

We first present our baseline IV results from equation 6, which estimates the effect of the combined ACA marriage subsidy on the probability of being married, including the results of a placebo test. Then we estimate heterogeneous effects by presence of children, education, policy eligibility, Medicaid expansion status, age, and income.

5.1 Baseline Estimates

Table 3 displays the baseline regression results, with the first-stage coefficients from the simulated IV reported in the bottom panel. The outcome variable for all specifications is an indicator variable equal to 1 if the couple is married and 0 if they are cohabiting. The OLS estimates indicate that a $100 monthly increase of the ACA marriage subsidy ($1,200 annually) is associated with a 0.18 percentage point increase (0.22%) in the probability of being married. These estimates are very small but precisely estimated, and are smaller than most non-zero estimates found in the literature (e.g., by Alm and Whittington 1999; Eissa and Hoynes 2003; Bastian 2017; Michelmore 2018; Jones, Wang, and Yilmazer 2021; Friedberg and Isaac, Forthcoming).

However, because the OLS estimates may be either positively or negatively biased, as discussed above, we focus on the results from the IV estimation. The first-stage coefficients from our IV estimation are highly significant and range between 0.45 and 0.47.[25] The IV estimates in column 2 remain statistically significant at the 1% level and are significantly larger than the OLS estimates. We estimate that a $100 monthly increase in the ACA marriage subsidy ($1,200 annually), increases the probability of being married by 0.29 percentage points (0.36%). Despite our estimates being highly significant, they imply a very small, but significant, marriage-subsidy elasticity of 0.0059 ($p < 0.01$), which is comparable in magnitude to those estimated by Friedberg and Isaac (Forthcoming).[26] The small coefficient and elasticity estimate may at least partially be due to the high marriage rate in the sample (81.0%), which suggests that any behavioral response is likely to

25. The first-stage coefficients differ from one because we only use predicted earned income instead of income from all sources when computing the predicted marriage subsidy; and because our simulated IV approach, as designed, abstracts from endogenous determinants of earnings.

26. This elasticity is based on a mean marriage subsidy of $1,954.195 and mean marriage rate of 0.811 among observations post-ACA with non-zero values of the marriage subsidy, and coefficient of 0.00000243 (i.e., 0.002916 per $1,200).

be small. In contrast, we do not estimate a significant effect of Medicaid expansions on marriage, although the coefficient is negative which is consistent with both Chaterjee (2021) and Hampton and Lenhart (2022).

Our estimated elasticity is relatively small compared to results found in the existing literature and documented by Friedberg and Isaac (Forthcoming), Table 1. Researchers using tax reforms or estimating marriage flow responses typically estimate marriage elasticities around 0.1-0.2 (e.g., Alm and Whittington 1999; Herbst 2011; Bastian 2017; Michelmore 2018; Jones, Wang, and Yilmazer 2021). Friedberg and Isaac (Forthcoming) use same-sex marriage recognition legislation and estimate marriage elasticities between 0.006–0.011, which is similar to our estimates above. In a contemporaneous paper, Jones, Wang, and Yilmazer (2021) also estimate marriage effects from the ACA premium tax credit and Medicaid expansion, but do not consider the individual mandate. Noting, as we do, that OLS estimates may be biased in this context, they estimate simulated instrument reduced form coefficients that imply a marriage-subsidy elasticity of 0.03, which is over five-times larger than and significantly different from our estimate despite the higher marriage rate in their sample.[27] One possible explanation for this difference is that Jones, Wang, and Yilmazer (2021) use the couple's marriage subsidy based on their out-of-pocket premium rather than only from the PTC or Medicaid expansion, meaning that their sample is larger than only those couples with income between 100–400% of the FPL.

It is perhaps expected that marriage responses to the ACA are relatively small because the ACA's main policy objective is to promote insurance coverage and because overall ACA policies are complicated. The ACA's marriage incentives may not be as easily understood relative to marriage incentives from other policies, which we consider in the heterogeneity specifications below. In addition, the population of couples who are potentially affected by marriage incentives from the ACA is a relatively unique group compared to the general United States population or to populations studied in prior research. Although the average treatment effect on marriage is small, it is not negligible and there may be further subpopulations for which these marriage incentives could still

27. This elasticity is based on their mean exposure of $1,201.6909, mean marriage rate of 0.9123, and coefficient of -0.0243 per $1,000. Their OLS difference-in-differences estimates imply a marriage-subsidy elasticity of 0.0055, which is very similar to our estimate. However, they also note, as we do, that OLS estimates may be biased in this context.

be considerable that we explore below.

5.2 Robustness of Baseline Estimates

We explore the robustness of our baseline estimates in two ways. First, to address concerns that there remain state-time varying unobservables that may affect both the ACA variation and marriage rates, columns 3-4 of Table 3 replace the separate state and year fixed effects with state-by-year fixed effects. This specification no longer allows us to identify the coefficient on the Medicaid expansion variable. Identification of the ACA marriage subsidy should be similar in this context as in our first specification because we exploit variation in health insurance premiums at the health insurance rating area level rather than at the state level. This differs, for example, from Jones, Wang, and Yilmazer (2021) who use Marketplace Average Benchmark Premiums within each state, meaning that state-by-year fixed effects would absorb much of their identifying variation from premiums. Our first-stage estimates in column 4 continue to be similar in magnitude and remain highly significant. Our IV estimates are essentially unchanged, suggesting that state-time varying unobservables are not confounding our baseline estimates.[28,29]

Second, our main sample is limited to couples in which at most one partner reports receiving employer sponsored health insurance. This suggests a natural placebo sample of couples in the same income ranges but where both partners report receiving employer sponsored health insurance.[30] We expect that the effect of the ACA marriage subsidy among this placebo sample should be essentially zero because couples in this sample receive health insurance from their employers and, therefore, should not respond to incentives originating from the ACA marketplaces or individual mandate. Column 5 of Table 3 displays these coefficients, which are very close to zero, opposite-signed according to theory, and statistically insignificant. This suggests that our baseline IV estimates in columns 2 and 4 are estimating the causal effect among the affected sample.

28. We use state-by-year fixed effects in the remaining specifications below because our main coefficient does not appear to be affected by them and they will more flexibly control for unobservable differences that may vary by both state and year. Therefore, our discussion of robustness and heterogeneity focuses on the effect of the tax-based marriage subsidy from the ACA rather than the effect of the Medicaid expansion.

29. We have also estimated a bootstrapped specification to address Young's (2019) concerns about bias in IV estimates created by non-iid error processes. These results are essentially identical to those in column 2 of Table 3, and are available upon request.

30. Our approach here is similar to that by Hampton and Lenhart (2022), who conduct a placebo test using a sample of elderly couples who are eligible for Medicare.

5.3 Heterogeneous Effects

Table 4 displays IV estimates that differ based on the presence of children, the couple's education level, the couple's eligibility for the premium tax credit, or the state's Medicaid expansion status.[31]

Column 1 of Table 4 separately estimates the effect of the ACA marriage subsidy on marriage among couples with and without children. Although childless couples have lower marriage rates, meaning there is more potential for them to respond to marriage incentives, they face smaller ACA marriage subsidies relative to couples with children because they only have two family members to insure. We find that our main estimates appear to be driven by couples with dependent children. The coefficient estimate among childless couples is essentially zero and statistically insignificant.

Column 2 of Table 4 allows the effect of the ACA marriage subsidy to differ depending on the educational achievement of the more educated partner.[32] We estimate positive and significant coefficients among all but one of the education groups, which display a U-shaped pattern. The estimate is largest among couples where the most educated partner either did not finishing high school or graduated college (0.60 percentage points per $100 monthly increase in the ACA marriage subsidy for the less than high school group and 0.50 for the college group), and is smallest (and statistically insignificant) for couples where the most educated partner has exactly a high school education.

Columns 3–4 of Table 4 explore heterogeneity by policy characteristics. First, column 3 allows the effect of the ACA marriage subsidy to differ depending on the marital status(es) in which the couple is eligible for the PTC. We consider three categories: the couple is only eligible for the PTC when they are married, the couple is only eligible when they are cohabiting, and the partners have mixed eligibility (at least one partner is eligible in each marital status). We continue to estimate positive and significant effects of the ACA marriage subsidy, but only among couples who are eligible in a single marital status (either only when married or only when cohabiting). We interpret these results as suggestive of saliency effects of the ACA marriage subsidy because marriage incentives may be easier to determine if they primarily exist in a single marital status and more complicated to determine with mixed eligibility.

31. Appendix Table A2 displays the full set of coefficient estimates.
32. The education interactions in column 2 of Table 4 are the same education indicator variables we include as controls in all specifications.

