Same-Sex Marriage Recognition and Taxes: New Evidence About the Impact of Household Taxation*

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Abstract

The U.S. income tax code encourages marriage for some and discourages marriage for others, but same-sex couples were only recently exposed to these incentives. We estimate marriage responses by exploiting variation in the recognition of same-sex marriages for tax purposes, versus earlier papers leveraging smaller changes. Using the American Community Survey, which reports cohabitation and marriage, we estimate a significant though very small marriage elasticity, with further analysis suggesting a higher (though still small) elasticity for low-earning households and in response to federal taxes specifically. Our estimates imply that the 2018 tax reform will increase marriage among high-earning cohabiting couples.

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1 Introduction

The United States uses a progressive, family-based system of income taxation, which necessarily creates unequal tax burdens between unmarried and married couples (Rosen 1977). In other words, two couples with the same total earnings can face differing tax liabilities upon marriage, depending on how those earnings are split between partners. Although some couples in the U.S. face a tax-induced marriage penalty, giving rise to the colloquial term "marriage tax," many more currently face a tax-induced marriage subsidy.[1]

The non-neutrality of tax and welfare policy with respect to marriage has generated substantial public debate, not only about inequity based on marital status for otherwise identical households but also about marriage incentives. For example, the recent 2018 Tax Cuts and Jobs Act increased the marriage subsidy further for many high-earning couples by reducing progressivity of the tax schedule. Figure 1 shows the marriage subsidy in 2017 and 2018 across hypothetical filers; increases in the marriage subsidy are evident for childless filers earning above roughly $100,000 and filers with children earning above roughly $200,000.

[FIGURE 1 HERE]

In this paper, we estimate the effect of the tax-induced marriage subsidy on the probability of being married. Two key features differentiate our analysis from most previous research, which we summarize in Table 1. First, our focus on same-sex couples enables a new identification strategy. While earlier studies incorporated variation in the tax code arising from tax reforms, those often induced small average changes in marriage subsidies, or were local to particular earnings ranges, for example involving the Earned Income Tax Credit. Our key variation depends on the recognition of same-sex marriage for tax purposes. Tax recognition began as some states legalized same-sex marriage, so same-sex married couples were required to file state income taxes as a household when marrying in or moving to those states; and then followed as the federal government was required by *United States v. Windsor* in 2013 to recognize legal marriages in those states, so

1. We use the subsidy measure common to much of the literature, by which a reduction in tax liability due to marriage is coded as positive, and we will refer to it throughout the paper as such.

previously-married same-sex couples became subject to household taxation at the federal level; and finished as the remaining states allowed couples to marry (because of additional state laws and finally *Obergefell v. Hodges* in 2015), so same-sex married couples were required to file state and federal income taxes as a household when marrying in or moving to those states. These legal and judicial sources of variation, combined with conventional variation over states and years in tax progressivity and cross-sectionally in (predicted) household earnings and earnings splits, yield heterogeneous and sometimes quite large changes in the marriage subsidy.[2] This paper is the first, to the best of our knowledge, to leverage variation arising from a switch in tax regime (from individual to joint taxation) to identify marriage effects.

[TABLE 1 HERE]

The second feature that distinguishes our analysis from many previous studies is our use of the American Community Survey (ACS), which reports both cohabitation and marriage, allowing us to define a sample exclusively of couples in a relationship.[3] We use the 2012-2017 waves, which are the first of the U.S. Census Bureau Surveys to explicitly identify same-sex married couples.[4] Thus, we consider the margin between cohabitation and marriage, compared to past studies that either use samples including married, cohabiting, and single individuals (Alm and Whittington 1995a; Sjoquist and Walker 1995; Dickert-Conlin and Houser 2002; Herbst 2011; Isaac 2020a) or use data in which cohabitation is not measured (Alm and Whittington 1997, 1999; Eissa and Hoynes 2003) or must be inferred (Ellwood 2000; Fisher 2013). We demonstrate that an analysis which ignores cohabitation information would result in substantial upward bias in the estimated elasticity of marriage. Another feature in some of the previous studies is their use of cross-sectional data and therefore marriage stocks as an outcome (Alm and Whittington 1995a; Sjoquist and Walker 1995; Ellwood 2000; Eissa and Hoynes 2003; Fisher 2013), which are necessarily less responsive than marriage flows. Ours is close to a flow approach, because the stock and flow of married couples is

2. The magnitude of variation that we employ exceeds that in prior studies listed in Table 1 for which information is quantifiable, sometimes by an order of magnitude.

3. Oreffice (2016) uses the ACS in a descriptive study of marriage among same-sex cohabiting couples.

4. Cohabiting partners in the U.S. must file separate tax returns as single individuals. Editing of the Decennial Census and pre-2012 ACS make it impossible to reliably identify same-sex married couples in earlier data (Black et al. 2007; Gates and Steinberger 2010). For example, in the 2000 and 2010 censuses and in pre-2012 waves of the American Community Survey, the marital status of a same-sex married couple was changed to "unmarried partner," sometimes without an accompanying data quality flag (U.S. Census Bureau 2009).

identical immediately following marriage legalization. And notably, the analysis we undertake is not possible using administrative data because, for example, all same-sex couples would appear to be unmarried in federal tax return data through 2012.[5]

As in other studies, we use self-reported household income from the ACS and impute income in the counterfactual marital state in order to calculate the marriage subsidy. We find a mean subsidy of $442 among married couples – meaning that they would pay $442 less in federal and state taxes than if they were single – compared to $264 among cohabiting couples, with sizeable variation within both groups. As a counterfactual, this calculation assumes that individuals would have the same earnings in both states, so we address concerns that variation in the marriage subsidy may be endogenously determined. For example, couples may change their labor supply in response to marriage or marriage-induced tax changes (Isaac 2020b). Also, couples may report income with error, and may not report enough information for us to accurately compute tax liability. We address such concerns in part by controlling for year and state fixed effects, which capture evolving attitudes toward same-sex marriage nationally as well as state-varying attitudes that may be correlated with tax progressivity or marriage recognition as well as with residential, earnings, and marriage choices of same-sex couples. We further implement a simulated instruments approach, in which we calculate each individual's predicted earnings and then the couple's predicted marriage subsidy to use as an instrument for their observed marriage subsidy.

Following the general methods of Dahl and Lochner (2012) and Isaac (2020b), we predict earned income for each individual using observable household and individual characteristics in the ACS, and use predicted earned income, legal marriage recognition status, and the NBER TAXSIM simulator to calculate each couple's predicted marriage subsidy. We implement a machine learning LASSO approach for the predictions in order to gain as much explanatory power as possible.[6] Then, after instrumenting for the observed marriage subsidy with the predicted marriage subsidy in our baseline marriage specification, we gradually add controls for predicted earnings to ensure that

5. We have been informed by those knowledgeable about such data that it is far from straightforward to distinguish cohabitors from other roommates using administrative tax data. Additionally, our use of ACS covariates to predict individual earned income as part of our identification strategy may not work as well using administrative data containing less demographic information.

6. Isaac (2020b) introduced the use of a machine learning LASSO approach to predict individual earnings so as to calculate marriage subsidies, and ours is the first paper that we know of to use it in a simulated instrumental variables framework.

identification comes purely from predicted changes in the marriage subsidy due to legal marriage recognition and not from a spurious relationship between predicted earnings and marriage rates.[7]

Our instrumental variables estimates indicate a statistically significant and robustly estimated but quite small effect of the tax-induced marriage subsidy on marriage. For the sample as a whole, we estimate that a $1,000 increase in the marriage subsidy (well above the mean subsidy of $341) causes a 0.8–1.4 percentage point (1.9–3.2%) increase in the probability of being married, implying an elasticity of 0.006–0.011. Our estimates are robust to controlling for state-by-year fixed effects or marriage incentives introduced by the Affordable Care Act or employer sponsored health insurance, and are not driven by migration across states.[8] We find somewhat bigger effects, but still quite modest, for female couples and childless couples; for the response to the federal component of the marriage subsidy, suggesting that federal taxes are more salient than state taxes; and for low-earning households, with the elasticity reaching as high as around 0.05 and falling gradually below 0.015 as household earnings pass $100,000.[9] The interpretation of the federal subsidy elasticity of 0.015 is particularly clean because it avoids concerns about estimates that leverage staggered rollout of policy (Goodman-Bacon 2021).

Lastly, we use our estimates to simulate changes in marriage behavior for unmarried cohabiting couples as a result of the 2018 Tax Cuts and Jobs Act (TCJA). The TCJA increased the marriage subsidy for many high-earning couples by reducing progressivity: at the low end of the tax schedule by increasing the standard deduction and married-filing jointly tax brackets, and at the high end by reducing marginal tax rates. Our simulations suggest that the TCJA, by boosting average marriage subsidies, would increase the propensity of most high-earning cohabiting couples to marry, by an average of over 20% among couples with earnings above $300,000. Meanwhile, the changes in the marriage propensity for couples earning less than $230,000 range between a 10% increase or decrease but average to about zero.

7. Further analysis suggests that a linear specification is reasonable. While residual plots show a slightly U-shaped response of marriage to the marriage subsidy, the relationship becomes linear when we trim the top and bottom 2% of the sample; point estimates remain almost identical; and we lose some precision, as shown in Appendix B.2.

8. Our results are also robust to using bootstrapped estimates in Appendix A to address Young's (2019) concerns about bias in IV estimates created by non-iid error processes.

9. We also confirm recent findings by Carpenter et al. (2021): we estimate that state same-sex marriage legalization increases the probability of being married, controlling for tax considerations, by 6.6–11.6 percentage points (15.3–26.9%).

Some of the recent research in this area estimates higher elasticities for low earners, compared to elasticities in earlier papers incorporating comprehensive tax variation. Those papers, focused on the Earned Income Tax Credit (EITC) – notably Michelmore (2018) and Bastian (2017) – report elasticities of over 0.20. In comparison, our estimated elasticities have a similar relative pattern by earnings but are significantly and substantially smaller. Other researchers have found significant but small effects of taxes on both marriage and divorce (Alm and Whittington 1995a, 1999; Whittington and Alm 1997; Dickert-Conlin 1999; Eissa and Hoynes 2003; Herbst 2011; Fisher 2013; Gayle and Shephard 2019), while some have found little to no effect (Sjoquist and Walker 1995; Ellwood 2000; Dickert-Conlin and Houser 2002; Light and Omori 2008; Herbst 2011; Isaac 2020a). Regardless of the effect size, significant impacts on marital status can be economically and socially meaningful, by influencing tax revenue (Stevenson 2012; Alm, Leguizamon, and Leguizamon 2014; Isaac 2020b), retirement finances (Zissimopoulos, Karney, and Rauer 2015; Borella, De Nardi, and Yang, Forthcoming), health and access to health care (Carpenter et al. 2021; Friedberg, Guo, and Lin 2018), and children's well-being (Lyle 2006; Finlay and Neumark 2010).

This paper is grounded in traditional taxation and marriage questions, but also adds to the small yet growing literature on same-sex couples. Most closely related to this paper, Oreffice (2016) and Carpenter et al. (2021) also study marriage among same-sex couples, though neither focus on taxation. Other research on same-sex couples and LGBT individuals has analyzed labor supply (Hansen, Martell, and Roncolato 2019; Sansone 2019; Isaac 2020b), labor market behavior compared to different-sex couples (Tebaldi and Elmslie 2006; Oreffice 2011; Antecol and Steinberger 2013), workplace discrimination (Badgett 1995; Carpenter 2007; Plug, Webbink, and Martin 2014), health outcomes (Buchmueller and Carpenter 2010; Gonzales and Blewett 2014; Carpenter et al. 2021), and predicted revenue effects of same-sex marriage legalization (Stevenson 2012; Alm, Leguizamon, and Leguizamon 2014). This paper is the first, to the best of our knowledge, to use same-sex married couples to identify the effects of taxation on marriage.

2 Tax Consequences of Same-Sex Marriage Recognition

This section describes the legal landscape for same-sex marriage at the federal and state levels and relevant tax implications since the federal Defense of Marriage Act (DOMA) was passed in 1996.

2.1 The Evolution of Same-Sex Marriage Recognition

The passage of DOMA, at a time when no states permitted same-sex marriages, defined, for federal government purposes, "marriage" as the union between one man and one woman and "spouse" as a member of the opposite sex who is a husband or wife. Despite DOMA, state law governs who may marry. In 2004 Massachusetts became the first state to legalize and recognize for tax purposes same-sex marriages.[10] Twelve more states legalized same-sex marriage before the *United States v. Windsor* Supreme Court ruling in 2013. *United States v. Windsor* invalidated the definitions of "marriage" and "spouse" under the federal DOMA law, thereby requiring the federal government to recognize same-sex marriages that some states had legalized, but it still did not require all states to legalize same-sex marriages or recognize same-sex marriages performed in other states. Two years later, the 2015 *Obergefell v. Hodges* Supreme Court ruling required this. Figure 2 illustrates the relevant level of marriage recognition for each state between 2004–2017.

[FIGURE 2 HERE]

Each of these changes (state legalization, *United States v. Windsor*, post-*Windsor* state legalization, and *Obergefell v. Hodges*) introduced different treatment effects. We parameterize two classes of treatment: the legalization of same-sex marriage itself and the resulting marriage subsidy or penalty for same-sex couples, whether coming from the state, federal, or both tax schedules (which we will sometimes distinguish as separate treatments as well). Appendix Table A1 provides a summary of these treatment effects, discussed below.

At the outset, state legalization laws before *Windsor* included legalization and tax treatment.

10. We use "legalize" to refer to a state's decision to grant same-sex marriage licenses, and "recognize" to refer to recognition of same-sex marriages for tax purposes at either the state or federal levels. We do not consider alternative partnerships such as civil unions or domestic partnerships because we cannot observe these statuses in the ACS, although some states did allow civil union partners to file as married for state tax purposes.

The tax treatment in those early states is only generated by state tax progressivity. Same-sex married couples were still required to file as single individuals at the federal level and, therefore, were not exposed to the federal marriage subsidy.[11]

Next, *United States v. Windsor* introduced only a federal tax treatment without a marriage legalization treatment. The ruling striking down DOMA did not affect states' same-sex marriage legislation, and only required the federal government to recognize same-sex marriages that were permitted by some states. This treatment affected all same-sex married couples regardless of their current state of residence. Same-sex married couples were required to file at the federal level as married (filing jointly or separately) beginning in tax year 2013 even if their state of residence did not recognize same-sex marriages and required them to file as single individuals at the state level.[12] For states that had already legalized same-sex marriage by that time, *Windsor* aligned state and federal policy. For states that had not, it still exposed same-sex married couples living in those states to the federal marriage subsidy.

After that, state legalization that followed *Windsor* included a legalization treatment and introduced marriage subsidy variation arising from both the state and federal tax codes. Similarly, the *Obergefell v. Hodges* ruling, by mandating state legalization and recognition of same-sex marriages, included all treatment effects. Both of these changes aligned state and federal policy.

2.2 Tax-Induced Marriage Subsidies

The staggered rollout of marriage equality at the state and federal levels meant that same-sex couples, even in the same financial situation, were exposed to varying magnitudes of marriage subsidies. As Figure 2 made clear, pre-*Windsor* state-level marriage recognition generated a state but not federal tax treatment; the 2013 *Windsor* ruling generated a federal tax treatment only; and subsequent state-level recognition, followed by the 2015 *Obergefell* ruling, generated combined state and federal tax treatments.

11. If a couple traveled to another state to marry (and reported to the ACS that they were married while living in a state in which marriage was not legally licensed), then they would not be exposed to a state marriage subsidy. Traveling to marry would, however, expose the couple to a federal marriage subsidy after *Windsor* regardless of where they reside.

12. The federal tax code uses the "place of celebration" rule, meaning that a same-sex couple is considered married, for federal tax purposes, so long as they married in a state that permitted same-sex marriage, even if they live in or moved to another state.

The tax-induced marriage subsidy is defined as Marriage $\text{Subsidy}_{ct} = (T_{it} + T_{jt}) - T_{ct}$, where T_{it} and T_{jt} are each partner's tax liability if they file as single in year t, and T_{ct} is the couple's tax liability if they file jointly in year t.[13] A positive value of the marriage subsidy indicates a decline in tax liability and, hence, an increase in after-tax income as a result of marriage. Variation in the observed marriage subsidy is driven not only by the couple's total earned income but also by the partners' earned income split, which are the horizontal and vertical axes, respectively, in Figure 1. The marriage subsidy is more positive the more uneven is the split in household earnings. Also, given the current tax code, the average marriage subsidy is more negative (i.e., a penalty) relative to income at very low and high household income levels than at other levels.

[TABLE 2 HERE]

The means and standard deviations of the marriage subsidy for same-sex couples in the ACS appear in Table 2, while details about these calculations appear later. We find that approximately 89% of the average observed marriage subsidy for this sample originates in the federal tax code. Among married couples the observed marriage subsidy is $442, and among cohabiting couples it is $264. The smaller value for cohabiting same-sex couples suggest a potential causal effect deterring marriage that we investigate below.

While the observed marriage subsidy depends on many couple-specific factors, we highlight here the variation in our marriage subsidy calculations (described later) driven by marriage incentives in both the state and federal tax codes. Figure 3 illustrates the marriage subsidy averaged for couples in our sample at the state-year level, which mirrors some of the variation we exploit. Although our analysis with the ACS starts in 2012, we illustrate the impact of state marriage legalization beginning in 2004, followed by the 2013 *United States v. Windsor* ruling, and followed by additional state legalization along with the 2015 *Obergefell v. Hodges* ruling.

[FIGURE 3 HERE]

13. By "observed marriage subsidy" we mean the marriage subsidy calculated and imputed using the NBER TAXSIM simulator, which applies the relevant tax code to a couple's reported income from all available sources. However, we do not have information on their actual tax liability, nor enough information about deductions and so on to compute their exact tax liability. We also distinguish the observed marriage subsidy from the "predicted marriage subsidy" calculated and imputed in the same way from predicted earned income, as described later.

The average marriage subsidy in most of the early-legalizing states was negative but small in Figure 3; the exception is California, which briefly legalized marriage in 2008. While state tax codes introduced some marriage non-neutrality, much of the variation we exploit was generated by federal marriage recognition following *Windsor*, which is evident in the jump in the average marriage subsidy arising when couples became exposed to substantial federal tax progressivity. This, along with subsequent state and federal recognition in the remaining states, also generated a substantial spread across states in the average marriage subsidy, arising from the interaction of progressivity at the state level with systematic differences in the typical level and split of household earnings among same-sex couples across states. Meanwhile, we will control separately for the legalization of marriage to distinguish its effect from the tax recognition of marriage.

3 Empirical Strategy

We estimate the causal effect of the marriage subsidy on marriage for a sample of married and cohabiting couples, who are thus known to be in a relationship. Our research design exploits variation in the tax recognition of marriages. We begin with a specification that takes the form:

$$\text{Married}_{cst} = \beta_0 + \beta_1 \text{Marriage Subsidy}_{cst} + \beta_2 \text{Legal Marriage}_{st} + \beta_3 X_{cst} + \delta_t + \mu_s + v_{cst} \qquad (1)$$

Married is a binary variable that takes a value of one if couple c in state s in year t is married. *Marriage Subsidy* is zero when same-sex marriages are recognized by neither state nor federal tax authorities, and it takes positive or negative values as calculated from the relevant tax code otherwise, depending on the sequence of recognition delineated in Figure 2. We additionally control for the variable *Legal Marriage* to capture whether the state allows same-sex marriages to occur, since this generates part of the variation in tax recognition. Therefore, the coefficient β_1 isolates the effect of marriage non-neutrality of the tax code, while β_2 captures the direct effect of marriage legalization, as in Carpenter et al. (2021). X_{cst} controls for the couple's sex, racial composition, age, education, presence and number of children, along with whether state s expanded Medicaid under the ACA; in some specifications, we add additional controls that we discuss later to help deal with potential endogeneity or omitted variable concerns. δ_t and μ_s are year and state fixed effects; and in some specifications later we control for state-by-year fixed effects. Year fixed effects capture time-varying nationwide shocks that may affect same-sex marriage rates, such as changing attitudes about same-sex relationships that may be correlated with the *Windsor* or *Obergefell* rulings. State fixed effects capture, for example, state attitudes toward same-sex relationships or discrimination against LGBT individuals, which may be correlated with the state's decision to legalize same-sex marriages (Gao and Zhang 2016). We assume that the effect of the marriage subsidy on marriage is linear, and explore this assumption further in Appendix B.2.[14]

OLS estimation of Equation 1 may be problematic for several reasons, resulting in an ambiguous direction of bias. First, measurement error in *Marriage Subsidy* may introduce bias into OLS estimates. Income in the ACS is likely to be reported with error, and is reported for the previous 12-month period, rather than the calendar year. Furthermore, we do not observe enough about the household to determine its exact tax liability and hence its marriage subsidy. We do not know enough about either problem to determine whether the resulting measurement error is classical.

Second, it is possible that community-level omitted variables introduce bias because they are correlated with the marriage subsidy through attitudes toward both marriage recognition and labor supply in the LGBT community. If norms in favor of marriage recognition also drive, say, greater earnings equality within same-sex couples (reducing the marriage subsidy), then our OLS estimates would be biased downward; or, if norms in favor of marriage recognition also drive more traditional household specialization (raising the marriage subsidy), then our OLS estimates would be biased upward. Overall, we observe relatively more equal earners in same-sex couples than in different-sex couples (Appendix Figure A1), suggesting the first possibility.

Third, and most importantly, labor supply of a married couple may change in response to marriage or to the same tax progressivity that causes non-neutrality of marriage. Isaac (2020b)

14. Residual plots show a slightly U-shaped response of marriage to the predicted marriage subsidy, whereas theory predicts that it should be weakly positive. When we trim the sample by 2% to avoid regions of the data where theory may be violated, and the resulting relationship becomes linear, we obtain very similar estimates and policy implications. This suggests that a linear specification is reasonable. Using the full sample avoids introducing or exacerbating omitted variable bias (Bollinger and Chandra 2005).

demonstrates that *Windsor*-induced changes in the marriage subsidy caused secondary earners in already-married same-sex couples to reduce their labor supply. This labor supply response alters the observed marriage subsidy, introducing bias into an estimate of Equation 1. The direction of simultaneity bias depends on the magnitude of the relationship between the marriage subsidy and marriage itself, but our results suggest that it may bias estimates upward.[15]

These problems are addressed by using a simulated instrumental variable for the observed marriage subsidy. The first- and second-stage equations are:

$$\begin{aligned}\text{Marriage Subsidy}_{cst} = \alpha_0 + \alpha_1 \text{Predicted Marriage Subsidy}_{cst} + \alpha_2 \text{Legal Marriage}_{st} \\ + \alpha_3 X_{cst} + \delta_t + \mu_s + u_{cst}\end{aligned} \tag{2}$$

$$\text{Married}_{cst} = \beta_0 + \beta_1 \widehat{\text{Marriage Subsidy}}_{cst} + \beta_2 \text{Legal Marriage}_{st} + \beta_3 X_{cst} + \delta_t + \mu_s + \varepsilon_{cst} \tag{3}$$

$\widehat{\textit{Marriage Subsidy}}$ is the fitted value from Equation 2. Following the general methods of Dahl and Lochner (2012) and Isaac (2020b), we predict earned income for each individual and use predicted earned income and the NBER TAXSIM simulator to calculate each couple's predicted marriage subsidy. In doing so, we find that an accurate prediction of the marriage subsidy is critical, so we implement a machine learning LASSO approach in order to gain as much explanatory power as possible.[16]

The idea, therefore, is to use individual and couple characteristics to predict earnings of each partner and then use predicted earnings to compute a predicted marriage subsidy. Lacking an untreated control group for a standard difference-in-differences specification, we instead incorporate rich variation in the magnitude of the treatment. For example, the Predicted Marriage Subsidy$_{cst}$ variable is non-zero only after state legalization or federal recognition (i.e., in the *Post* period), which resembles a difference-in-differences treatment specification, and we leverage further vari-

15. A bigger marriage subsidy generates an income effect, potentially reducing labor supply of both spouses. However, it also raises the marginal tax rate on the lower/secondary earner and reduces it on the higher/primary earner. A further source of bias is that income in the ACS, as noted previously, covers the previous 12 months rather than the tax year. Consequently, some income earned after policy changes is recorded as being earned before.

16. Since we lack a clearly exogenous predictor with substantial identifying power, we rely on individual and couple characteristics collectively to help explain earnings. Therefore, we view the first-stage instrumental variables approach as "effectively a prediction exercise" (Mullainathan and Spiess 2017, page 100), which makes it well-suited to machine learning methods. The LASSO uses interaction terms involving the covariates and their polynomials in order to best fit the data.

ation in the strength of the treatment across couples. The orthogonality condition necessary for identification is $E(\varepsilon_{cst}|\text{Predicted Marriage Subsidy}_{cst}, Z_{cst}) = 0$, where Z_{cst} are the remaining covariates in Equation 3. In other words, we require that Predicted Marriage Subsidy$_{cst}$ is exogenous with respect to marriage decisions in the years after state legalization or federal recognition.

To check whether our approach identifies β_1 strictly from the rollout of same-sex marriage recognition, we gradually add controls for predicted earnings when estimating Equations 2 and 3. This ensures that identification arises purely from predicted changes in the marriage subsidy due to legal marriage recognition and does not reflect a spurious relationship between predicted earnings and marriage rates.[17] These expanded earnings controls include a 5^{th}-order polynomial in the couple's earnings and the earnings split between partners, in one specification, and also a control function in another.[18]

Our instrumental variables strategy thus alleviates measurement error, omitted variables bias, and endogeneity concerns by leveraging tax variation in the predicted marriage subsidy generated by state and federal same-sex marriage legalization and recognition. We also find that our estimates are robust to including state-by-year fixed effects, which exploits variation solely from the federal tax code and further controls for state-time varying unobservables that may affect same-sex marriage or its legalization, alleviating concerns about identification based on the staggered rollout of policy (Goodman-Bacon 2021).

4 Data

4.1 Sample Characteristics

We use the 2012–2017 waves of the American Community Survey to construct a sample of same-sex married and cohabiting couples.[19] We restrict the sample to couples where both partners are

17. It would be a problem, for example, if couples predicted to have a relatively uneven earnings split are systematically more (or less) likely to marry, independent of the effect of their earnings split on the marriage subsidy, once they are allowed to.

18. For this approach, we include controls for all covariates with non-zero coefficients in the LASSO prediction of earnings in levels. Controlling for the predicted earnings split and the 5^{th}-order polynomial in predicted earnings means we essentially condition on the x- and y-axis variables in Figure 1 and use only policy-induced variation in the marriage subsidy for identification. Including the covariates with non-zero coefficients from the predicted earnings LASSO acts as a control function similar to Dahl and Lochner's (2012) approach, meant to break any remaining correlation between marriage rates and the predicted earnings instrument. Our estimates are robust to these additional controls.

19. The ACS began explicitly recording whether a couple was a same-sex married couple in 2012, allowing us to credibly differentiate between married and cohabiting couples from then on.

between 18–60 years old to ensure that both partners are adults and to avoid potential marriage incentives originating from Social Security. Our main sample includes 37,234 couples (21,136 cohabiting couples and 16,098 married couples).[20,21]

Appendix Tables A2 and A3 present couple-level and individual-level summary statistics for same-sex married and cohabiting couples in 2012–2017. 43.2% of our sample of same-sex couples are married. Married couples are more likely to be female and to have children and are older and have slightly lower employment, compared to cohabiting couples.

4.2 Predicted Earnings

The ACS reports earnings for each individual household member over the past 12 months. To alleviate endogeneity concerns that we noted earlier, we implement a simulated instrumental variable approach. We predict earned income for each individual, use predicted earned income and the NBER TAXSIM simulator to calculate each couple's predicted marriage subsidy, and use that as an instrumental variable for each couple's observed marriage subsidy. We limit our prediction sample to individuals observed in 2012 so that predictions do not reflect potential labor supply responses to the policies we study.

Because we have found that an accurate prediction of the marriage subsidy is critical, we implement a machine learning LASSO approach, as in Isaac (2020b), to gain explanatory power. The LASSO is a model selection method that uses a penalized regression to select the variables that best predict earned income using OLS (Tibshirani 2011).[22] It considers a large number of covariates and interactions while selecting the subset of variables that best fit the data. 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,

20. If a same-sex couple reports themselves to be married even though they reside in a state that does not recognize same-sex marriages, then we assume the couple married in a state that did license such marriages, although they will not be recognized as married for state tax purposes until after marriage legalization in their state or *Obergefell v. Hodges*.

21. Fisher, Gee, and Looney (2018) use the ACS to estimate that there are 425,357 same-sex married couples in the U.S. in 2015. Using household weights in the ACS and eliminating our maximum age restriction, our sample represents 421,911 in 2015, which is very similar.

22. The LASSO uses an L1 norm constraint rather than the L2 norm constraint of the similar ridge regression. The LASSO relies on and estimates a tuning parameter, λ, that determines which variables have non-zero coefficients, with smaller λs resulting in more non-zero coefficients. We use 10-fold cross validation (i.e., a split-sample methodology) to test 100 different values of λ.

college major, and state of residence, and pairwise interactions between all these.[23]

We found that we gained important explanatory power when we first use a LASSO to predict whether individuals have positive earnings with a linear probability model. We convert these predicted probabilities into a binary variable by setting a threshold in the predicted earnings distribution resulting in the same value as the sample mean of having positive predicted earnings. For individuals with resulting positive predicted earnings, we use another LASSO regression to predict their earnings level, estimated on those in the prediction sample with positive observed earnings.[24]

Appendix Figure A2 displays kernel densities for reported and predicted earned income, split to show the higher-earning and lower-earning member of each couple. Our two-step approach to predict zero and then positive conditional earnings helps us capture the relatively higher non-employment rate for secondary earners, on the right side of the figure, although for both we under-predict the frequency of positive but very low earnings and over-predict the frequency of earnings in the middle range. The R^2 of the first- and second-step LASSO regressions are 0.449 for having positive earnings and 0.301 for earnings conditional on having positive earnings; and the mean predicted earnings split is 0.644, compared to the mean reported earnings split of 0.733; all of which suggest a reasonably accurate prediction process. Table 2 reports these mean values separately for married and cohabiting couples, Appendix Table A3 reports them separately for each partner, and Appendix B.3 compares the joint distribution of the couple's total earned income and the earnings split between partners for reported and predicted earned income. They make it clear that our prediction process tends to understate earned income and the earnings split a little.