Similarly, column 4 of Table 4 shows larger effects among couples living in states that expanded Medicaid. These results may again be suggestive of saliency effects of the ACA marriage subsidy because couples in Medicaid expansion states would have experienced all three legs of the ACA's "three-legged stool," which could increase awareness of ACA incentives more generally. However, our findings differ from those found by Jones, Wang, and Yilmazer (2021), who instead estimate larger marriage effects among couples in non-Medicaid expansion states. We believe the different estimates are likely due to differences in treatment definitions in the two studies. Non-Medicaid expansion states introduced a coverage gap where households with income below 100% of the FPL are ineligible for the PTC and may also be ineligible for Medicaid in those states.[33] The Jones, Wang, and Yilmazer (2021) treatment definition is based on out-of-pocket premiums and only takes into account the PTC, meaning that their treatment will only capture the marriage subsidy from the PTC for the couples in non-Medicaid expansion states. In this paper, we consider both the PTC and the individual mandate, meaning that a cohabiting couple that falls in the coverage gap may be both eligible for the PTC and subject to individual mandate if they get married.[34] The marriage penalty from the individual mandate may at least partially offset the marriage subsidy from the PTC. These couples would also fall into the "mixed eligibility" category in column 3 of Table 4, where we also do not estimate significant effects.

Figure 4 displays heterogeneous effects of the ACA marriage subsidy on marriage based on the age group of the oldest partner. We find that the largest effects manifest among relatively younger couples, with a general downward trend as couples get older. Our coefficients suggest an elasticity of 0.0259 ($p < 0.01$) among the youngest couples, which is more than four times larger than our baseline estimate.[35] These results may be expected because relatively younger couples are more likely to be on the marriage market and more likely to respond to marriage incentives than are older couples.

33. Couples in non-Medicaid expansion states are exempt from the individual mandate if their $\frac{AGI}{FPL} < 138$.

34. Our sample is limited to couples where both partners are between 27–60 years old and where either partner's income is within 100–400% of the FPL or the couple's combined income is within 100–400% of the FPL. Therefore, we may include couples where one or both partners' income fall within the coverage gap in non-Medicaid expansion states.

35. For couples whose oldest partner is 50 years old or younger (i.e., the five youngest age groups), our elasticity estimates range from 0.0093–0.0259.

Finally, Figure 5 displays heterogeneous effects of the ACA marriage subsidy on marriage based on the couple's combined $\frac{\text{AGI}}{\text{FPL}}$ quintile. We find that couples in the first, second, and third income quintiles have estimated treatment effects that are comparable to our baseline estimate. Couples in the fourth income quintile may have larger treatment effects, but the standard errors are much larger and we cannot reject the null hypothesis that the coefficients are equal across all quintiles. The estimate among couples in the highest quintile is statistically insignificant, which may be expected because the value of the premium tax credit decreases with family income leading to weaker marriage incentives as income rises.

Overall, although our baseline estimate is small, these heterogeneity analyses show that the effect of the ACA's marriage subsidy on marriage can be significantly larger for some couples. This especially appears to be the case for those who may be closer to the marginal population, such as couples with children, couples with less than a high school education, and younger couples.

6 The Separate Roles of the PTC and Individual Mandate

The total tax-based ACA marriage subsidy contains two components: the premium tax credit (PTC) and the individual mandate. Our baseline estimates above combine the incentives from both components, but in this section we split apart each component to explore the role of each in influencing marriage decisions. The separate roles of each policy are newly relevant following the effective repeal of the individual mandate in 2019.

Separately identifying the roles of the PTC marriage subsidy and the mandate marriage subsidy is further complicated by the couple's health insurance coverage decision. If the couple chooses to purchase coverage from the ACA marketplace then they may experience marriage incentives from the PTC, but may be unlikely to experience marriage incentives from the individual mandate. Likewise, if the couple chooses to forgo health insurance coverage then they may experience marriage incentives from the individual mandate, but would be unlikely to experience marriage incentives from the PTC. We do not consider the couple's health insurance coverage decision in this paper because we cannot accurately observe it in the ACS, but this decision likely affects the source and strength of marriage incentives the couple ultimately faces. For this reason, it is useful to further unpack the drivers of our baseline estimate by separating the ACA's two components.

Note, however, that the results of this exercise should be interpreted cautiously due to the issues we describe below. On one hand, we do not believe we are able to separately identify the two effects among the subsample of couples who face both incentives and are therefore limited in drawing conclusions about the importance of the PTC relative to the individual mandate among these couples. On the other hand, the fact that we cannot separately identify the effects of each component among this subsample supports our main specifications that use the combined ACA marriage subsidy instead.

With those caveats in mind, column 1 of Table 5 first estimates a simple specification using the full sample that splits apart the PTC marriage subsidy from the mandate marriage subsidy.[36] We estimate a positive and significant coefficient on the mandate marriage subsidy, which is consistent with theory, but estimate a negative and significant coefficient on the PTC marriage subsidy, which contradicts theory.

Column 2 of Table 5 expands on this specification by differentiating couples that face incentives from both components from couples that face incentives from only one component.[37] These distinctions serve two purposes. First, we would expect couples who face only one incentive to respond to that component. These couples can therefore serve as a validation check of our baseline estimates because we would expect positive coefficients for both components. Second, we would expect couples who face both incentives to only respond to one of them depending on their health insurance coverage decision. These couples may therefore inform the question of which component of the ACA marriage subsidy appears to be more important to couples.

Unfortunately, these results are somewhat inconclusive. The coefficients among couples who face only one incentive are indeed both positive and significant, thereby corroborating our baseline estimates and suggesting that both components drive marriage responses as predicted by theory. We estimate marriage-subsidy elasticities of 0.0068 and 0.0527 for the PTC marriage subsidy

36. Appendix Table A3 displays the full set of coefficient estimates.

37. In other words, couples who face both incentives have non-zero values (either negative or positive) for both the PTC marriage subsidy and the mandate marriage subsidy, and couples who face only one incentive have a non-zero value for only one marriage subsidy.

and mandate marriage subsidy, respectively, implying that couples may be more responsive to marriage incentives from the individual mandate. However, it should be noted that only 15% of this subsample faces a non-zero mandate marriage subsidy, whereas the remaining 85% of couples face a non-zero PTC marriage subsidy. Therefore, although this validation check supports our baseline estimates, it remains somewhat unclear whether larger and noisier elasticity estimate for the mandate marriage subsidy is due to true behavioral responses or due to weaker identification.

The coefficients among couples who face both incentives again show a positive and significant effect of the mandate marriage subsidy and an opposite-signed and significant effect of the PTC marriage subsidy. Figure 6 displays a possible explanation for these results. Each point in these figures is a couple in our sample. Panel 6a displays couples that face only one incentive and panel 6b displays couples that face both incentives. The percentages report the fraction of observations in each section of the figures. Couples facing only one incentive appear more balanced across negative and positive values, which aids in identification. However, couples facing both incentives are imbalanced, with essentially no couples in the northwest quadrant where the mandate marriage subsidy is negative and the PTC marriage subsidy is positive.

The pattern in panel 6b poses a problem for identification among couples facing both incentives in column 2 of Table 5. In this specification, identification of the PTC marriage subsidy is conditional on the couple's value of the mandate marriage subsidy. In other words, the effect of the PTC marriage subsidy is identified by north-south variation conditional on a fixed mandate marriage subsidy.[38] There appears to be enough variation when the mandate marriage subsidy is positive, but if the mandate marriage subsidy is negative then almost all of the values of the PTC marriage subsidy are also negative. This pattern translates into an opposite-signed and significant effect of the PTC marriage subsidy in column 2 of Table 5 that is driven by the imbalanced distribution in Figure 6.

We therefore believe that we are not able to separately identify the two effects among the subsample of couples who face both incentives (i.e., the couples who could choose to respond to either

38. Likewise, the effect of the mandate marriage subsidy is identified by west-east variation conditional on a fixed PTC marriage subsidy.

incentive), which is a result of the tight connection in policy variation and the couple's additional health insurance coverage decision. This conclusion supports our main specifications that use the combined ACA marriage subsidy instead. However, we continue to estimate positive and significant effects of each component among the subsample of couples who face only one incentive, which supports our baseline estimates.

7 Conclusion

In this paper, we provide new evidence of the effect of tax-based marriage incentives in the Affordable Care Act on marriage, a topic that has not been extensively explored in the existing literature. Together with the Medicaid expansions, the premium tax credit and the individual mandate were designed to increase health insurance coverage by utilizing the tax system, but all of these aspects of the ACA also introduced marriage incentives. Although we primarily focus on the premium tax credit and the individual mandate, we are among the first to incorporate variation from all three legs of the ACA's "three-legged stool" to provide a holistic picture of the marriage effects of the ACA.