We use predicted earned income and the NBER TAXSIM simulator to calculate the predicted marriage subsidy for each couple. We focus on earned income rather than total income because positive income from other sources is infrequent and often small, making it difficult to predict precisely.[25] We calculate the tax liability as a function of only predicted earned income, number

23. The ACS reports occupation for a respondent's current or most recent job, except for respondents who have not worked at all in the previous 5 years or who are seeking employment for the first time. Approximately 5.8% of the prediction sample had missing occupation information, which we dummy out, but this variable ends up dropping out of the LASSO estimation.

24. The LASSO regression output is available upon request. Appendix B.3 contains more details about the regressors selected by the LASSO.

25. The NBER TAXSIM program separates income from numerous sources, some of which is taxed at different rates. Some of these sources are reported in the ACS, but for quite few households, with a very high observed variance, and likely with error. Tax liabilities depend further on exclusions, deductions, and credits that are largely unreported in the ACS. For these reasons, we focus on wage and salary income, which is by far the most common income source.

of children, and state of residence. As reported in Table 2, the prediction process naturally yields more compressed variation than observed for actual marriage subsidies. Nevertheless, as we show later, we obtain a strong first-stage estimate.

Table 2 also makes it clear that the majority of the variation in the marriage subsidy arises from the federal rather than state subsidy, which is only 10.7% of the total. Therefore, our identification of the causal effect of the marriage subsidy comes largely from the federal subsidy and the *United States v. Windsor* ruling.

4.3 Comparison of ACS Marriage Transitions with the SIPP

One issue with our approach to sample definition is that we omit non-cohabiting people, some of whom are in relationships and may be encouraged or discouraged from marrying by the tax code, so our analysis offers an incomplete picture of marriage responses. We cannot determine how many couples married without cohabiting first using the ACS, so we use the 2014 Survey of Income and Program Participation (SIPP) to gauge this, although the resulting sample of same-sex couples is small. The 2014 panel was the first to differentiate between same-sex and different-sex partnerships, and therefore allows us to observe transitions into cohabitation or marriage.

Appendix Table A4 presents relationship transitions for individuals in same-sex relationships (Panel A) and, for the sake of comparison, different-sex relationships (Panel B), whom we can observe for at least two years. Among newly married same-sex couples in year t (whom we observed as not married in year $t-1$), 81.5% were cohabiting the year before. In contrast, among newly married different-sex couples, 61.0% were cohabiting the year before.[26] Thus, while the newly-married were more commonly cohabiting than not beforehand, this was especially the case for a large majority of same-sex couples. Though the sample size is small, this analysis suggests that our approach using the ACS does not omit many non-cohabiting couples who are contemplating marriage.

26. Of the 156 individuals we observe in the SIPP in same-sex marriages, 28.7% were unmarried and cohabiting the year before and 6.4% were single, so 81.5% of newly married same-sex couples were cohabiting the year before (compared to 61.0% of newly married different-sex couples).

5 Results

We first present results for our baseline IV model in equations 2 and 3, which estimates the impact of the marriage subsidy on the probability of being married. Then, we add controls for predicted earned income and earned income split to ensure that our estimated marriage subsidy effect is driven by tax variation and not by our method for predicting earnings. After that, we estimate effects of the marriage subsidy that vary by household earnings, by sources of variation in tax recognition, and by other couple characteristics. Finally, we explore robustness of our estimates.[27]

5.1 Baseline Estimates

Table 3 presents the OLS and IV estimates of the effect of the combined federal and state marriage subsidy on the probability of being married, with the first-stage coefficients from the simulated IV reported in the bottom panel. The OLS estimates indicate that a $1,000 increase in the total marriage subsidy is associated with a 0.4–0.5 percentage point increase (0.9–1.2%) in the probability of being married, which implies a marriage-subsidy elasticity of 0.003–0.004 ($p < 0.01$). 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 1995a; Eissa and Hoynes 2003; Bastian 2017; Michelmore 2018).

[TABLE 3 HERE]

As noted earlier, however, OLS estimates of the effect of the marriage subsidy on marriage may be either positively or negatively biased due to measurement error, omitted variables, or endogeneous labor supply changes caused by marriage. The first-stage coefficients from our IV estimation are highly significant and range between 0.41 and 0.46. 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. For example, some couples who marry are likely to

27. Appendix A presents the full set of OLS, reduced-form, IV, and bootstrapped IV estimates for Tables 3–6, below.

specialize within the household, which would tilt the earnings split and raise the observed marriage subsidy but not our predicted one, for married relative to cohabiting households.

The IV estimates remain statistically significant at the 1% level. We estimate that a $1,000 increase in the combined federal and state marriage subsidy causes a 0.8–1.4 percentage point (1.9–3.2%) increase in the probability of being married. These estimates are substantially larger than the OLS estimates. Nevertheless, the coefficient estimates translate to a quite small and precisely estimated marriage-subsidy elasticity of 0.006–0.011 ($p < 0.01$).[28] Among estimates from the literature, some are relatively small as well (e.g., by Alm and Whittington 1995a; Eissa and Hoynes 2003; Herbst 2011) or are insignificant, while others are considerably higher (e.g., by Alm and Whittington 1999; Fisher 2013; Gayle and Shephard 2019), especially some recent ones based on EITC variation (e.g., by Bastian 2017; Michelmore 2018); we consider possible heterogeneity in responsiveness by household income level below, which helps reconcile our results to recent ones to an extent. We further demonstrate in Appendix B.1 the improvement in precision resulting from the considerably greater magnitude in marriage incentives that we exploit, compared to the literature; this gives us the statistical power to implement our IV approach and still gain more precision in our second-stage estimates than in some of the other papers, allowing us to obtain statistical significance of an estimate that is nonetheless quite small.[29]

Moreover, the IV estimates are insensitive to the inclusion of predicted earnings controls. These additional specifications, shown in the remaining columns of Table 3, isolate the variation arising from the tax code exclusive of the predicted level of earnings, predicted split in earnings, and the inputs to predicted earnings. It is also notable that access to legal same-sex marriage in one's state increases the probability of being married by 6.6–11.6 percentage points (15.2–26.9%), controlling for the tax-related effect. This estimate is smaller than those from Carpenter et al. (2021), but corroborate their main conclusions that legalizing same-sex marriage increases marriage rates.

Finally, one of the distinguishing features of our analysis is the use of cohabitation data in the

28. Event study estimates in Appendix B.5 provide little evidence of gradual responses.

29. Measuring the magnitude of variation as the sample standard deviation of the marriage subsidy, ours is greater than in prior studies for which information is available, as listed in Table 1, sometimes by an order of magnitude. We detail in Appendix B.1 the impact on the magnitude of our standard errors compared to many of the other studies.

ACS, which allows us to define a sample exclusively of couples in a relationship. In comparison, most estimates in the literature consider single and married people together, which, we demonstrate, inflates the estimated marriage elasticity. If we ignored information about cohabitation, the expanded sample that includes same-sex unrelated householders yields estimates that appear in Appendix Table B7.[30] The newly added non-partner roommates are obviously unmarried, which results in a level drop in the sample mean marriage rate, and are largely equally distributed around the mean marriage subsidy if they were to marry their roommate, which thus does little to pull the slope downward. Therefore, we continue to estimate effects of the marriage subsidy on marriage that are almost the same in magnitude, yet the much lower marriage rate in the extended sample including non-cohabitors results in elasticity estimates that are approximately 2.5 times *larger*, a substantial upward bias. This analysis confirms the improvement that results from observing non-married partners, so we can determine who is on the margin of marriage.[31]

5.2 Heterogeneous Effects by Earnings

As we noted above, the marriage elasticity implied by our baseline estimates is quite small, especially compared to recent estimates based on EITC variation, which affects low-earning couples. Thus, it is worth exploring whether responsiveness to the marriage subsidy in our sample differs by household earnings level. We estimate our baseline IV model again, while interacting the marriage subsidy with a 5^{th}-order polynomial in household earned income.

Figure 4 depicts the implied elasticity and 95% confidence interval, which we will use in our later policy simulation, as a function of earnings. These results confirm that the marriage elasticity declines with total household earnings, though a lack of power makes these results suggestive rather than conclusive. Our point estimate indicates an elasticity in the 0.050–0.10 range at low earnings levels, declining to around 0.015 for household earnings of $100,000. The elasticity remains above the baseline estimate of 0.011 (displayed in Figure 4 as the dashed black line) for

30. This adds 66,756 unrelated same-sex households to our original sample, tripling it in size: 86.8% are same-sex roommates and 13.2% are other same-sex non-relatives. Appendix B.7 compares select statistics for the original and expanded sample.

31. Many of the previous studies listed in Table 1 include a sample of all married and single people, which implicitly assumes that everyone wants to be in a different-sex relationship (since the marriage rate is computed relative to people of the same sex). Appendix B.7 displays scatter plots of the residualized outcome variable against the residualized first stage marriage subsidy fitted values conditional on the full set of covariates in the control function specification to visually demonstrate why we obtain a similar estimate among this expanded sample.

households earning less than $113,000 and is statistically different than zero over an earnings range of $0-$134,200 and $393,000–665,000.

[FIGURE 4 HERE]

Our results therefore confirm, as recent EITC-based estimates suggest compared to earlier estimates, that the marriage elasticity is higher for low-earning households. However, our estimate still fails to come anywhere close to the high recent estimates, based on EITC variation, of over 0.20 in Michelmore (2018) and Bastian (2017).

5.3 Heterogeneous Effects by Other Characteristics

Table 4 presents IV estimates that distinguish the effect of the marriage subsidy arising from differing tax recognition policy treatments or from the federal versus state tax codes. We find that the marriage subsidy has an effect that is sometimes opposite signed, but imprecisely estimated and insignificant, before *United States v. Windsor*, and has comparable and significant effects of 0.8–1.5 percentage points per $1,000, relative to the baseline estimates in Table 3, as a result of *Windsor* and post-*Windsor* state legalization that persists until *Obergefell*. Thus, the introduction of the federal marriage subsidy due to and after *Windsor* plays an important role in our estimation.

[TABLE 4 HERE]

The second specification in Table 4 explicitly allows the effects of the federal versus state marriage subsidies to differ. This shows that our main estimates are driven by variation in the federal subsidy, with an estimated effect of 0.022 in the most detailed specification, corresponding to a still-small elasticity of 0.015. In contrast, the estimated effect of the state subsidy is small, negatively signed, significantly different than the federal subsidy, and insignificantly different than zero. The interpretation of the effect of the federal subsidy in this specification is particularly clean because it avoids concerns involving the staggered rollout of policy (Goodman-Bacon 2021). Our findings corroborate Light and Omori (2008), who find no significant effect of the state marriage tax penalty on the probability of marrying or divorcing. The relative lack of state-level variation, however, makes it difficult to conclude whether this reflects weaker identification arising from less state progressivity or weaker salience of state income taxes.[32]

Next, Table 5 explores heterogeneous effects of the marriage subsidy depending on whether the couple has children and whether the partners are male or female. We estimate significantly larger effects among childless couples and among female couples, relative to couples with children or male couples.[33] The mechanical equivalence of the effect of marriage subsidies on women and men in studies of different-sex couples no longer holds in our setting, and so our estimates speak more broadly to possible differences in responsiveness to taxes by gender. We conclude that women are more responsive across the marriage margin in response to the tax-induced marriage subsidy.

[TABLE 5 HERE]

5.4 Robustness

In this subsection, we address concerns that may remain about endogeneity or omitted variables, including estimating a state-by-year fixed effect specification, controlling for employer-sponsored health insurance coverage, exploring migration effects, and considering how a traditional Mincer approach to predicting earnings performs as a simulated IV.[34]

It may yet be that state-level attitudes toward same-sex relationships and discrimination against LGBT individuals are correlated with states' decisions to legalize same-sex marriage. It is also possible that state-time varying social norms within the LGBT community confound our estimates. To address these concerns, we include a full set of state-by-year fixed effects to capture state-time varying shocks and unobservables (such as changes in state-level transfer programs or health insurance coverage policies for same-sex couples) that may affect marriage rates or same-sex marriage

32. To further examine heterogeneous effects, Appendix B.8 presents IV estimates that distinguish a federal marriage subsidy treatment from a federal marriage penalty treatment.

33. The estimates for couples with and without children are significantly different at the 10% level in columns 3 and 5. The male and female estimates are all significantly different at the 1% level.

34. Along these lines, in Appendix B.9 we (counterfactually) assume that the federal marriage subsidy is active for the full sample period and has its own period-specific coefficient, although the results are somewhat inconclusive. We do not estimate any statistically significant response to the federal marriage subsidy in 2012, suggesting that our analysis passes this placebo test. We also explored robustness to alternative age restrictions, in results available upon request.

legalization. This specification no longer allows us to identify coefficients on the *Legal Marriage* and Medicaid expansion variables. Identification of the effect of the federal subsidy should be similar in this context as in our main specifications because the *Windsor* ruling affected all same-sex married couples regardless of where they live or whether their state of residence recognized same-sex marriage. Identification of the effect of the state marriage subsidy, already weak, becomes more so, because it is no longer driven by state same-sex marriage legalization, but only by cross-sectional variation in predicted earnings and number of children.

Table 6 presents the estimates with state-by-year fixed effects. All of our first-stage estimates continue to be quite similar in magnitude and remain highly significant. Our main estimates that use the combined federal and state subsidy are essentially unchanged. When separating the effect of the federal and state subsidies, the specification with state-by-year fixed effects continues to show a significant and comparable effect of the federal subsidy relative to Table 4. The coefficient on the state subsidy is negative as in our main estimates, and is sometimes significant with slightly larger standard errors, which may reflect weaker identification. Thus, it does not appear that state-time varying omitted variables are confounding our estimates of the effect of the marriage subsidy on the probability of being married.[35]

[TABLE 6 HERE]

Yet another concern is that the marriage effects we estimate are instead driven by new access to health insurance coverage through one spouse's employer. *Windsor* did not mandate employer-sponsored health insurance (ESHI) coverage for same-sex spouses outside the federal government (Dawson, Kates, and Rae 2018). Rather, access was granted by state marriage legalization or alternative partnership policies (e.g., civil unions).[36]

An analysis of correlations of ESHI coverage, as observed in the ACS, and our predicted and observed marriage subsidy measures indicate that ignoring the possibility of spousal coverage following marriage might impart a negative bias to our estimate of the marriage subsidy impact on

35. We consider in Appendix B.6 whether the means of marriage legalization, either through legislative or judicial action, affected the responsiveness of same-sex couples, as in Hansen, Martell, and Roncolato (2019).

36. To the extent that marriage incentives arising from spousal ESHI coverage was altered uniformly by state-level policy, they would be absorbed by our state-by-year fixed effects specification in Table 6, which did not alter our estimates.

marriage, as detailed in Appendix B.10. However, the estimated marriage subsidy impact when we include observed ESHI along with expanded predicted income controls is quite similar, suggesting little remaining correlation between ESHI coverage and the marriage subsidy.[37]

A further concern related to health insurance is that the Affordable Care Act (ACA) introduced marriage incentives in 2014 via the tax credit available to households with income between 100–400% of the federal poverty line that purchased insurance through the exchanges. The ACA tax credit can introduce marriage incentives depending upon the age-adjusted premium for each partner and the partners' income split because unmarried couples are considered separate health insurance units for the purposes of the tax credit. As detailed in Appendix B.11, we calculate the ACA-induced marriage subsidy, which is small relative to the federal income tax-induced marriage subsidy, in Appendix Table B12. Same-sex couples in 2015–2017 in our sample faced an average ACA marriage subsidy of only $4-5, but, conditional on having a non-zero value, faced an average subsidy of approximately $400.

Appendix Table B13 presents estimates controlling for the ACA marriage subsidy. Our main estimates are essentially unchanged, and the coefficient on the ACA marriage subsidy is negative and insignificant in all specifications. We conclude that marriage incentives created by the ACA tax credit do not confound our estimated effect of the marriage subsidy.

Migration responses to state legalization and state tax incentives may affect our main estimates, though recall that couples that married in a state that licensed same-sex marriage may live in a state that does not. To examine this, Appendix Table A4 reports that moves within the previous year are relatively infrequent; that moves from states that did not grant same-sex marriages to states that did were even more infrequent; and that such moves by married couples were yet more infrequent than by cohabiting couples. Moreover, while same-sex couples who moved experienced gains in their state tax marriage subsidy, and the gains were greater for married than for cohabiting couples, in both cases they were quite small on average, on the order of less than $100.

Lastly, we consider a more traditional method than the LASSO of simulating income for our

37. We are not claiming a causal interpretation of the effect of ESHI in these regressions, as we do not have a strategy to control for potential endogeneity in whether spouses have ESHI. Rather, this exercise indicates whether ESHI matters as a potential omitted variable.

IV approach, instead based on a simple Mincer specification, in order to demonstrate our improvement in precision.[38] The values of the predicted marriage subsidy using the Mincer approach are, on average, negative rather than positive, as shown in Appendix Table B4, due to more equal predicted earnings splits using the Mincer earnings prediction. Appendix Figure B3 makes clear that the traditional Mincer earnings prediction does not match the observed data well. Moreover, the Mincer-predicted marriage subsidy does not yield as good a fit in the first stage estimates explaining the observed marriage subsidy, and the resulting IV estimates are all either wrong-signed relative to what theory would suggest, statistically insignificant, or both.

6 The Tax Cuts and Jobs Act

We finish by using our estimated responses to the marriage subsidy to simulate changes in the probability of being married for the population as a whole as a result of the 2018 Tax Cuts and Jobs Act (TCJA).[39] The TCJA increased the marriage subsidy (or decreased the marriage penalty) for many high-earning couples by reducing progressivity: at the low end of the tax schedule by increasing the standard deduction and married-filing jointly tax brackets, and at the high end by reducing marginal tax rates. While the TCJA may have increased the probability of marrying, the highly non-uniform changes, depending on both the level and split of household earnings, means that some couples faced dramatic increases in marriage incentives while others faced less pronounced increases or even decreases.

We use our earnings-specific estimates, as shown in Figure 4, for this exercise. We multiply these point estimates by the simulated dollar change in the marriage subsidy between 2017 and 2018 for each unmarried same-sex cohabiting couple in our sample and calculate the change in the marriage probability as a percentage of the base marriage rate.

Figure 5 illustrates our simulated changes in the probability of being married as a result of

38. Heckman, Lochner, and Todd (2006) provide an overview of the Mincer regression and suggest a set of covariates, which we implement. Appendix B.4 presents details of this empirical specification.

39. While we extrapolate our results to different-sex couples in this section, it is of course not possible to establish external validity. Our regression specification is meant to distinguish the effects of tax recognition from marriage legalization, yet different-sex cohabiting couples who have always had the option to marry may not react to changes in tax incentives as our estimates suggest. One indication of such a difference is that the age at marriage for same-sex and different-sex couples in the ACS is quite different.

the TCJA, throughout the earned income distribution, along with the mean change within each $10,000 earnings bin.[40] While the figure shows little average change for cohabiting couples earning less than $230,000, the range for most households with the same earnings includes about a 10% increase or decrease. Meanwhile, the average change becomes positive for cohabiting couples earning above approximately $240,000, and essentially all cohabiting couples earning above $350,000 face an increase in marriage incentives.

[FIGURE 5 HERE]

The largest predicted effects of the TCJA are at the top of the income distribution because the TCJA flattened out the progressivity of the tax code, reducing the marriage penalties by far more than through the rest of the income distribution. Therefore, even though the elasticities that we estimated by income are largest for lower income households, the average increase in the marriage subsidy in the lower section of the income distribution is small, leading to negligible predicted changes in the average probability of being married due to the TCJA.

7 Conclusion

We provide new evidence of the effects of progressive household-based taxation on the probability of being married among couples in a relationship. We use a sample of same-sex married and cohabiting couples from the 2012–2017 American Community Surveys, along with recent state and federal tax variation created by same-sex marriage legalization and recognition.

Our instrumental variables estimates imply that a $1,000 increase in the total marriage subsidy causes a 0.8–1.4 percentage point (1.9–3.2%) increase in the probability of being married, implying a significant marriage-subsidy elasticity of 0.006–0.011. This estimate is precisely and robustly estimated but quite small. We find somewhat bigger effects, though still quite modest, for female and for childless couples; for the response to the federal as opposed to state tax subsidies; and for low-earning households.

40. Appendix Figure A3 displays the percentage point change the probability of being married.

Finally, we use our estimates to simulate changes in the probability of being married as a result of the 2018 Tax Cuts and Jobs Act. Our simulations suggest that there were small changes in the probability of being married, averaging to about zero but with a range of +/- 10%, for cohabiting couples earning less than $230,000; and sizable increases for higher-earning cohabiting couples.

The Tax Cuts and Jobs Act is only the most recent policy that alters marriage incentives, and while some such changes have been incidental, at other times policy has been designed to deliberately reward marriage, as when the tax code was altered to reduce the "marriage tax" in the late 1990s and early 2000s. One statistic of interest, therefore, is the size of tax incentives needed to "generate" one marriage. Our baseline estimate suggests it would require approximately $71,500 in a tax-based marriage subsidy to generate one marriage.[41]

This analysis not only speaks to the tax-induced economic impact of marriage for same-sex couples, therefore, but also offers an opportunity to learn more generally about couples' responsiveness to marriage incentives, and especially how these responses differ by income.

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41. Our main estimate is that a $1,000 increase in the marriage subsidy increases the probability of marrying by 1.4 percentage points, suggesting that it would require $(1/0.014)(1000) \approx \$71,500$ in incentives to go from a 0% probability of marrying to a 100% probability of marrying.

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Table 1
Methods and Results in Marriage-Subsidy Studies

Study	Identification	Data	Sample	Marriage measure	Elasticity estimate[a] (standard error)
Alm and Whittington (1995a)	U.S. tax reforms	Annual time series from 1947–1988	Married vs. all unmarried	Stock	$\hat{\varepsilon} = 0.012^{***}$
Alm and Whittington (1995b)	U.S. tax reforms	PSID 1985 and 1989	Married vs. all unmarried	Flow	$\hat{\varepsilon} < 0.050^{*}$
Sjoquist and Walker (1995)	U.S. tax reforms	Annual time series from 1947–1987	Married vs. all unmarried	Stock	null
Alm and Whittington (1999)	U.S. tax reforms	PSID 1968–1992	Married vs. all unmarried	Flow	$\hat{\varepsilon} = 0.230^{*}(0.131)$
Ellwood (2000)	EITC reforms	March CPS 1986 and 1999	Married vs. all unmarried	Stock	null
Dickert-Conlin and Houser (2002)	EITC reforms	SIPP 1990–1993	Married vs. all unmarried	Flow	null
Eissa and Hoynes (2003)	U.S. tax reforms	March CPS 1985–1998	Married vs. all unmarried	Stock	$\hat{\varepsilon} = 0.004^{***}(0.0001)$
Light and Omori (2008)	State tax reforms	NLSY79 1979–2004	Married vs. unmarried cohabiting vs. non-cohabiting single	Flow	null
Herbst (2011)	EITC reforms	Vital Statistics 1977–2004	Married vs. all unmarried	Flow	$\hat{\varepsilon} = 0.094^{***}(0.028)$
Fisher (2013)	U.S. tax reforms	March CPS 1984–2008	Married vs. unmarried cohabiting	Stock	$\hat{\varepsilon} = 1.123^{***}(0.092)$
Bastian (2017)	EITC reforms	PSID 1980–2013	Married vs. all unmarried	Flow	$\hat{\varepsilon} = 0.222^{***}(0.064)$
Michelmore (2018)	EITC reforms	SIPP 2001, 2004, 2008	Married vs. non-cohabiting single	Flow	$\hat{\varepsilon} = 0.248^{***}(0.092)$
Friedberg and Isaac (2022)	**Same-sex marriage recognition**	**ACS 2012–2017**	**Married vs. unmarried cohabiting**	Hybrid	$\hat{\varepsilon} = \mathbf{0.012}^{***}(\mathbf{0.004})$, varies with earnings
Gayle and Shephard (2019)	Marriage market variation, structural model	ACS 2006 and ATUS 2002–2007	Married vs. non-cohabiting single	Stock	$\hat{\varepsilon} = 0.100$
Isaac (2020a)	EITC reforms	NLSY79 1991–1998	Married vs. all unmarried, married vs. cohabiting	Flow	null

Notes: *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively, when possible and “null” indicates that the preferred specification yields a statistically insignificant estimate. “PSID” is the Panel Study of Income Dynamics, “March CPS” is the March Current Population Survey, “NLSY79” is the 1979 National Longitudinal Survey of Youth, “ACS” is the American Community Survey, and “ATUS” is the American Time Use Survey. Details of the elasticity and standard error calculations are presented in Appendix B.1.

Table 2
Couple-Level Reported and Predicted Earnings Statistics

	Married couples	Cohabiting couples
Positive earnings	0.935	0.935
	(0.246)	(0.247)
Positive earnings (predicted)	0.963	0.969
	(0.188)	(0.172)
Reported earnings	125,286.76	105,188.00
	(119,779.91)	(105,191.59)
Predicted earnings	110,729.40	102,952.54
	(57,936.40)	(54,275.74)
Reported earnings split	0.745	0.723
	(0.200)	(0.174)
Predicted earnings split	0.648	0.641
	(0.197)	(0.181)
Fed + st marriage subsidy (reported income)	442.45	263.79
	(5,116.62)	(3,247.05)
Fed + st marriage subsidy (predicted earned income)	68.19	256.82
	(2,218.99)	(1,623.22)
Fed marriage subsidy (reported income)	395.05	231.80
	(4,563.36)	(3,055.28)
Fed marriage subsidy (predicted earned income)	122.41	266.89
	(1,896.07)	(1,427.33)
St marriage subsidy (reported income)	47.41	31.99
	(974.14)	(584.34)
St marriage subsidy (predicted earned income)	-54.21	-10.06
	(487.06)	(332.98)
Observations	16,098	21,136

Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys and include same-sex married and cohabiting couples where both partners are between 18–60 years old. The earnings split means are conditional on the couple having positive reported earnings.

Table 3
Baseline OLS and IV Estimates of the Effect of the Marriage Subsidy on the Probability of Being Married

	No income controls		Expanded income controls			
	OLS	IV	OLS	IV	OLS	IV
Outcome: Married						
Marriage subsidy ($1,000s)	0.005***	0.008***	0.004***	0.009*	0.005***	0.014***
	(0.001)	(0.003)	(0.001)	(0.005)	(0.001)	(0.005)
Legal marriage	0.066***	0.066***	0.066***	0.066***	0.116***	0.116***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)
State expanded Medicaid	0.010	0.010	0.009	0.010	0.035***	0.034***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.006)	(0.006)
Male	0.003	0.003	-0.005	-0.002	0.002	0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.009)
Couple has children	0.171***	0.176***	0.167***	0.176***	0.165***	0.181***
	(0.011)	(0.012)	(0.011)	(0.013)	(0.011)	(0.013)
Number of children	0.037***	0.037***	0.037***	0.035***	0.032***	0.029***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.009***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Most educated partner's years of education	0.006***	0.006***	0.001	0.004**	-0.007***	-0.004
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Partners' education difference	-0.002	-0.002*	-0.000	-0.002	0.005***	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.037***	0.037***	0.037***	0.037***	0.032***	0.033***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.057***	0.032	0.063***	0.057***
			(0.012)	(0.020)	(0.012)	(0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient		0.463***		0.408***		0.420***
		(0.021)		(0.027)		(0.026)
		[474.697]		[220.977]		[261.297]
Observations	37,234	37,234	37,234	37,234	37,234	37,234

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 year and state fixed effects. In specifications using expanded income controls, the OLS specifications use reported earnings measures and the IV specifications use predicted earnings measures.

Table 4
Heterogeneous IV Estimates by Treatment Effect

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy × pre-*Windsor*	-0.013		-0.013		0.023	
	(0.096)		(0.097)		(0.099)	
Marriage subsidy × post-*Windsor*, pre-*Obergefell*	0.008*		0.009		0.015**	
	(0.004)		(0.006)		(0.006)	
Marriage subsidy × post-*Obergefell*	0.008**		0.008		0.014***	
	(0.004)		(0.005)		(0.006)	
Fed. marriage subsidy ($1,000s)		0.012***		0.015**		0.022***
		(0.004)		(0.007)		(0.008)
St. marriage subsidy ($1,000s)		-0.013		-0.014		-0.004
		(0.013)		(0.014)		(0.012)
Legal marriage	0.066***	0.067***	0.066***	0.067***	0.116***	0.117***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)
Additional controls for:						
Couple's earnings split			✓	✓	✓	✓
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient 1	0.446***	0.462***	0.445***	0.363***	0.444***	0.337***
	(0.056)	(0.028)	(0.056)	(0.033)	(0.055)	(0.031)
	[92.204]	[359.017]	[94.762]	[146.678]	[105.674]	[121.857]
1^{st} stage coefficient 2	0.497***	0.561***	0.473***	0.571***	0.473***	0.630***
	(0.031)	(0.021)	(0.034)	(0.021)	(0.033)	(0.021)
	[296.775]	[1,129.643]	[193.728]	[880.175]	[219.990]	[672.345]
1^{st} stage coefficient 3	0.480***		0.449***		0.461***	
	(0.026)		(0.030)		(0.028)	
	[375.200]		[217.123]		[261.937]	
Observations	37,234	37,234	37,234	37,234	37,234	37,234

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 year and state fixed effects, as well as controls detailed in the text. In specifications using expanded income controls, the measures are based on predicted earnings. The first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted Marriage Subsidy × pre-*Windsor* variable using the outcome Observed Marriage Subsidy × pre-*Windsor*. The mean marriage rate is 0.245 pre-*Windsor*, 0.355 post-*Windsor* and pre-*Obergefell*, and 0.524 post-*Obergefell*.