We use a sample of married and cohabiting couples in the 2012–2017 American Community Surveys where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line, and where at most one partner reports receiving employer sponsored health insurance. This sample represents the group most likely affected by the ACA premium tax credit and the individual mandate. We use a machine learning LASSO method to predict earnings for each partner and construct a simulated instrument for identification to exploit rich identifying variation in the premium tax credit and individual mandate across couples and over time.

We find that a \$100 monthly increase in the ACA marriage subsidy increases the probability of being married by 0.20 percentage points (0.36%), implying a small, but highly significant marriage elasticity of 0.0059. This baseline effect is robust to including more flexible state-by-year fixed effects and passes a placebo test using a sample of couples where both partners report receiving employer sponsored health insurance. We find larger effects among couples living in states that expanded Medicaid, couples with children, couples with less than a high school education, younger couples, and couples who are eligible for premium tax credits in only one marital status. In contrast, we do not estimate a significant effect of Medicaid expansions on marriage, although the coefficient is negative which is consistent with both Chaterjee (2021) and Hampton and Lenhart (2022).

We also explore the potentially separate roles of the premium tax credit and the individual mandate in influencing marriage decisions, which is a novel contribution to this literature even though our results are somewhat mixed. On one hand, we believe that the tight connection in policy variation and the couple's additional health insurance coverage decision does not allow us to separately identify the two effects among the subsample of couples who face both incentives. On the other hand, we continue to estimate positive and significant effects of each component among the subsample of couples who face only one incentive, which supports our baseline estimates.

Some of our heterogeneity specifications are also consistent with lower saliency of ACA marriage incentives, particularly those that differentiate between the couple's eligible marital statuses and Medicaid expansion states. Given the complexity of the ACA, we believe it is reasonable that we estimate a small marriage response overall, but further research is needed to explore the saliency of ACA incentives more rigorously.

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8 Tables

Table 1. Couple-Level Observed and Predicted Earnings

	Married couples		Cohabiting couples	
	Observed values	Predicted values	Observed values	Predicted values
Couple's joint earnings	55,461.07	72,038.32	51,647.13	64,663.70
	(49,334.16)	(44,729.16)	(38,697.16)	(35,556.92)
Husband's earnings	38,068.18	50,356.38	31,050.26	42,578.41
	(41,876.52)	(32,343.36)	(31,414.47)	(24,419.07)
Wife's earnings	17,392.89	21,681.94	20,596.88	22,085.29
	(23,335.20)	(22,897.88)	(23,040.57)	(20,997.70)
Couple's joint $\frac{AGI}{FPL}$	296.465	355.762	291.064	345.828
	(272.229)	(238.902)	(234.920)	(218.371)
Couple's joint second-lowest-cost Silver plan	5986.470	5986.470	5393.305	5393.305
	(6055.203)	(6055.203)	(5372.537)	(5372.537)
Couple's joint expected annual contribution	3159.497	3637.867	3060.190	3510.013
	(2592.223)	(2698.746)	(2348.922)	(2480.559)
Number of Medicaid-eligible adults in HH	0.24	0.24	0.56	0.56
	(0.65)	(0.65)	(0.58)	(0.58)
Full ACA marriage subsidy	1,220.20	1,092.37	963.31	912.98
	(4,022.62)	(3,688.17)	(3,370.43)	(3,300.64)
Conditional full ACA marriage subsidy[a]	2,033.08	1,831.88	1,616.04	1,538.58
	(5,030.79)	(4,632.13)	(4,242.92)	(4,170.94)
PTC marriage subsidy	1,072.09	875.94	852.97	741.82
	(3,793.34)	(3,524.41)	(3,222.27)	(3,166.52)
Conditional PTC marriage subsidy[a]	1,953.47	1,998.53	1,560.87	1,616.23
	(4,949.50)	(5,108.53)	(4,230.27)	(4,520.26)
Mandate marriage subsidy	148.11	216.43	110.34	171.16
	(627.90)	(575.75)	(463.77)	(443.51)
Conditional mandate marriage subsidy[a]	453.38	481.61	393.60	414.06
	(1,033.67)	(780.99)	(809.79)	(612.60)
Observations	469,581	469,581	110,298	110,298

Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance.
a: These conditional marriage subsidies are calculated for couples observed in 2014 or later with non-zero values of the marriage subsidy measure.

Table 2. Couple-Level Demographic Summary Statistics

	Married couples	Cohabiting couples
Partners are the same race	0.900	0.844
	(0.300)	(0.363)
Age of older partner	45.674	42.433
	(9.085)	(9.213)
Age of younger partner	41.954	37.814
	(8.976)	(8.569)
Age difference between partners	3.719	4.619
	(3.690)	(4.379)
Education of more educated partner	13.443	13.312
	(2.988)	(2.515)
Education of less educated partner	11.576	11.470
	(3.445)	(2.975)
Education difference between partners	1.868	1.842
	(2.475)	(2.377)
Any dependent children	0.669	0.549
	(0.471)	(0.498)
Conditional number of dependent children	2.176	2.023
	(1.170)	(1.100)
Both partners work	0.583	0.670
	(0.493)	(0.470)
Only 1 partner works	0.397	0.319
	(0.489)	(0.466)
Neither partner works	0.020	0.012
	(0.141)	(0.107)
Observations	469,581	110,298

Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance.

Table 3. The Effects of the ACA on Marriage

	Baseline specifications				Placebo
	OLS	IV	OLS	IV	sample
Outcome: Married					
ACA marriage subsidy	0.0018***	0.0029***	0.0018***	0.0030***	-0.0003
($100s per month)	(0.0002)	(0.0004)	(0.0002)	(0.0004)	(0.0002)
State expanded Medicaid	-0.0031	-0.0025			
	(0.0020)	(0.0020)			
Couple's joint $\frac{AGI}{FPL}$ (10pps)	-0.1194***	-0.1148***	-0.1193***	-0.1144***	-0.0805***
	(0.0046)	(0.0048)	(0.0046)	(0.0048)	(0.0017)
IIT marriage subsidy	0.0048***	0.0049***	0.0048***	0.0049***	-0.0012***
($100s per month)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0001)
Couple has any children:					
0-1 years old	0.0614***	0.0614***	0.0614***	0.0615***	0.0532***
	(0.0025)	(0.0025)	(0.0025)	(0.0025)	(0.0010)
1-5 years old	0.0868***	0.0868***	0.0869***	0.0868***	0.0573***
	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0007)
6-18 years old	0.0807***	0.0805***	0.0807***	0.0805***	0.0301***
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0005)
Oldest partner's age	0.0113***	0.0113***	0.0113***	0.0113***	0.0054***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)
Partners' age difference	-0.0160***	-0.0160***	-0.0160***	-0.0160***	-0.0078***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Most educated partner has:					
Exactly HS education	-0.0103***	-0.0104***	-0.0103***	-0.0104***	-0.0087***
	(0.0019)	(0.0019)	(0.0019)	(0.0019)	(0.0018)
Some college education	0.0001	0.0000	0.0001	0.0000	-0.0061***
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0018)
College education or more	0.0510***	0.0509***	0.0510***	0.0509***	0.0081***
	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0018)
Partners are:					
White	0.0287***	0.0286***	0.0286***	0.0285***	0.0150***
	(0.0047)	(0.0047)	(0.0047)	(0.0047)	(0.0030)
Black	-0.0226***	-0.0225***	-0.0226***	-0.0225***	-0.0149***
	(0.0052)	(0.0052)	(0.0052)	(0.0051)	(0.0032)
Hispanic	0.0552***	0.0553***	0.0552***	0.0553***	0.0070**
	(0.0048)	(0.0048)	(0.0048)	(0.0048)	(0.0031)
Asian	0.1587***	0.1586***	0.1587***	0.1587***	0.0428***
	(0.0049)	(0.0049)	(0.0049)	(0.0049)	(0.0031)
Different races	-0.0247***	-0.0247***	-0.0247***	-0.0248***	-0.0147***
	(0.0049)	(0.0049)	(0.0049)	(0.0049)	(0.0031)
Additional controls for:					
State FEs	✓	✓			
Year FEs	✓	✓			
State-by-year FEs			✓	✓	✓
Mean of dep var	0.810	0.810	0.810	0.810	0.945
1^{st} stage coefficient 1		0.456***		0.452***	0.468***
		(0.002)		(0.002)	(0.002)
		[43,649.451]		[42,887.658]	[79,707.768]
Observations	579,879	579,879	579,879	579,879	1,100,563

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications also control for the couple's joint earnings bin ($10,000 bins) and joint earnings split bin (5pp bins). The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance. All ACA marriage subsidy variables are measured in $100s per month ($1,200s per year). We instrument for the observed ACA marriage subsidy with the predicted ACA marriage subsidy based on a LASSO prediction process described in the text.