Table 5
Heterogeneous IV Estimates by Presence of Children and Sex

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy × couple has children	0.003 (0.004)		0.004 (0.005)		0.008 (0.006)	
Marriage subsidy × childless couple	0.011*** (0.004)		0.013** (0.006)		0.021*** (0.006)	
Marriage subsidy × male		-0.002 (0.003)		-0.002 (0.005)		0.004 (0.005)
Marriage subsidy × fem.		0.025*** (0.005)		0.024*** (0.007)		0.030*** (0.007)
Legal marriage	0.066*** (0.010)	0.068*** (0.010)	0.066*** (0.010)	0.068*** (0.010)	0.115*** (0.008)	0.117*** (0.008)
Additional controls for:						
Couple's earnings split			✓	✓	✓	✓
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient 1	0.469*** (0.037) [179.320]	0.549*** (0.032) [341.861]	0.457*** (0.038) [199.452]	0.492*** (0.035) [205.288]	0.448*** (0.037) [233.548]	0.506*** (0.033) [244.447]
1^{st} stage coefficient 2	0.463*** (0.026) [323.643]	0.410*** (0.022) [382.049]	0.415*** (0.031) [189.489]	0.405*** (0.024) [255.910]	0.431*** (0.029) [240.711]	0.402*** (0.024) [292.100]
Observations	37,234	37,234	37,234	37,234	37,234	37,234

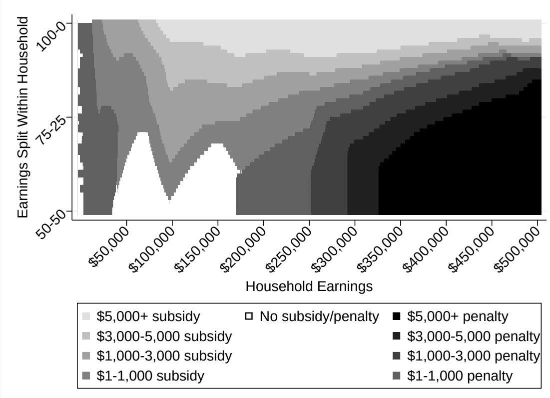
Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications also include year and state fixed effects, as well as controls detailed in the text. In specifications using expanded income controls, the measures are based on predicted earnings. The first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted Marriage Subsidy × Has Children variable using the outcome Observed Marriage Subsidy × Has Children. The mean marriage rate is 0.596 among couples with children, 0.384 among childless couples, 0.414 among male couples, and 0.450 among female couples.

Table 6
IV Estimates Using State-by-Year Fixed Effects

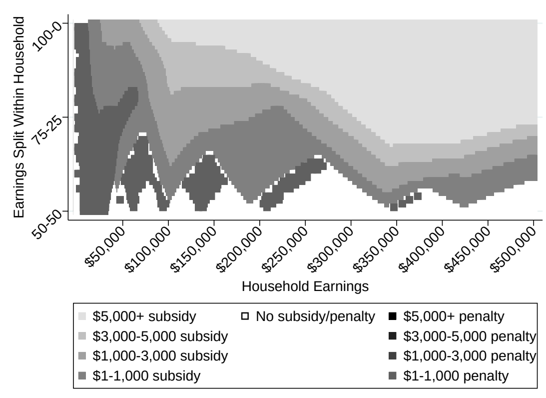
	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy ($1,000s)	0.007**		0.008*		0.011**	
	(0.003)		(0.005)		(0.006)	
Fed. marriage subsidy ($1,000s)		0.011***		0.015**		0.022***
		(0.004)		(0.007)		(0.008)
St. marriage subsidy ($1,000s)		-0.015		-0.017		-0.023*
		(0.014)		(0.014)		(0.014)
Additional controls for:						
Couple's earnings split			✓	✓	✓	✓
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient 1	0.464***	0.461***	0.407***	0.359***	0.401***	0.343***
	(0.021)	(0.029)	(0.028)	(0.033)	(0.026)	(0.031)
	[472.529]	[349.573]	[216.694]	[140.324]	[230.932]	[141.042]
1^{st} stage coefficient 2		0.554***		0.565***		0.570***
		(0.021)		(0.022)		(0.021)
		[1,041.797]		[786.759]		[727.457]
Observations	37,234	37,234	37,234	37,234	37,234	37,234

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 include state-by-year fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, and the partners' ages and education levels. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The reported first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 2 is the coefficient of the Predicted Federal Marriage Subsidy variable using the outcome Observed Federal Marriage Subsidy.

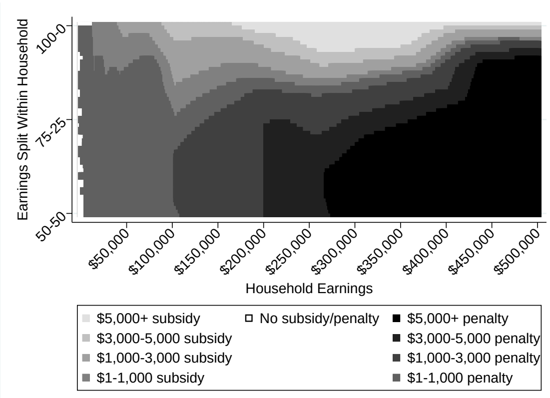
Figure 1
Marriage Taxes from 2017 and 2018



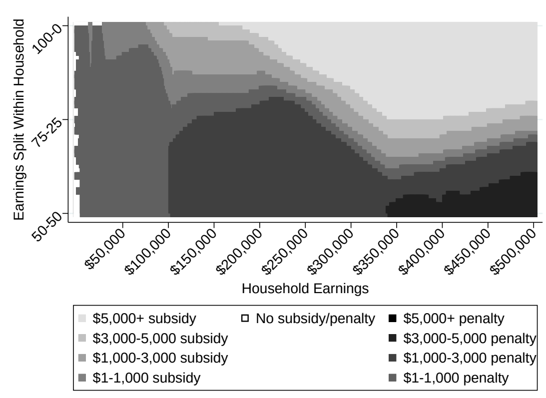
(a) 2017, no children



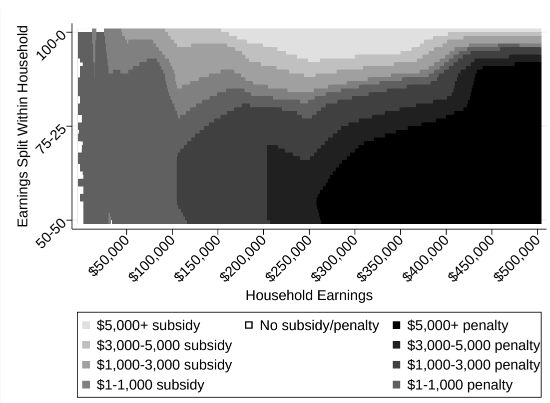
(b) 2018, no children



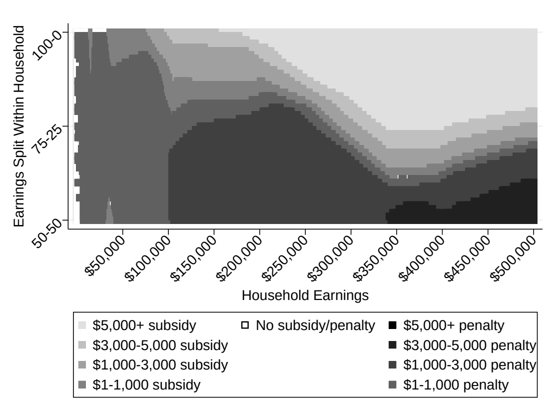
(c) 2017, one child



(d) 2018, one child



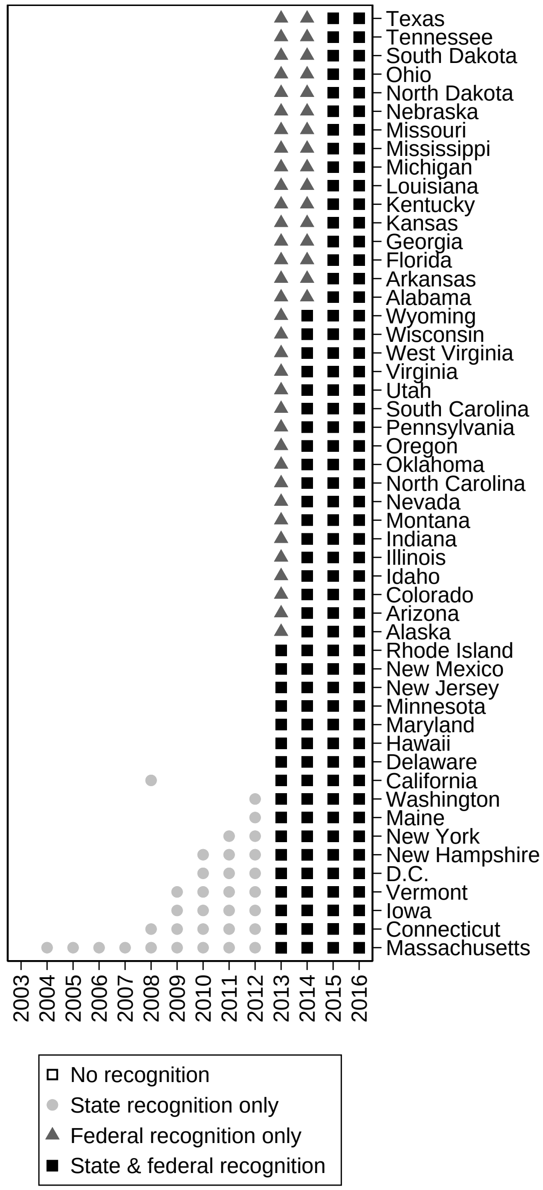
(e) 2017, two children



(f) 2018, two children

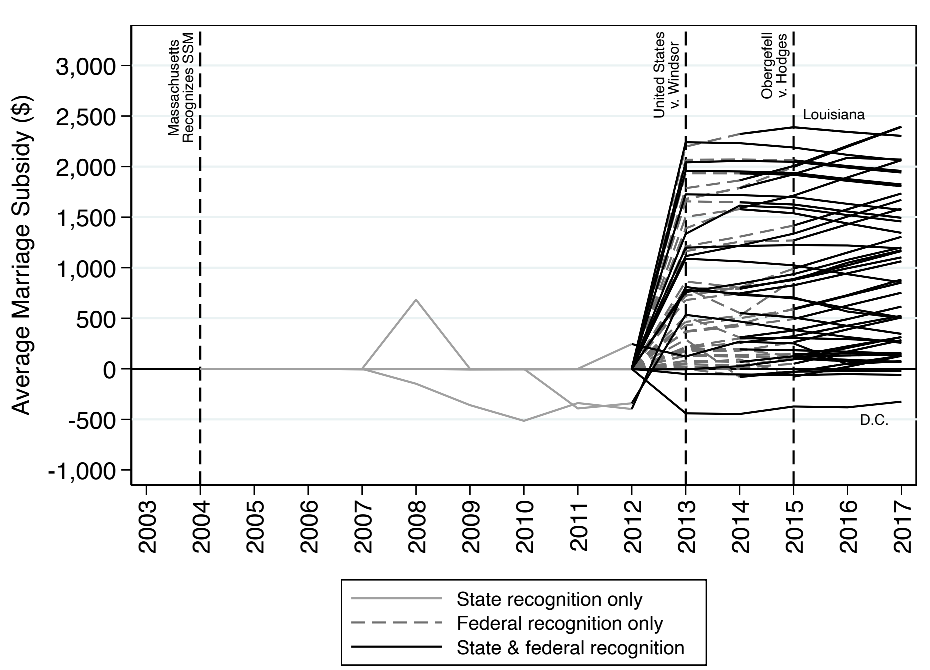
Notes: The data in Figure 1 are generated, and do not originate from the sample we analyze. The marriage subsidy is calculated as Marriage Subsidy$_{ct} = (T_{it} + T_{jt}) - T_{ct}$, where T_{it} and T_{jt} are each partner's tax liability if they file as single in year t, and T_{ct} is the couple's tax liability if they file jointly in year t. We use the NBER TAXSIM simulator to calculate the marriage subsidy assuming all income comes from wages and there are no other tax expenditures.

Figure 2
Timeline of Same-Sex Marriage Recognition



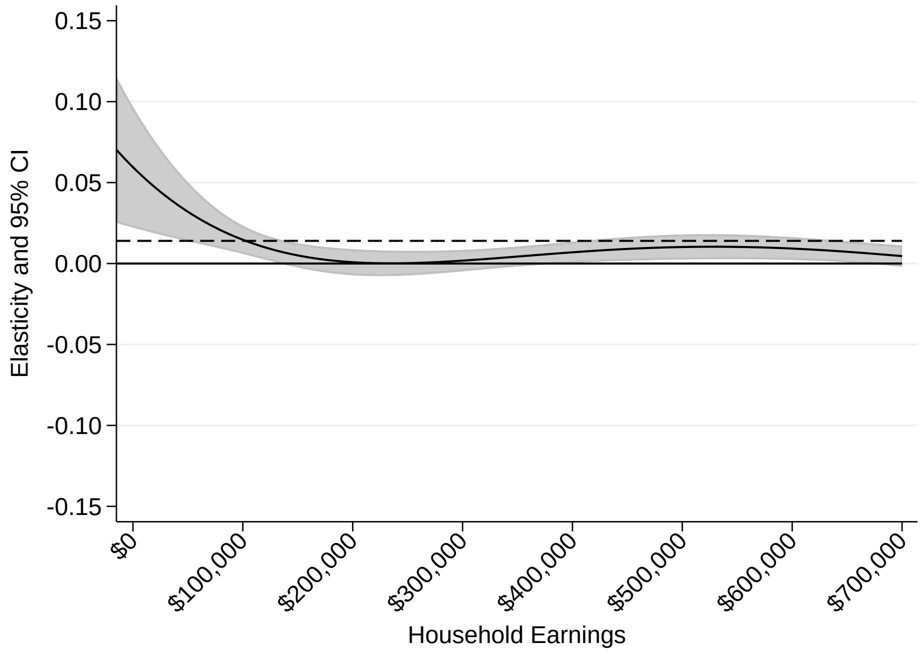
Notes: California legalized same-sex marriage in June 2008, but the statute was suspended by Proposition 8 in November 2008 until the Supreme Court decision in 2013. Same-sex marriage licenses issued in California between June and November 2008 continued to be recognized by the state.

Figure 3
Average Marriage Subsidy by State and Year



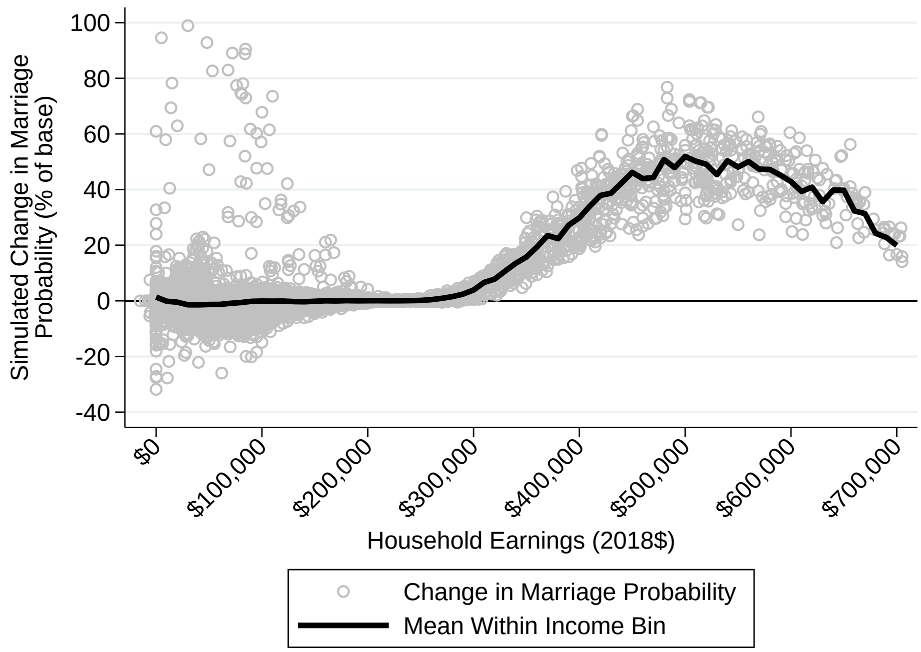
Notes: The data in Figure 3 come from average same-sex couples in the 2012 American Community Survey, run through the federal and state tax codes via TAXSIM in each prior and subsequent year. We use the population-weighted average earned income for primary and secondary earners in same-sex couples in each state in 2012 (assuming a 3% annual growth rate), and the recognition status of same-sex marriages in each state and year.

Figure 4
Heterogeneous Marriage Subsidy Elasticities by Household Earnings



Notes: The figure displays the marriage subsidy elasticity estimate and 95% confidence intervals implied by point estimates from an instrumental variables specification that interacts the marriage subsidy with a 5^{th}-order polynomial in household earned income. The dashed black line represents our baseline elasticity estimate of 0.011 from column 6 of Table 3. This specification includes all baseline covariates described in the text in addition to the un-interacted 5^{th}-order polynomial in household earned income, but does not include the other expanded income controls. We trim off elasticities for couples earning more than $700,000 for presentation purposes only.

Figure 5
Implied Changes in the Probability of Being Married Due to the Tax Cuts and Jobs Act



Notes: The figure translates the dollar change in the marriage subsidy due to the 2018 Tax Cuts and Jobs Act among same-sex cohabiting couples in our sample into a marriage effect based on point estimates from our household earnings heterogeneity specification (elasticities displayed in Figure 4). The baseline marriage rate in the sample is 0.432. We trim off outlier data points in this figure (those whose simulated changes are greater than 100% or less than -40%) for presentation purposes only.

A Appendix: Additional Tables and Figures

This appendix contains a summary of the treatment effects we parameterize (Table A1), couple-level demographic characteristics (Table A2), individual level summary statistics from our main estimation sample (Table A3), migration summary statistics (Table A5), the distribution of earnings splits among same- and different-sex couples in the 2012–2017 ACS (Figure A1), and kernel densities of reported and predicted earnings (Figure A2).

We also include OLS, reduced-form, full IV, and bootstrapped IV estimates for each of our tables in the main text (Tables A6–A19), the TCJA effects in percentage point terms (Figure A3), the bootstrapped implied heterogeneous elasticity estimates (Figure A4) and the bootstrapped TCJA effects (Figure A5).

Young (2021) notes that non-iid error processes can create spuriously large first stage F-statistics, leading researchers to conclude that their instruments are not weak because the F-statistics are higher than the rule-of-thumb values of 10 or 40. The author concludes that "while the bootstrap does not undo the increased bias of 2SLS brought on by non-iid errors, it nevertheless allows for improved inference under these circumstances" (p. 2). We therefore bootstrapped our estimates and robust standard errors using 1,000 replications to consider and address the possibility of non-iid errors, but, as can be seen below in Tables A7–A19, bootstrapping does not change our first stage conclusions about the strength of our instrument or our second stage results.

One corollary of the bootstrapping process, however, is that the confidence intervals of our estimated heterogeneous elasticities by household earnings are larger, and indicate significant elasticities only for households earning between $37,200 and $187,000. Despite larger standard errors, the evolution of the elasticity estimate has the same downward sloping shape as before and, as a result, the simulation of the effect of the TCJA by earnings remains unchanged.

Table A1
Treatment Effects Resulting From the Recognition of Same-Sex Marriage

		Treatment		
		Legalization	State marriage subsidy	Federal marriage subsidy
2004–2012	State legalization pre-*Windsor*	✓	✓	
2013	*United States v. Windsor*			✓
2013–2014	State legalization post-*Windsor*	✓	✓	✓
2015–	*Obergefell v. Hodges*	✓	✓	✓

Table A2
Couple-Level Demographic Characteristics

	Married couples	Cohabiting couples
Male	0.469	0.506
	(0.499)	(0.500)
Female	0.531	0.494
	(0.499)	(0.500)
Partners are the same race	0.793	0.757
	(0.405)	(0.429)
Age of older partner	46.205	43.353
	(9.633)	(10.902)
Age of younger partner	41.252	37.858
	(9.831)	(10.442)
Age difference between partners	4.953	5.495
	(5.234)	(5.543)
Education of more educated partner	15.594	15.363
	(2.468)	(2.264)
Education of less educated partner	13.718	13.513
	(3.044)	(2.604)
Education difference between partners	1.875	1.850
	(2.286)	(2.108)
Any dependent children	0.314	0.162
	(0.464)	(0.369)
Conditional number of dependent children	1.813	1.694
	(0.980)	(0.951)
Both partners work	0.776	0.811
	(0.417)	(0.392)
Only 1 partner works	0.195	0.160
	(0.396)	(0.367)
Neither partner works	0.029	0.029
	(0.167)	(0.168)
Observations	16,098	21,136

Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys and include same-sex married and cohabiting couples where both partners are between 18–60 years old. Years of education are constructed using the detailed educational codes in the ACS, which reports the individual's highest grade completed through 12^{th} grade. We assign 13 years of schooling for 1 or more years of college credit and no degree, 14 years for an associate's degree, 16 years for a bachelor's degree, and 18 years for a master's, professional, or doctoral degree.

Table A3
Individual Summary Statistics

	Married couples		Cohabiting couples	
	Predicted primary earners	Predicted secondary earners	Predicted primary earners	Predicted secondary earners
Male	0.469	0.469	0.506	0.506
	(0.499)	(0.499)	(0.500)	(0.500)
Female	0.531	0.531	0.494	0.494
	(0.499)	(0.499)	(0.500)	(0.500)
Black	0.054	0.061	0.060	0.072
	(0.225)	(0.239)	(0.238)	(0.259)
White	0.748	0.718	0.761	0.727
	(0.434)	(0.450)	(0.427)	(0.446)
Hispanic	0.125	0.144	0.119	0.140
	(0.331)	(0.351)	(0.323)	(0.347)
Asian	0.047	0.045	0.029	0.026
	(0.211)	(0.208)	(0.169)	(0.160)
Other race	0.027	0.031	0.031	0.035
	(0.161)	(0.174)	(0.173)	(0.184)
Age	44.162	43.295	41.208	40.004
	(9.615)	(10.434)	(10.620)	(11.378)
Years of education	15.208	14.104	15.020	13.856
	(2.835)	(2.910)	(2.523)	(2.565)
Positive earnings	0.935	0.812	0.935	0.847
	(0.246)	(0.390)	(0.247)	(0.360)
Positive earnings (predicted)	0.963	0.779	0.969	0.817
	(0.188)	(0.415)	(0.172)	(0.387)
Conditional annual hours worked	2,081.399	1,941.143	2,047.717	1,930.408
	(661.342)	(707.944)	(657.494)	(682.813)
Reported annual earnings	77,120.015	48,166.748	63,098.431	42,089.570
	(90,487.223)	(64,918.453)	(75,322.770)	(54,453.677)
Predicted annual earnings	69,653.683	41,075.712	64,302.898	38,649.642
	(34,755.452)	(29,394.051)	(32,976.598)	(26,690.846)
Observations	16,098	16,098	21,136	21,136

Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys. Predicted primary earners are the individual in each couple who has higher individual predicted earned income from the LASSO prediction process. Years of education are constructed using the detailed educational codes in the ACS, which reports the individual's highest grade completed through 12^{th} grade. We assign 13 years of schooling for 1 or more years of college credit and no degree, 14 years for an associate's degree, 16 years for a bachelor's degree, and 18 years for a master's, professional, or doctoral degree.

Table A4
Relationship Transitions in the 2014 SIPP

Panel A: Same-Sex Couples

	Transitioned to:		
	Single	Cohabiting	Married
Single	0.375	0.187	0.064
Cohabiting	0.542	0.748	0.282
Married	0.083	0.065	0.654
Observations	96	214	156

Panel B: Different-Sex Couples

	Transitioned to:		
	Single	Cohabiting	Married
Single	0.315	0.164	0.023
Cohabiting	0.328	0.736	0.036
Married	0.358	0.101	0.941
Observations	2,479	3,611	22,227

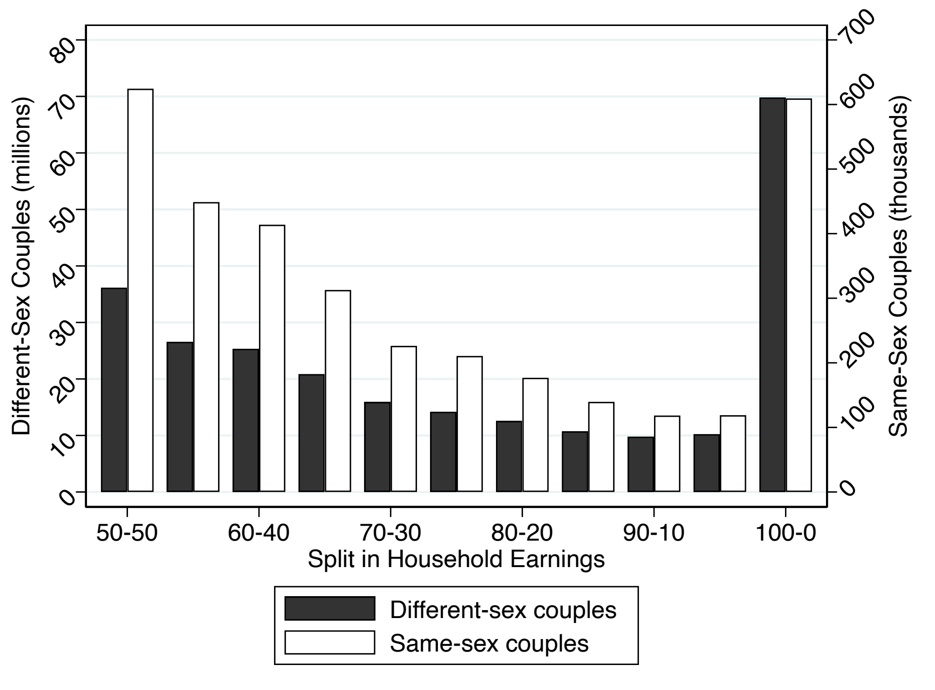
Notes: The data come from waves 1-3 of the 2014 Survey of Income and Program Participation and include same- and different-sex married and cohabiting couples where both partners are between 18–60 years old. The statistics are at the individual level, and include individuals we observe for two years. Each row represents the relationship status in year $t-1$, and each column represents the relationship status in year t. The relationship transition statistics in each column sum to 1, meaning that the transitions are conditional on relationship status in year t.

Table A5
Migration Pattern Summary Statistics

	Married couples	Cohabiting couples
At least 1 partner moved	0.032	0.056
between states	(0.176)	(0.229)
At least 1 partner moved	0.005	0.011
to a state with legal marriage	(0.067)	(0.104)
At least 1 partner moved	0.001	0.003
to a state without legal marriage	(0.032)	(0.054)
St. marriage subsidy in	-91.55	-31.46
prior state of residence[a]	(1,240.62)	(1,005.99)
St. marriage subsidy in	27.60	30.38
current state of residence[a]	(732.77)	(465.76)
Observations	16,098	21,136

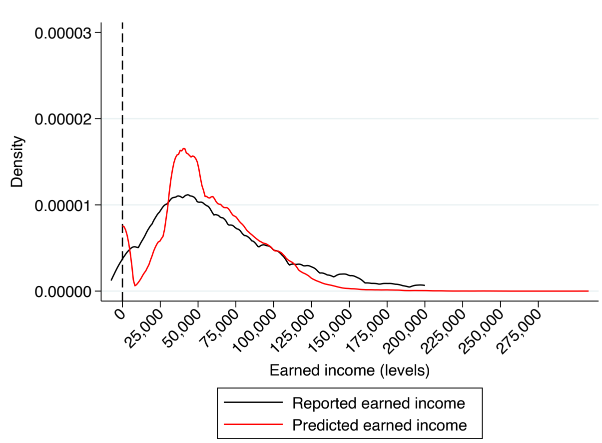
Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys and include same-sex married and cohabiting couples where both partners are between 18–60 years old. Note that the means in lines 2 and 3 will not add up to the mean in line 1 because line 1 includes any type of move (i.e., from a state with legal same-sex marriage to another state with legal same-sex marriage), whereas we only report cross-policy moves between states in lines 2 and 3.
a: Conditional on at least one partner having moved between states at all.

Figure A1
Distribution of Couple Earnings Splits

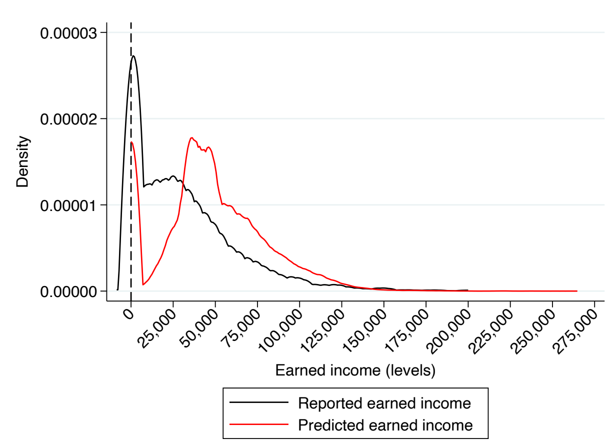


Notes: The data come from the 2012–2017 American Community Surveys and includes married and cohabiting couples where both partners are between 18–60 years old. Couples have been placed into 5 percentage point bins of partner earned income splits.

Figure A2
Earnings Densities



(a) Higher earners



(b) Lower earners

Notes: The LASSO prediction is a two-step process. We first use a LASSO to predict whether each individual has positive earnings using a linear probability model. We convert these predicted probabilities into a binary variable by setting a threshold in the distribution of predicted positive earnings such that the binary variable has the same observed sample mean of having positive predicted earnings (0.884). If the predicted probability is less than this threshold, then we assign $0 in predicted earnings to that individual. For individuals who have positive predicted earnings, we predict their earnings using coefficients from a LASSO regression of earnings in levels, estimated on a sample of individuals observed in 2012 with positive observed earnings. For illustrative purposes, we display reported and predicted earned income for higher and lower earners separately, although we calculate household predicted earned income as the sum of the partners' individual predicted earned incomes for estimation.

Table A6
Baseline OLS and Reduced Form Estimates of the Effect of the Marriage Subsidy on the Probability of Being Married

	No income controls		Expanded income controls			
	OLS	Reduced form	OLS	Reduced form	OLS	Reduced form
Outcome: Married						
Predicted marriage subsidy ($1,000s)	0.005***	0.004***	0.004***	0.003*	0.005***	0.006***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Legal marriage	0.066***	0.066***	0.066***	0.066***	0.116***	0.118***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)
State expanded Medicaid	0.010	0.010	0.009	0.010	0.035***	0.036***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.006)	(0.006)
Male	0.003	0.003	-0.005	-0.001	0.002	0.005
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)
Couple has children	0.171***	0.171***	0.167***	0.170***	0.165***	0.170***
	(0.011)	(0.011)	(0.011)	(0.012)	(0.011)	(0.012)
Number of children	0.037***	0.038***	0.037***	0.037***	0.032***	0.030***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.009***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Most educated partner's years of education	0.006***	0.006***	0.001	0.004**	-0.007***	-0.003
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Partners' education difference	-0.002	-0.002	-0.000	-0.002	0.005***	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.037***	0.037***	0.037***	0.037***	0.032***	0.033***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.057***	0.034*	0.063***	0.055**
			(0.012)	(0.019)	(0.012)	(0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses. All specifications also include year and state fixed effects. In specifications using expanded income controls, the OLS specifications use reported earnings measures and the reduced form specifications use predicted earnings measures. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. The OLS models use the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) as the main explanatory variable, and the reduced form models use the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence) as the main explanatory variable.