Table 4. Heterogeneous Effects of the ACA on Marriage

	Heterogeneity by presence of children	Heterogeneity by education	Heterogeneity by eligibility	Heterogeneity by Medicaid expansion status
Outcome: Married				
ACA marriage subsidy ×				
couple has children	0.0038***			
	(0.0004)			
childless couple	0.0000			
	(0.0008)			
ACA marriage subsidy ×				
less than HS education		0.0062***		
		(0.0008)		
HS education		0.0007		
		(0.0005)		
some college education		0.0036***		
		(0.0006)		
college education		0.0050***		
		(0.0006)		
Only eligible when married			0.0038***	
($100s per month)			(0.0009)	
Only eligible when cohabiting			0.0089**	
($100s per month)			(0.0042)	
Mixed eligibility			0.0005	
($100s per month)			(0.0008)	
ACA marriage subsidy ×				
state expanded Medicaid				0.0035***
				(0.0004)
state did not expand Medicaid				0.0022***
				(0.0006)
Mean of dep var	0.810	0.810	0.810	0.810
1^{st} stage coefficient 1	0.397***	0.570***	0.734***	0.387***
	(0.004)	(0.006)	(0.003)	(0.003)
	[8,791.558]	[11,606.155]	[3,486.326]	[18,058.230]
1^{st} stage coefficient 2	0.536***	0.527***	0.084***	0.597***
	(0.002)	(0.003)	(0.004)	(0.003)
	[52,966.296]	[29,192.061]	[443.306]	[42,605.532]
1^{st} stage coefficient 3		0.515***	0.463***	
		(0.004)	(0.002)	
		[23,749.046]	[2,669.785]	
1^{st} stage coefficient 4		0.538***		
		(0.005)		
		[16,017.858]		
Observations	579,879	579,879	579,879	579,879

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications include state-by-year fixed effects and controls for the oldest partner's age, the difference between the partners' ages, and indicators for whether the state expanded Medicaid, whether the couple has children in three age ranges (0-1, 1-5, and 6-18 years old), the most educated partners' education group (high school education, some college, and college or more), and whether the partners are both white, both Black, both hispanic, both asian, or different races, as well as the couple's marriage subsidy from the larger individual income tax code, joint $\frac{AGI}{FPL}$, joint earnings bin ($10,000 bins), and joint earnings split bin (5pp bins). The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance. All marriage subsidy variables are measured in $100s per month ($1,200s per year). We instrument for the observed ACA marriage subsidy with the predicted ACA marriage subsidy based on a LASSO prediction process described in the text. The first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted ACA Marriage Subsidy × 1(Has Children) variable using the outcome Observed ACA Marriage Subsidy × 1(Has Children).

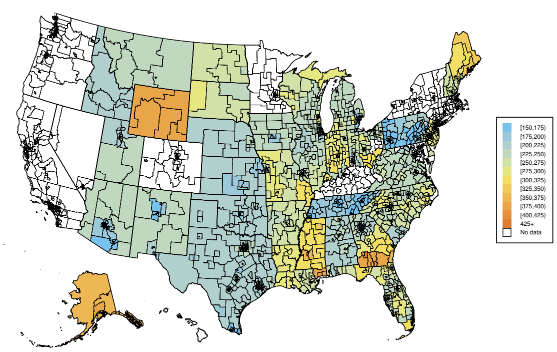
Table 5. Heterogeneous Effects of the ACA on Marriage by Source of Incentives

	Combined variation	Separate variation by incentive
Outcome: Married		
PTC marriage subsidy	-0.0042***	
($100s per month)	(0.0006)	
Mandate marriage subsidy	0.1203***	
($100s per month)	(0.0069)	
Couple faces both incentives ×		
PTC marriage subsidy		-0.0078***
		(0.0013)
Mandate marriage subsidy		0.1070***
		(0.0105)
Couple faces single incentive ×		
PTC marriage subsidy		0.0038***
		(0.0014)
Mandate marriage subsidy		0.3387***
		(0.0406)
Mean of dep var	0.810	0.810
1^{st} stage coefficient 1	0.434***	0.304***
	(0.002)	(0.002)
	[7,597.558]	[2,789.661]
1^{st} stage coefficient 2	0.165***	0.168***
	(0.003)	(0.004)
	[2,905.688]	[975.148]
1^{st} stage coefficient 3		0.283***
		(0.003)
		[2,892.791]
1^{st} stage coefficient 4		0.041***
		(0.003)
		[522.486]
Observations	579,879	579,879

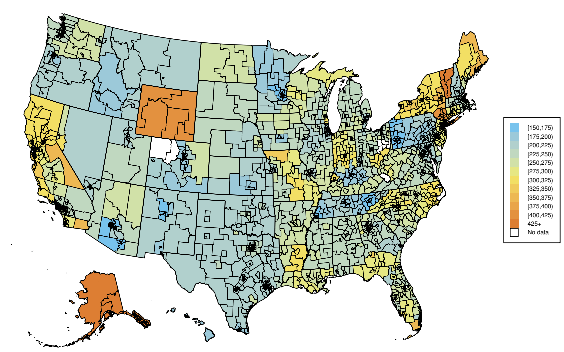
Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications include state-by-year fixed effects and controls for the oldest partner's age, the difference between the partners' ages, and indicators for whether the state expanded Medicaid, whether the couple has children in three age ranges (0-1, 1-5, and 6-18 years old), the most educated partners' education group (high school education, some college, and college or more), and whether the partners are both white, both Black, both hispanic, both asian, or different races, as well as the couple's marriage subsidy from the larger individual income tax code, joint $\frac{AGI}{FPL}$, joint earnings bin ($10,000 bins), and joint earnings split bin (5pp bins). The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance. All marriage subsidy variables are measured in $100s per month ($1,200s per year). We instrument for the observed marriage subsidy with the predicted marriage subsidy based on a LASSO prediction process described in the text. The first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted PTC Marriage Subsidy variable using the outcome Observed PTC Marriage Subsidy.

9 Figures

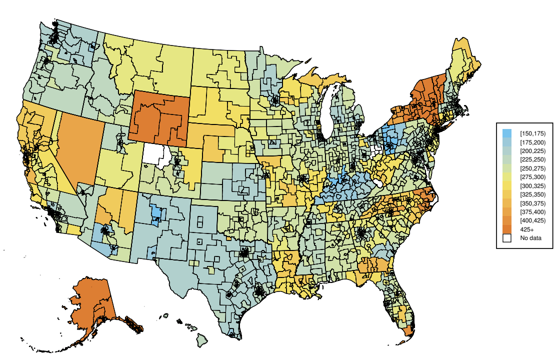
Figure 1. Second-Lowest-Cost Silver Plan Premiums by Geography and Year