Table A7
Bootstrapped Baseline OLS and IV Estimates of the Effect of the Marriage Subsidy on the Probability of Being Married

	No income controls		Expanded income controls			
	OLS	IV	OLS	IV	OLS	IV
Outcome: Married						
Marriage subsidy ($1,000s)	0.005***	0.008***	0.004***	0.009*	0.004***	0.017***
	(0.001)	(0.003)	(0.001)	(0.005)	(0.001)	(0.006)
Legal marriage	0.066***	0.066***	0.066***	0.066***	0.112***	0.113***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)
State expanded Medicaid	0.010	0.010	0.009	0.010	0.030***	0.032***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.006)	(0.007)
Male	0.003	0.003	-0.005	-0.002	0.005	0.004
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)
Couple has children	0.171***	0.176***	0.167***	0.176***	0.167***	0.188***
	(0.011)	(0.012)	(0.011)	(0.013)	(0.012)	(0.014)
Number of children	0.037***	0.037***	0.037***	0.035***	0.033***	0.029***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.009***	0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Most educated partner's years of education	0.006***	0.006***	0.001	0.004**	0.000	0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Partners' education difference	-0.002	-0.002*	-0.000	-0.002	-0.000	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.037***	0.037***	0.037***	0.037***	0.036***	0.036***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.057***	0.032	0.059***	0.061***
			(0.012)	(0.020)	(0.012)	(0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient		0.426***		0.342***		0.303***
		(0.026)		(0.037)		(0.034)
		[474.697]		[220.977]		[178.452]
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Bootstrapped robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications also include year and state fixed effects. In specifications using expanded income controls, the OLS specifications use reported earnings measures and the IV specifications use predicted earnings measures. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence).

Table A8
Heterogeneous OLS Estimates by Treatment Effect

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy × pre-*Windsor*	0.022 (0.035)		0.021 (0.035)		0.028 (0.035)	
Marriage subsidy × post-*Windsor*, pre-*Obergefell*	0.002 (0.002)		0.002 (0.002)		0.002 (0.002)	
Marriage subsidy × post-*Obergefell*	0.006*** (0.001)		0.006*** (0.001)		0.006*** (0.001)	
Fed. marriage subsidy ($1,000s)		0.005*** (0.001)		0.005*** (0.001)		0.005*** (0.001)
St. marriage subsidy ($1,000s)		-0.000 (0.006)		-0.003 (0.005)		0.003 (0.006)
Legal marriage	0.066*** (0.010)	0.066*** (0.010)	0.066*** (0.010)	0.066*** (0.010)	0.116*** (0.008)	0.116*** (0.008)
State expanded Medicaid	0.010 (0.010)	0.010 (0.010)	0.009 (0.010)	0.009 (0.010)	0.034*** (0.006)	0.035*** (0.006)
Male	0.003 (0.005)	0.003 (0.005)	-0.005 (0.005)	-0.005 (0.005)	0.002 (0.008)	0.002 (0.008)
Couple has children	0.171*** (0.011)	0.170*** (0.011)	0.167*** (0.011)	0.166*** (0.011)	0.166*** (0.011)	0.165*** (0.011)
Number of children	0.037*** (0.005)	0.037*** (0.005)	0.037*** (0.005)	0.037*** (0.005)	0.032*** (0.006)	0.032*** (0.006)
Oldest partner's age	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.009*** (0.000)	0.009*** (0.000)
Partners' age difference	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)
Most educated partner's years of education	0.006*** (0.001)	0.006*** (0.001)	0.001 (0.001)	0.001 (0.001)	-0.007*** (0.002)	-0.007*** (0.002)
Partners' education difference	-0.002 (0.001)	-0.002 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.005*** (0.001)	0.005*** (0.001)
Partners are the same race	0.037*** (0.006)	0.037*** (0.006)	0.037*** (0.006)	0.037*** (0.006)	0.032*** (0.006)	0.032*** (0.006)
Partners' earnings split			0.055*** (0.012)	0.057*** (0.012)	0.061*** (0.012)	0.063*** (0.012)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses. All specifications also include year and state fixed effects. In specifications using expanded income controls, the earnings measures are based on reported earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and are calculated from reported income from all available sources, number of children, and state of residence. The federal marriage subsidy variable is the marriage subsidy only from the federal tax code, and the state marriage subsidy variable is the marriage subsidy only from the state tax code. The mean marriage rate is 0.245 pre-*Windsor*, 0.354 post-*Windsor* and pre-*Obergefell*, and 0.526 post-*Obergefell*.

Table A9
Heterogeneous Reduced Form Estimates by Treatment Effect

	No income controls		Expanded income controls			
Outcome: Married						
Predicted marriage subsidy × pre-*Windsor*	-0.009 (0.043)		-0.009 (0.043)		0.003 (0.044)	
Predicted marriage subsidy × post-*Windsor*, pre-*Obergefell*	0.004* (0.002)		0.004 (0.003)		0.006** (0.003)	
Predicted marriage subsidy × post-*Obergefell*	0.004** (0.002)		0.003 (0.002)		0.006** (0.002)	
Predicted fed. marriage subsidy ($1,000s)		0.006*** (0.002)		0.006** (0.002)		0.007*** (0.003)
Precited st. marriage subsidy ($1,000s)		-0.007 (0.007)		-0.006 (0.007)		0.000 (0.007)
Legal marriage	0.066*** (0.010)	0.066*** (0.010)	0.066*** (0.010)	0.066*** (0.010)	0.117*** (0.008)	0.117*** (0.008)
State expanded Medicaid	0.010 (0.010)	0.010 (0.010)	0.010 (0.010)	0.010 (0.010)	0.036*** (0.006)	0.036*** (0.006)
Male	0.003 (0.005)	0.003 (0.005)	-0.001 (0.005)	-0.001 (0.005)	0.005 (0.008)	0.004 (0.008)
Couple has children	0.171*** (0.011)	0.170*** (0.011)	0.170*** (0.012)	0.170*** (0.012)	0.170*** (0.012)	0.171*** (0.012)
Number of children	0.038*** (0.005)	0.038*** (0.005)	0.037*** (0.005)	0.037*** (0.005)	0.030*** (0.006)	0.030*** (0.006)
Oldest partner's age	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.009*** (0.000)	0.009*** (0.000)
Partners' age difference	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)
Most educated partner's years of education	0.006*** (0.001)	0.006*** (0.001)	0.004** (0.002)	0.004** (0.002)	-0.003 (0.002)	-0.003 (0.002)
Partners' education difference	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.002 (0.001)	0.003** (0.001)	0.003** (0.001)
Partners are the same race	0.037*** (0.006)	0.037*** (0.006)	0.037*** (0.006)	0.037*** (0.006)	0.033*** (0.006)	0.032*** (0.006)
Partners' earnings split			0.034* (0.019)	0.030 (0.020)	0.055** (0.022)	0.053** (0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses. All specifications also include year and state fixed effects. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All specifications use the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence) as the main explanatory variable. All marriage subsidy variables are measured in $1,000s. The federal marriage subsidy variable is the marriage subsidy only from the federal tax code, and the state marriage subsidy variable is the marriage subsidy only from the state tax code. The mean marriage rate is 0.245 pre-*Windsor*, 0.354 post-*Windsor* and pre-*Obergefell*, and 0.526 post-*Obergefell*.

Table A10
Full Results: Heterogeneous IV Estimates by Treatment Effect

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy × pre-*Windsor*	-0.013		-0.013		0.023	
	(0.096)		(0.097)		(0.099)	
Marriage subsidy × post-*Windsor*, pre-*Obergefell*	0.008*		0.009		0.015**	
	(0.004)		(0.006)		(0.006)	
Marriage subsidy × post-*Obergefell*	0.008**		0.008		0.014***	
	(0.004)		(0.005)		(0.006)	
Fed. marriage subsidy ($1,000s)		0.012***		0.015**		0.022***
		(0.004)		(0.007)		(0.008)
St. marriage subsidy ($1,000s)		-0.013		-0.014		-0.004
		(0.013)		(0.014)		(0.012)
Legal marriage	0.066***	0.067***	0.066***	0.067***	0.116***	0.117***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)
State expanded Medicaid	0.010	0.011	0.010	0.011	0.034***	0.035***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.006)	(0.006)
Male	0.003	0.004	-0.002	-0.001	0.003	0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.009)	(0.009)
Couple has children	0.176***	0.175***	0.176***	0.177***	0.181***	0.186***
	(0.012)	(0.012)	(0.013)	(0.013)	(0.014)	(0.014)
Number of children	0.037***	0.036***	0.035***	0.034***	0.029***	0.029***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.009***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.009***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Most educated partner's years of education	0.006***	0.007***	0.004**	0.004**	-0.004	-0.004*
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Partners' education difference	-0.002*	-0.003**	-0.002	-0.002	0.003**	0.003*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.037***	0.037***	0.037***	0.038***	0.033***	0.033***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.032	0.024	0.057***	0.054**
			(0.020)	(0.021)	(0.022)	(0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient 1	0.446***	0.462***	0.445***	0.363***	0.444***	0.337***
	(0.056)	(0.028)	(0.056)	(0.033)	(0.055)	(0.031)
	[92.204]	[359.017]	[94.762]	[146.678]	[105.674]	[121.857]
1^{st} stage coefficient 2	0.497***	0.561***	0.473***	0.571***	0.473***	0.630***
	(0.031)	(0.021)	(0.034)	(0.021)	(0.033)	(0.021)
	[296.775]	[1,129.643]	[193.728]	[880.175]	[219.990]	[672.345]
1^{st} stage coefficient 3	0.480***		0.449***		0.461***	
	(0.026)		(0.030)		(0.028)	
	[375.200]		[217.123]		[261.937]	
Observations	37,234	37,234	37,234	37,234	37,234	37,234

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 include year and state fixed effects. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s. The federal marriage subsidy variable is the marriage subsidy only from the federal tax code, and the state marriage subsidy variable is the marriage subsidy only from the state tax code. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence). The reported first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted Marriage Subsidy × pre-*Windsor* variable using the outcome Observed Marriage Subsidy × pre-*Windsor*. "Coefficient 2" in column 1 is the coefficient of the Predicted Marriage Subsidy × post-*Windsor*, pre-*Obergefell* variable using the outcome Observed Marriage Subsidy × post-*Windsor*, pre-*Obergefell*, and so on. The mean marriage rate is 0.245 pre-*Windsor*, 0.354 post-*Windsor* and pre-*Obergefell*, and 0.526 post-*Obergefell*.

Table A11
Bootstrapped Heterogeneous IV Estimates by Treatment Effect

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy × pre-*Windsor*	-0.013 (0.100)		-0.013 (0.101)		0.029 (0.103)	
Marriage subsidy × post-*Windsor*, pre-*Obergefell*	0.008* (0.005)		0.009 (0.006)		0.018** (0.007)	
Marriage subsidy × post-*Obergefell*	0.008** (0.004)		0.008* (0.005)		0.017*** (0.006)	
Fed. marriage subsidy ($1,000s)		0.012*** (0.004)		0.015** (0.006)		0.025*** (0.008)
St. marriage subsidy ($1,000s)		-0.013 (0.014)		-0.014 (0.014)		-0.007 (0.014)
Legal marriage	0.066*** (0.010)	0.067*** (0.010)	0.066*** (0.010)	0.067*** (0.010)	0.113*** (0.008)	0.113*** (0.008)
State expanded Medicaid	0.010 (0.010)	0.011 (0.010)	0.010 (0.010)	0.011 (0.010)	0.032*** (0.007)	0.031*** (0.007)
Male	0.003 (0.005)	0.004 (0.005)	-0.002 (0.005)	-0.001 (0.005)	0.004 (0.008)	0.003 (0.008)
Couple has children	0.176*** (0.012)	0.175*** (0.012)	0.176*** (0.013)	0.177*** (0.013)	0.188*** (0.014)	0.191*** (0.015)
Number of children	0.037*** (0.005)	0.036*** (0.005)	0.035*** (0.005)	0.034*** (0.005)	0.029*** (0.006)	0.029*** (0.006)
Oldest partner's age	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)
Partners' age difference	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.009*** (0.000)	-0.009*** (0.000)
Most educated partner's years of education	0.006*** (0.001)	0.007*** (0.001)	0.004** (0.002)	0.004** (0.002)	0.002 (0.002)	0.001 (0.002)
Partners' education difference	-0.002* (0.001)	-0.003** (0.001)	-0.002 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Partners are the same race	0.037*** (0.006)	0.037*** (0.006)	0.037*** (0.006)	0.038*** (0.006)	0.036*** (0.006)	0.036*** (0.006)
Partners' earnings split			0.032 (0.020)	0.024 (0.021)	0.061*** (0.022)	0.056** (0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient 1	0.382*** (0.059) [92.204]	0.396*** (0.038) [359.017]	0.378*** (0.059) [94.762]	0.266*** (0.048) [146.678]	0.375*** (0.058) [97.746]	0.218*** (0.044) [114.705]
1^{st} stage coefficient 2	0.434*** (0.040) [296.775]	0.558*** (0.020) [1,129.643]	0.391*** (0.049) [193.728]	0.564*** (0.021) [880.175]	0.380*** (0.043) [158.073]	0.573*** (0.020) [880.521]
1^{st} stage coefficient 3	0.469*** (0.030) [375.200]		0.428*** (0.034) [217.123]		0.412*** (0.031) [178.814]	
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Bootstrapped robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications also include year and state fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, the partners' ages and education levels, and for whether the couple's state of residence expanded Medicaid under the Affordable Care Act. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s. The federal marriage subsidy variable is the marriage subsidy only from the federal tax code, and the state marriage subsidy variable is the marriage subsidy only from the state tax code. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence). The reported first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted Marriage Subsidy × pre-*Windsor* variable using the outcome Observed Marriage Subsidy × pre-*Windsor*. "Coefficient 2" in column 1 is the coefficient of the Predicted Marriage Subsidy × post-*Windsor*, pre-*Obergefell* variable using the outcome Observed Marriage Subsidy × post-*Windsor*, pre-*Obergefell*, and so on. The mean marriage rate is 0.245 pre-*Windsor*, 0.354 post-*Windsor* and pre-*Obergefell*, and 0.526 post-*Obergefell*.

Table A12
Heterogeneous OLS Estimates by Presence of Children and Sex

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy × couple has children	0.005***		0.004***		0.005***	
	(0.001)		(0.001)		(0.001)	
Marriage subsidy × childless couple	0.005***		0.004***		0.004***	
	(0.001)		(0.002)		(0.002)	
Marriage subsidy × male		0.003***		0.003***		0.003***
		(0.001)		(0.001)		(0.001)
Marriage subsidy × fem.		0.006**		0.005**		0.006**
		(0.003)		(0.003)		(0.003)
Legal marriage	0.066***	0.066***	0.066***	0.066***	0.116***	0.116***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)
State expanded Medicaid	0.010	0.010	0.009	0.009	0.035***	0.035***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.006)	(0.006)
Male	0.003	0.004	-0.005	-0.004	0.002	0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)
Couple has children	0.171***	0.171***	0.167***	0.167***	0.165***	0.165***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Number of children	0.037***	0.037***	0.037***	0.037***	0.032***	0.032***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.009***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Most educated partner's years of education	0.006***	0.006***	0.001	0.001	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Partners' education difference	-0.002	-0.002	-0.000	-0.000	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.037***	0.037***	0.037***	0.037***	0.032***	0.032***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.057***	0.057***	0.063***	0.063***
			(0.012)	(0.013)	(0.012)	(0.013)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses. All specifications also include year and state fixed effects. In specifications using expanded income controls, the earnings measures are based on reported earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in \$1,000s and are calculated from reported income from all available sources, number of children, and state of residence. All marriage subsidy variables include both federal and state taxes. The mean marriage rate is 0.597 among couples with children, 0.385 among childless couples, 0.414 among male couples, and 0.451 among female couples.