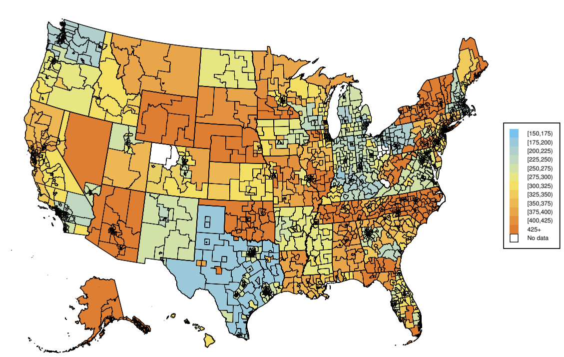
(a) 2014



(b) 2015



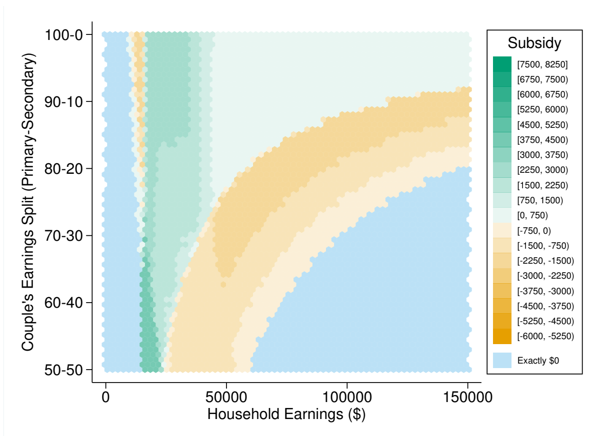
(c) 2016



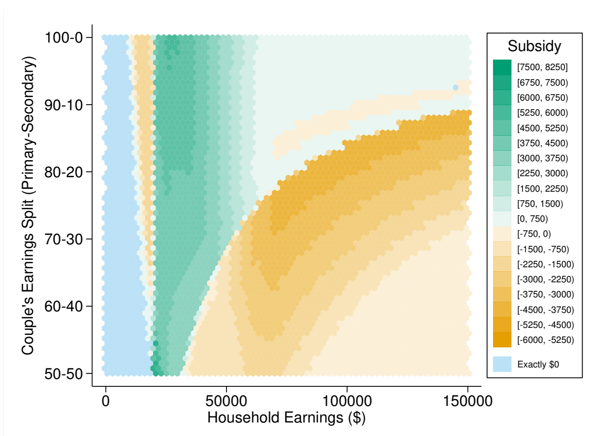
(d) 2016

Notes: The data come from the Robert Wood Johnson Foundation's HIX Compare data. The figure displays the second-lowest-cost Silver plan (SLCSP) monthly premium for a 30 year old single individual within each Census public-use microdata area (PUMA), which are the smallest geographical units that offer comprehensive coverage in the public-use American Community Surveys (ACS). States determine how their rating area boundaries are defined, with most states using existing county boundaries and others using 3-digit zip codes to divide rating areas. However, county of residence is only observable in the ACS for counties that are large enough to maintain privacy of respondents. Therefore, there is some measurement error in the rating area boundaries in these maps because we instead link health insurance rating areas to PUMAs, and some PUMAs span the boundaries of multiple rating areas. In estimation, we follow Frean, Gruber, and Sommers (2017) and use a population-weighted average of the SLCSP for PUMAs that span multiple rating areas, but in these maps we use the modal rating area for the PUMA for illustrative purposes. In most cases the vast majority of the PUMA lies within a single rating area, and there are only very small portions in others.

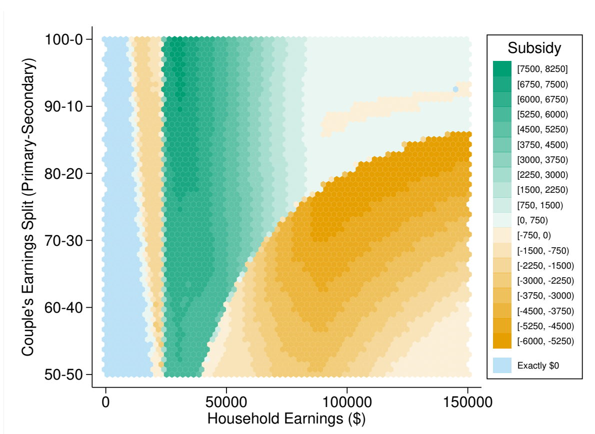
Figure 2. Full Marriage Subsidy from the ACA



(a) No Children



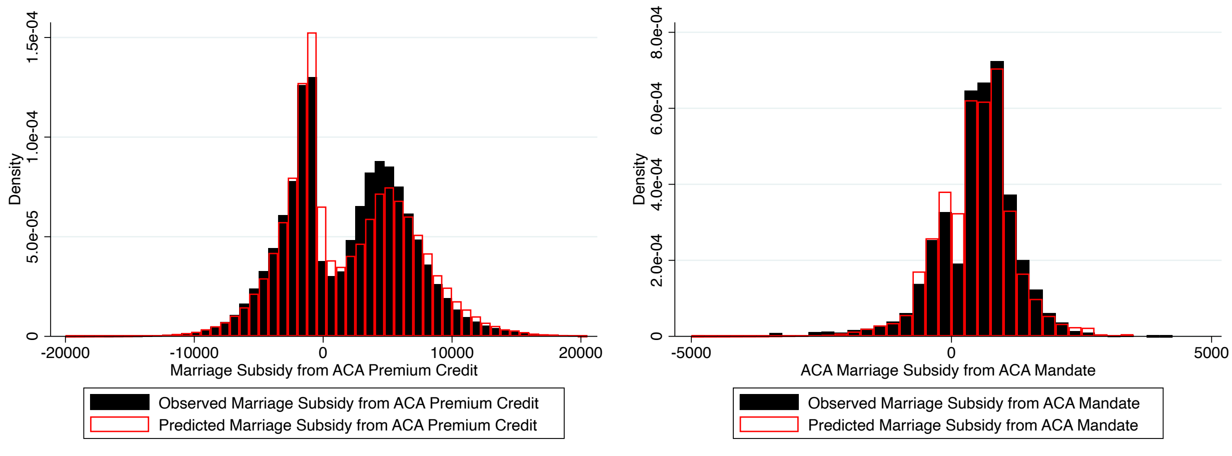
(b) One Child



(c) Two Children

Notes: The data are simulated and are not from our estimation sample. The figure displays the level of the full ACA marriage subsidy in 2014, which is the sum of the marriage subsidy from the premium tax credit and the marriage subsidy from the individual mandate, as a function of the household's total earnings and the earnings split between partners. For the purpose of this figure, we use the national average cost of the SLCSP ($192.5 per adult and 161.61 per child), assume that both partners are 30 years old, assume that the female partner claims any children as dependents for tax purposes if the couple is unmarried, and do not consider Medicaid eligibility.

Figure 3. Distribution of Observed and Predicted PTC and Mandate Marriage Subsidies

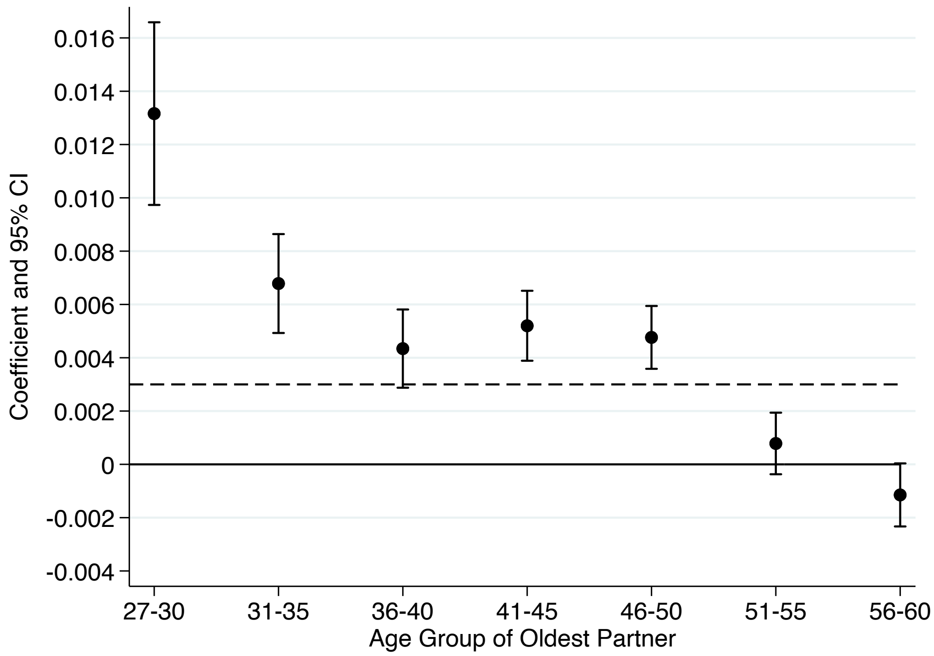


(a) PTC Marriage Subsidy

(b) Individual Mandate Marriage Subsidy

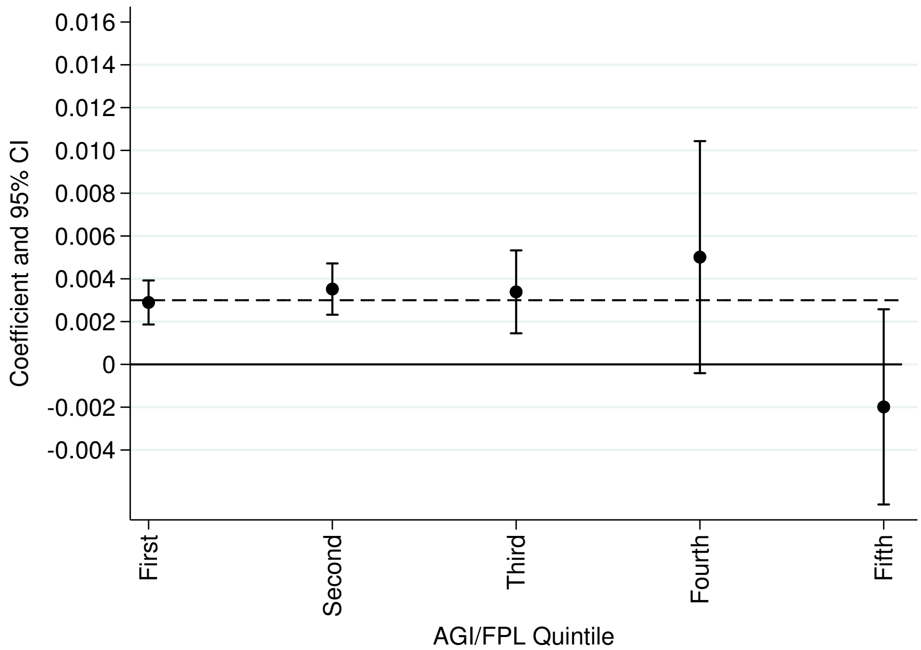
Notes: The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance. Only couples with non-zero marriage subsidy values are displayed in the figure. Values below -$20,000 or above $20,000 in panel 3a and values below -$5,000 or above $5,000 in panel 3b are excluded from the figures for illustrative purposes only.

Figure 4. Heterogeneous Effects of the ACA Marriage Subsidy on Marriage Rate by Age



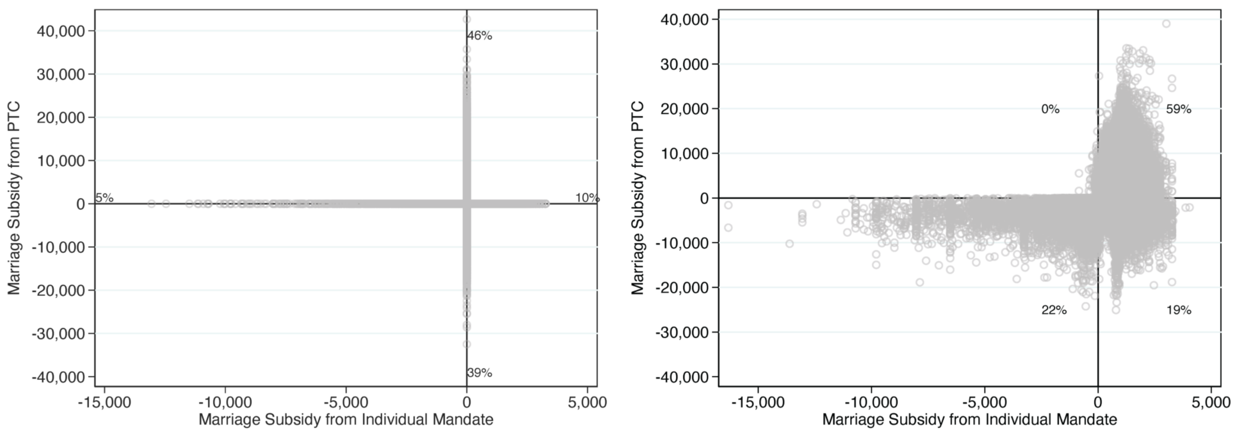
Notes: The figure displays coefficients and 95% confidence intervals for IV heterogeneous effects of the marriage subsidy by the age group of the oldest partner. The dashed line indicates our baseline coefficient of 0.030 in column 4 of Table 3. This specification includes state-by-year fixed effects and controls for the oldest partner's age, the difference between the partners' ages, and indicators for whether the state expanded Medicaid, whether the couple has children in three age ranges (0-1, 1-5, and 6-18 years old), the most educated partners' education group (high school education, some college, and college or more), and whether the partners are both white, both Black, both Hispanic, both Asian, or different races, as well as the couple's marriage subsidy from the larger individual income tax code, joint $\frac{\text{AGI}}{\text{FPL}}$, joint earnings bin ($10,000 bins), and joint earnings split bin (5pp bins). The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance. All ACA marriage subsidy variables are measured in $100s per month ($1,200s per year). We instrument for the observed ACA marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted ACA marriage subsidy (calculated from predicted earned income, number of children, and state of residence) based on a LASSO prediction process described in the text.

Figure 5. Heterogeneous Effects of the ACA Marriage Subsidy on Marriage Rate by AGI



Notes: The figure displays coefficients and 95% confidence intervals for IV heterogeneous effects of the marriage subsidy by quintile of the couple's AGI as a percentage of the federal poverty line. The dashed line indicates our baseline coefficient of 0.030 in column 4 of Table 3. This specification includes state-by-year fixed effects and controls for the oldest partner's age, the difference between the partners' ages, and indicators for whether the state expanded Medicaid, whether the couple has children in three age ranges (0-1, 1-5, and 6-18 years old), the most educated partners' education group (high school education, some college, and college or more), and whether the partners are both white, both Black, both Hispanic, both Asian, or different races, as well as the couple's marriage subsidy from the larger individual income tax code, joint $\frac{AGI}{FPL}$, joint earnings bin ($10,000 bins), and joint earnings split bin (5pp bins). The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance. All ACA marriage subsidy variables are measured in $100s per month ($1,200s per year). We instrument for the observed ACA marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted ACA marriage subsidy (calculated from predicted earned income, number of children, and state of residence) based on a LASSO prediction process described in the text.

Figure 6. Variation in PTC and Individual Mandate Marriage Subsidies



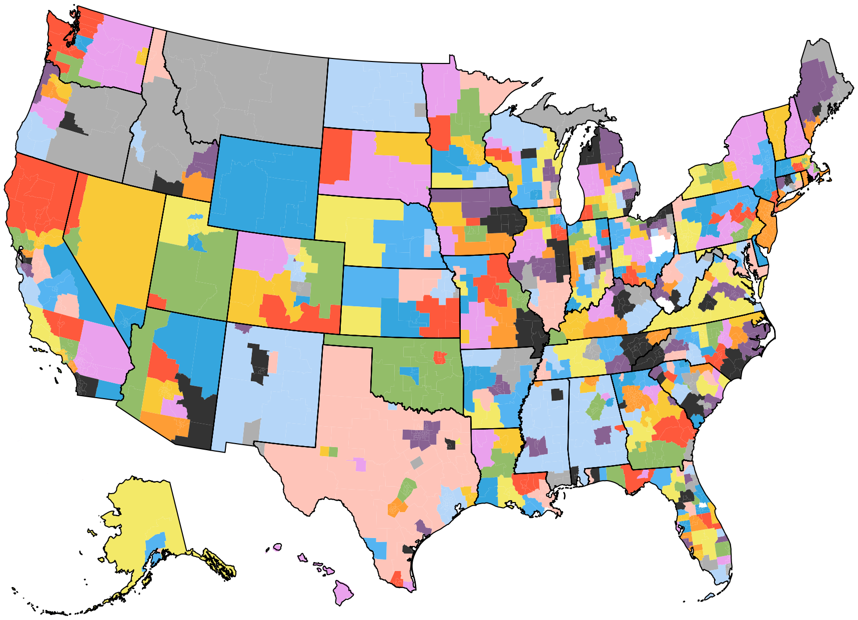
(a) Couples Facing Only One Incentive

(b) Couples Facing Both Incentives

Notes: The figure plots a couple's PTC marriage subsidy (y-axis) against their mandate marriage subsidy (x-axis). Panel 6a includes couples with a non-zero value for only one marriage subsidy and panel 6b includes couples with a non-zero value for both marriage subsidies. The data come from the estimation sample, but only include observations from 2014 or later of married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance.

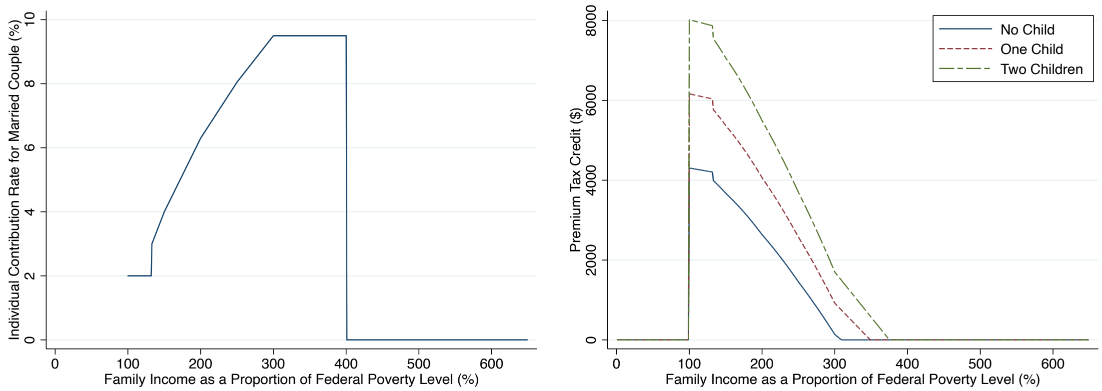
A Appendix: Additional Figures and Tables

Figure A1. Health Insurance Rating Areas



Notes: The figure displays the approximate geographical boundaries of health insurance rating areas in each state. Health insurance rating areas are contained within states, meaning that state boundaries will separate rating areas in this map even if the map shows identical colors for two rating areas that lie next to each other in separate states. States determine how their rating area boundaries are defined, with most states using existing county boundaries and others using 3-digit zip codes to divide rating areas. However, county of residence is only observable in the American Community Survey (ACS) for counties that are large enough to maintain privacy of respondents. Therefore, there is some measurement error in the rating area boundaries in these figures because we instead link health insurance rating areas to Census public-use microdata areas (PUMAs), which are the smallest geographical units that offer comprehensive coverage in the public-use ACS, and some PUMAs span the boundaries of multiple rating areas. For illustrative purposes, we use the modal rating area for the PUMA in this map. In most cases the vast majority of the PUMA lies within a single rating area, and there are only very small portions in others.

Figure A2. The ACA Premium Credit Contribution Rate and Value Schedule for a Married Couple

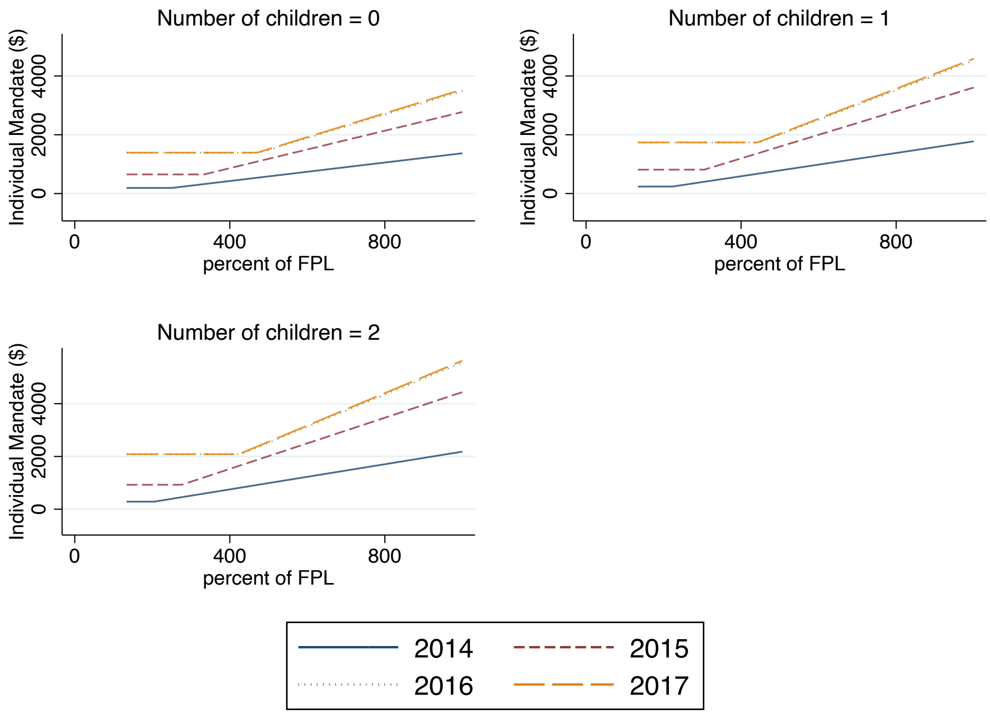


(a) PTC Contribution Rate

(b) PTC Value

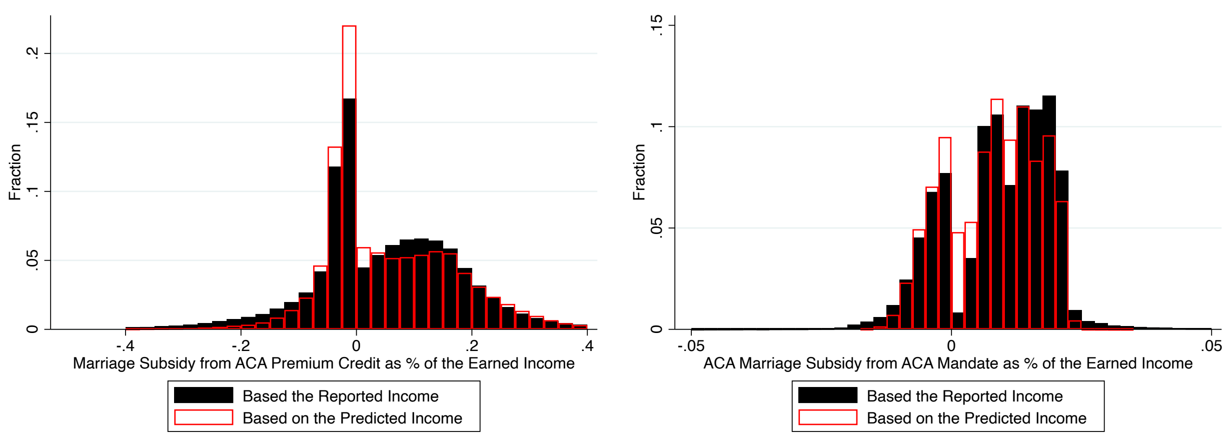
Notes: The figure displays the contribution rate and premium tax credit value schedule for 2014. We use the national average cost of the SLCSP ($192.5 per adult and 161.61 per child) and assume that both partners are 30 years old.

Figure A3. The ACA Individual Mandate as a Proportion to the Federal Poverty Level for a Married Couple



Notes: The figure displays the individual mandate penalty schedule for a married couple. Note that there is no policy change between 2016 and 2017 so the lines in Figure A3 are the same for those years.

Figure A4. Distribution of Observed and Predicted PTC and Mandate Marriage Subsidies Relative to Earnings



(a) PTC Marriage Subsidy

(b) Individual Mandate Marriage Subsidy

Notes: The figure displays the premium tax credit and mandate marriage subsidies as a percentage of earnings. Observed values are reported relative to observed earnings, and predicted values are reported relative to predicted earnings. The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance. Only couples with non-zero marriage subsidy values are displayed in the figure.

Table A1. Individual-Level Demographic Summary Statistics

	Married couples		Cohabiting couples	
	Husbands	Wives	Male partners	Female partners
Black	0.072	0.065	0.112	0.087
	(0.258)	(0.246)	(0.315)	(0.282)
White	0.596	0.591	0.608	0.624
	(0.491)	(0.492)	(0.488)	(0.484)
Hispanic	0.242	0.244	0.227	0.224
	(0.428)	(0.429)	(0.419)	(0.417)
Asian	0.064	0.073	0.019	0.026
	(0.245)	(0.260)	(0.135)	(0.158)
Other race	0.026	0.028	0.035	0.039
	(0.160)	(0.164)	(0.183)	(0.195)
Age	44.858	42.770	41.022	39.225
	(9.171)	(9.151)	(9.191)	(9.104)
Years of education	12.377	12.642	12.155	12.627
	(3.380)	(3.329)	(2.879)	(2.911)
Positive earnings	0.901	0.662	0.894	0.764
	(0.299)	(0.473)	(0.308)	(0.425)
Conditional annual hours worked	2093.007	1619.317	1968.165	1705.423
	(722.213)	(757.287)	(705.862)	(686.019)
Reported annual earnings	38068.177	17392.892	31050.256	20596.879
	(41876.516)	(23335.199)	(31414.470)	(23040.567)
Predicted annual earnings	50,356.377	21,681.940	42,578.412	22,085.286
	(32,343.359)	(22,897.885)	(24,419.070)	(20,997.702)
Observations	469,581	469,581	110,298	110,298

Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance.

Table A2. Full Results: Heterogeneous Effects of the ACA on Marriage

	Heterogeneity by presence of children	Heterogeneity by education	Heterogeneity by eligibility	Heterogeneity by Medicaid expansion status
Outcome: Married				
ACA marriage subsidy ×				
couple has children	0.0038***			
	(0.0004)			
childless couple	0.0000			
	(0.0008)			
ACA marriage subsidy ×				
less than HS education		0.0062***		
		(0.0008)		
HS education		0.0007		
		(0.0005)		
some college education		0.0036***		
		(0.0006)		
college education		0.0050***		
		(0.0006)		
Only eligible when married			0.0038***	
($100s per month)			(0.0009)	
Only eligible when cohabiting			0.0089**	
($100s per month)			(0.0042)	
Mixed eligibility			0.0005	
($100s per month)			(0.0008)	
ACA marriage subsidy ×				
state expanded Medicaid				0.0035***
				(0.0004)
state did not expand Medicaid				0.0022***
				(0.0006)
Couple's joint $\frac{AGI}{FPL}$ (10pps)	-0.1237***	-0.1122***	-0.1078***	-0.1151***
	(0.0053)	(0.0048)	(0.0068)	(0.0048)
IIT marriage subsidy	0.0047***	0.0049***	0.0048***	0.0049***
($100s per month)	(0.0002)	(0.0002)	(0.0003)	(0.0002)
Couple has any children:				
0-1 years old	0.0608***	0.0613***	0.0619***	0.0614***
	(0.0025)	(0.0025)	(0.0025)	(0.0025)
1-5 years old	0.0859***	0.0867***	0.0876***	0.0868***
	(0.0014)	(0.0014)	(0.0015)	(0.0014)
6-18 years old	0.0779***	0.0805***	0.0811***	0.0806***
	(0.0013)	(0.0012)	(0.0013)	(0.0012)
Oldest partner's age	0.0114***	0.0113***	0.0115***	0.0113***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Partners' age difference	-0.0160***	-0.0160***	-0.0161***	-0.0160***
	(0.0001)	(0.0001)	(0.0002)	(0.0001)

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Continued: Full Results: Heterogeneous Effects of the ACA on Marriage

	Heterogeneity by presence of children	Heterogeneity by education	Heterogeneity by eligibility	Heterogeneity by Medicaid expansion status
Outcome: Married				
Most educated partner has:				
Exactly HS education	-0.0104***	-0.0044**	-0.0106***	-0.0104***
	(0.0019)	(0.0022)	(0.0019)	(0.0019)
Some college education	-0.0001	0.0027	-0.0002	0.0000
	(0.0020)	(0.0024)	(0.0020)	(0.0020)
College education or more	0.0508***	0.0524***	0.0503***	0.0509***
	(0.0020)	(0.0024)	(0.0020)	(0.0020)
Partners are:				
White	0.0286***	0.0284***	0.0285***	0.0286***
	(0.0047)	(0.0047)	(0.0047)	(0.0047)
Black	-0.0224***	-0.0227***	-0.0227***	-0.0225***
	(0.0051)	(0.0052)	(0.0052)	(0.0051)
Hispanic	0.0550***	0.0552***	0.0554***	0.0553***
	(0.0048)	(0.0048)	(0.0048)	(0.0048)
Asian	0.1583***	0.1583***	0.1583***	0.1587***
	(0.0049)	(0.0049)	(0.0049)	(0.0049)
Different races	-0.0247***	-0.0249***	-0.0249***	-0.0247***
	(0.0049)	(0.0049)	(0.0049)	(0.0049)
[0.3cm] Mean of dep var	0.810	0.810	0.810	0.810
1^{st} stage coefficient 1	0.397***	0.570***	0.734***	0.387***
	(0.004)	(0.006)	(0.003)	(0.003)
	[8,791.558]	[11,606.155]	[3,486.326]	[18,058.230]
1^{st} stage coefficient 2	0.536***	0.527***	0.084***	0.597***
	(0.002)	(0.003)	(0.004)	(0.003)
	[52,966.296]	[29,192.061]	[443.306]	[42,605.532]
1^{st} stage coefficient 3		0.515***	0.463***	
		(0.004)	(0.002)	
		[23,749.046]	[2,669.785]	
1^{st} stage coefficient 4		0.538***		
		(0.005)		
		[16,017.858]		
Observations	579,879	579,879	579,879	579,879

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications include state-by-year fixed effects and controls for the oldest partner's age, the difference between the partners' ages, and indicators for whether the state expanded Medicaid, whether the couple has children in three age ranges (0-1, 1-5, and 6-18 years old), the most educated partners' education group (high school education, some college, and college or more), and whether the partners are both white, both Black, both hispanic, both asian, or different races, as well as the couple's marriage subsidy from the larger individual income tax code, joint $\frac{AGI}{FPL}$, joint earnings bin ($10,000 bins), and joint earnings split bin (5pp bins). The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance. All marriage subsidy variables are measured in $100s per month ($1,200s per year). We instrument for the observed ACA marriage subsidy with the predicted ACA marriage subsidy based on a LASSO prediction process described in the text. The first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted ACA Marriage Subsidy × 1(Has Children) variable using the outcome Observed ACA Marriage Subsidy × 1(Has Children).

Table A3. Full Results: Heterogeneous Effects of the ACA on Marriage by Source of Incentives

	Combined variation	Separate variation by incentive
Outcome: Married		
PTC marriage subsidy	-0.0042***	
($100s per month)	(0.0006)	
Mandate marriage subsidy	0.1203***	
($100s per month)	(0.0069)	
Couple faces both incentives ×		
PTC marriage subsidy		-0.0078***
		(0.0013)
Mandate marriage subsidy		0.1070***
		(0.0105)
Couple faces single incentive ×		
PTC marriage subsidy		0.0038***
		(0.0014)
Mandate marriage subsidy		0.3387***
		(0.0406)
Couple's joint $\frac{AGI}{FPL}$ (10pps)	-0.0001***	-0.0001***
	(0.0000)	(0.0000)
IIT marriage subsidy	0.0000***	0.0000***
($100s per month)	(0.0000)	(0.0000)
Couple has any children:		
0-1 years old	0.0607***	0.0608***
	(0.0025)	(0.0026)
1-5 years old	0.0858***	0.0860***
	(0.0015)	(0.0015)
6-18 years old	0.0797***	0.0817***
	(0.0012)	(0.0013)
Oldest partner's age	0.0113***	0.0113***
	(0.0001)	(0.0001)
Partners' age difference	-0.0160***	-0.0158***
	(0.0001)	(0.0002)
Most educated partner has:		
Exactly HS education	-0.0113***	-0.0120***
	(0.0019)	(0.0019)
Some college education	-0.0016	-0.0023
	(0.0020)	(0.0020)
College education or more	0.0498***	0.0496***
	(0.0020)	(0.0020)

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Continued: Full Results: Heterogeneous Effects of the ACA on Marriage by Source of Incentives

	Combined variation	Separate variation by incentive
Outcome: Married		
Partners are:		
White	0.0190***	0.0227***
	(0.0047)	(0.0048)
Black	-0.0309***	-0.0282***
	(0.0052)	(0.0052)
Hispanic	0.0472***	0.0510***
	(0.0048)	(0.0049)
Asian	0.1499***	0.1543***
	(0.0049)	(0.0049)
Different races	-0.0334***	-0.0300***
	(0.0050)	(0.0050)
[0.3cm] Mean of dep var	0.810	0.810
1^{st} stage coefficient 1	0.434***	0.304***
	(0.002)	(0.002)
	[7,597.558]	[2,789.661]
1^{st} stage coefficient 2	0.165***	0.168***
	(0.003)	(0.004)
	[2,905.688]	[975.148]
1^{st} stage coefficient 3		0.283***
		(0.003)
		[2,892.791]
1^{st} stage coefficient 4		0.041***
		(0.003)
		[522.486]
Observations	579,879	579,879

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications include state-by-year fixed effects and controls for the oldest partner's age, the difference between the partners' ages, and indicators for whether the state expanded Medicaid, whether the couple has children in three age ranges (0-1, 1-5, and 6-18 years old), the most educated partners' education group (high school education, some college, and college or more), and whether the partners are both white, both Black, both hispanic, both asian, or different races, as well as the couple's marriage subsidy from the larger individual income tax code, joint $\frac{AGI}{FPL}$, joint earnings bin ($10,000 bins), and joint earnings split bin (5pp bins). The data come from the 2012–2017 American Community Surveys and include married and cohabiting couples where both partners are between 27 and 60 years old, where either partner's income or the couple's joint income is within 100-400% of the federal poverty line (FPL), and where at most one partner reports receiving employer sponsored health insurance. All marriage subsidy variables are measured in $100s per month ($1,200s per year). We instrument for the observed marriage subsidy with the predicted marriage subsidy based on a LASSO prediction process described in the text. The first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted PTC Marriage Subsidy variable using the outcome Observed PTC Marriage Subsidy.