Table A13
Heterogeneous Reduced Form Estimates by Presence of Children and Sex

	No income controls		Expanded income controls			
Outcome: Married						
Predicted marriage subsidy × couple has children	0.001		0.001		0.003	
	(0.002)		(0.002)		(0.003)	
Predicted marriage subsidy × childless couple	0.005***		0.005**		0.009***	
	(0.002)		(0.002)		(0.003)	
Predicted marriage subsidy × male		-0.001		-0.001		0.001
		(0.002)		(0.002)		(0.002)
Predicted marriage subsidy × fem.		0.011***		0.010***		0.012***
		(0.002)		(0.002)		(0.003)
Legal marriage	0.066***	0.066***	0.066***	0.066***	0.117***	0.118***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)
State expanded Medicaid	0.010	0.010	0.010	0.010	0.035***	0.036***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.006)	(0.006)
Male	0.003	0.006	-0.001	0.002	0.004	0.009
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.009)
Couple has children	0.168***	0.176***	0.168***	0.175***	0.168***	0.175***
	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Number of children	0.038***	0.038***	0.037***	0.037***	0.031***	0.030***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.009***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Most educated partner's years of education	0.006***	0.006***	0.004**	0.004***	-0.003	-0.003
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Partners' education difference	-0.002	-0.002*	-0.001	-0.002	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.037***	0.037***	0.037***	0.037***	0.033***	0.032***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.030	0.029	0.052**	0.048**
			(0.020)	(0.019)	(0.022)	(0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses. All specifications also include year and state fixed effects. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All specifications use the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence) as the main explanatory variable. All marriage subsidy variables are measured in $1,000s. All marriage subsidy variables include both federal and state taxes. The mean marriage rate is 0.597 among couples with children, 0.385 among childless couples, 0.414 among male couples, and 0.451 among female couples.

Table A14

Full Results: Heterogeneous IV Estimates by Presence of Children and Sex

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy × couple has children	0.003 (0.004)		0.004 (0.005)		0.008 (0.006)	
Marriage subsidy × childless couple	0.011*** (0.004)		0.013** (0.006)		0.021*** (0.006)	
Marriage subsidy × male		-0.002 (0.003)		-0.002 (0.005)		0.004 (0.005)
Marriage subsidy × fem.		0.025*** (0.005)		0.024*** (0.007)		0.030*** (0.007)
Legal marriage	0.066*** (0.010)	0.068*** (0.010)	0.066*** (0.010)	0.068*** (0.010)	0.115*** (0.008)	0.117*** (0.008)
State expanded Medicaid	0.010 (0.010)	0.009 (0.010)	0.010 (0.010)	0.009 (0.010)	0.033*** (0.006)	0.034*** (0.006)
Male	0.002 (0.005)	0.012** (0.005)	-0.003 (0.005)	0.008 (0.006)	0.002 (0.009)	0.014 (0.009)
Couple has children	0.173*** (0.012)	0.186*** (0.012)	0.174*** (0.013)	0.185*** (0.014)	0.178*** (0.013)	0.189*** (0.014)
Number of children	0.038*** (0.005)	0.035*** (0.005)	0.036*** (0.005)	0.034*** (0.005)	0.031*** (0.006)	0.028*** (0.006)
Oldest partner's age	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.009*** (0.000)	0.009*** (0.000)
Partners' age difference	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.009*** (0.001)	-0.008*** (0.001)
Most educated partner's years of education	0.006*** (0.001)	0.006*** (0.001)	0.004** (0.002)	0.004** (0.002)	-0.004* (0.002)	-0.003 (0.002)
Partners' education difference	-0.003** (0.001)	-0.002** (0.001)	-0.002* (0.001)	-0.002* (0.001)	0.003* (0.001)	0.002* (0.001)
Partners are the same race	0.038*** (0.006)	0.036*** (0.006)	0.038*** (0.006)	0.036*** (0.006)	0.034*** (0.006)	0.032*** (0.006)
Partners' earnings split			0.028 (0.020)	0.029 (0.020)	0.052** (0.022)	0.052** (0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient 1	0.469*** (0.037) [179.320]	0.549*** (0.032) [341.861]	0.457*** (0.038) [199.452]	0.492*** (0.035) [205.288]	0.448*** (0.037) [233.548]	0.506*** (0.033) [244.447]
1^{st} stage coefficient 2	0.463*** (0.026) [323.643]	0.410*** (0.022) [382.049]	0.415*** (0.031) [189.489]	0.405*** (0.024) [255.910]	0.431*** (0.029) [240.711]	0.402*** (0.024) [292.100]
Observations	37,234	37,234	37,234	37,234	37,234	37,234

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 include year and state fixed effects. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence). The reported first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted Marriage Subsidy × Has Children variable using the outcome Observed Marriage Subsidy × Has Children. "Coefficient 2" in column 1 is the coefficient of the Predicted Marriage Subsidy × Childless variable using the outcome Observed Marriage Subsidy × Childless, and so on. The mean marriage rate is 0.597 among couples with children, 0.385 among childless couples, 0.414 among male couples, and 0.451 among female couples.

Table A15
Bootstrapped Heterogeneous IV Estimates by Presence of Children and Sex

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy × couple has children	0.003 (0.005)		0.004 (0.005)		0.012** (0.006)	
Marriage subsidy × childless couple	0.011*** (0.004)		0.013** (0.006)		0.024*** (0.007)	
Marriage subsidy × male		-0.002 (0.003)		-0.002 (0.004)		0.007 (0.006)
Marriage subsidy × fem.		0.025*** (0.005)		0.024*** (0.006)		0.032*** (0.007)
Legal marriage	0.066*** (0.010)	0.068*** (0.010)	0.066*** (0.010)	0.068*** (0.010)	0.113*** (0.008)	0.113*** (0.008)
State expanded Medicaid	0.010 (0.010)	0.009 (0.010)	0.010 (0.010)	0.009 (0.010)	0.031*** (0.007)	0.031*** (0.007)
Male	0.002 (0.005)	0.012** (0.005)	-0.003 (0.005)	0.008 (0.005)	0.002 (0.008)	0.013 (0.008)
Couple has children	0.173*** (0.012)	0.186*** (0.012)	0.174*** (0.013)	0.185*** (0.013)	0.186*** (0.014)	0.195*** (0.014)
Number of children	0.038*** (0.005)	0.035*** (0.005)	0.036*** (0.005)	0.034*** (0.005)	0.030*** (0.006)	0.028*** (0.006)
Oldest partner's age	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)
Partners' age difference	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.008*** (0.000)	-0.009*** (0.000)	-0.008*** (0.000)
Most educated partner's years of education	0.006*** (0.001)	0.006*** (0.001)	0.004** (0.002)	0.004** (0.002)	0.001 (0.002)	0.002 (0.002)
Partners' education difference	-0.003** (0.001)	-0.002** (0.001)	-0.002 (0.001)	-0.002* (0.001)	-0.001 (0.001)	-0.001 (0.001)
Partners are the same race	0.038*** (0.006)	0.036*** (0.006)	0.038*** (0.006)	0.036*** (0.006)	0.037*** (0.006)	0.035*** (0.006)
Partners' earnings split			0.028 (0.020)	0.029 (0.020)	0.058*** (0.022)	0.057*** (0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient 1	0.381*** (0.047) [179.320]	0.519*** (0.040) [341.861]	0.354*** (0.051) [199.452]	0.435*** (0.049) [205.288]	0.344*** (0.048) [177.780]	0.420*** (0.044) [170.477]
1^{st} stage coefficient 2	0.456*** (0.031) [323.643]	0.377*** (0.024) [382.049]	0.408*** (0.037) [189.489]	0.370*** (0.025) [255.910]	0.384*** (0.034) [159.898]	0.354*** (0.024) [213.943]
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Bootstrapped robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications also include year and state fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, the partners' ages and education levels, and for whether the couple's state of residence expanded Medicaid under the Affordable Care Act. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence). The reported first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted Marriage Subsidy × Has Children variable using the outcome Observed Marriage Subsidy × Has Children. "Coefficient 2" in column 1 is the coefficient of the Predicted Marriage Subsidy × Childless variable using the outcome Observed Marriage Subsidy × Childless, and so on. The mean marriage rate is 0.597 among couples with children, 0.385 among childless couples, 0.414 among male couples, and 0.451 among female couples.

Table A16
OLS Estimates Using State-by-Year Fixed Effects

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy ($1,000s)	0.005***		0.004***		0.004***	
	(0.001)		(0.001)		(0.001)	
Fed. marriage subsidy ($1,000s)		0.005***		0.005***		0.005***
		(0.001)		(0.001)		(0.001)
St. marriage subsidy ($1,000s)		0.001		-0.003		-0.003
		(0.006)		(0.005)		(0.006)
Male	0.002	0.003	-0.006	-0.006	0.002	0.002
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)
Couple has children	0.169***	0.169***	0.166***	0.165***	0.162***	0.161***
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Number of children	0.037***	0.037***	0.037***	0.037***	0.033***	0.034***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.008***	0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Most educated partner's years of education	0.006***	0.006***	0.001	0.001	-0.006***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Partners' education difference	-0.002	-0.002	-0.000	-0.000	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.036***	0.036***	0.036***	0.036***	0.035***	0.035***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.056***	0.056***	0.063***	0.062***
			(0.012)	(0.012)	(0.012)	(0.012)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses. All specifications also include state-by-year fixed effects. In specifications using expanded income controls, the earnings measures are based on reported earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and are calculated from reported income from all available sources, number of children, and state of residence. All marriage subsidy variables include both federal and state taxes.

Table A17
Reduced Form Estimates Using State-by-Year Fixed Effects

	No income controls		Expanded income controls			
Outcome: Married						
Predicted marriage subsidy ($1,000s)	0.003**		0.003*		0.005**	
	(0.001)		(0.002)		(0.002)	
Predicted fed. marriage subsidy ($1,000s)		0.005***		0.005**		0.008***
		(0.002)		(0.002)		(0.003)
Predicted st. marriage subsidy ($1,000s)		-0.008		-0.007		-0.010
		(0.007)		(0.008)		(0.008)
Male	0.003	0.003	-0.001	-0.001	0.007	0.006
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.009)
Couple has children	0.169***	0.168***	0.168***	0.168***	0.165***	0.166***
	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Number of children	0.038***	0.038***	0.037***	0.037***	0.032***	0.032***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.009***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Most educated partner's years of education	0.006***	0.006***	0.004**	0.004**	-0.003	-0.003
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Partners' education difference	-0.002	-0.002	-0.001	-0.001	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.036***	0.036***	0.036***	0.036***	0.036***	0.036***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.032	0.027	0.049**	0.044**
			(0.019)	(0.020)	(0.022)	(0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
Observations	37,234	37,234	37,234	37,234	37,234	37,234

Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses. All specifications also include state-by-year fixed effects. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All specifications use the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence) as the main explanatory variable. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes.

Table A18
Full Results: IV Estimates Using State-by-Year Fixed Effects

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy ($1,000s)	0.007**		0.008*		0.011**	
	(0.003)		(0.005)		(0.006)	
Fed. marriage subsidy ($1,000s)		0.011***		0.015**		0.022***
		(0.004)		(0.007)		(0.008)
St. marriage subsidy ($1,000s)		-0.015		-0.017		-0.023*
		(0.014)		(0.014)		(0.014)
Male	0.002	0.003	-0.002	-0.001	0.005	0.004
	(0.005)	(0.005)	(0.005)	(0.005)	(0.009)	(0.009)
Couple has children	0.174***	0.173***	0.174***	0.176***	0.174***	0.179***
	(0.012)	(0.012)	(0.013)	(0.013)	(0.014)	(0.014)
Number of children	0.037***	0.037***	0.035***	0.035***	0.031***	0.031***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.009***	0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Most educated partner's years of education	0.006***	0.006***	0.004**	0.004**	-0.003	-0.004
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Partners' education difference	-0.002*	-0.002*	-0.002	-0.002	0.003*	0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.036***	0.036***	0.036***	0.036***	0.036***	0.036***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.030	0.021	0.051**	0.043*
			(0.020)	(0.021)	(0.022)	(0.022)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient 1	0.464***	0.461***	0.407***	0.359***	0.401***	0.343***
	(0.021)	(0.029)	(0.028)	(0.033)	(0.026)	(0.031)
	[472.529]	[349.573]	[216.694]	[140.324]	[230.932]	[141.042]
1^{st} stage coefficient 2		0.554***		0.565***		0.570***
		(0.021)		(0.022)		(0.021)
		[1,041.797]		[786.759]		[727.457]
Observations	37,234	37,234	37,234	37,234	37,234	37,234

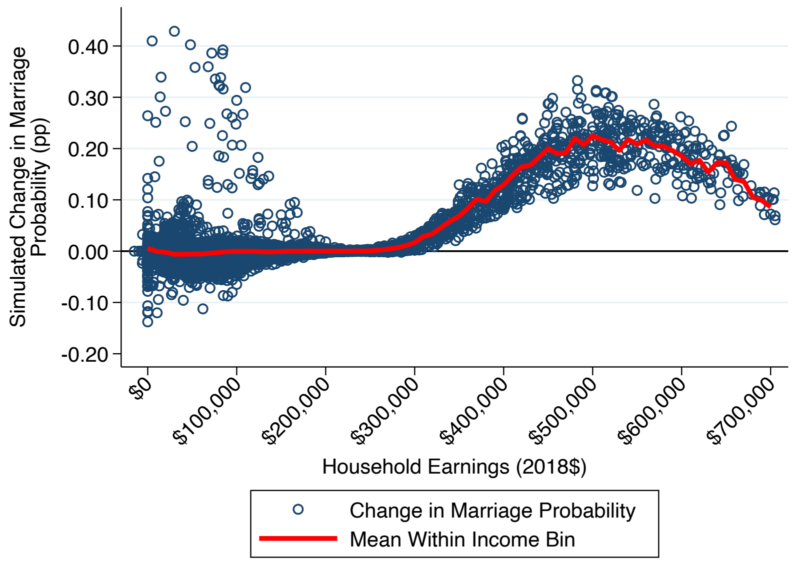
Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications also include state-by-year fixed effects. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence). The reported first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 2 is the coefficient of the Predicted Federal Marriage Subsidy variable using the outcome Observed Federal Marriage Subsidy. "Coefficient 2" in column 2 is the coefficient of the Predicted State Marriage Subsidy variable using the outcome Observed State Marriage Subsidy, and so on.

Table A19
Bootstrapped IV Estimates Using State-by-Year Fixed Effects

	No income controls		Expanded income controls			
Outcome: Married						
Marriage subsidy ($1,000s)	0.007**		0.008*		0.018***	
	(0.003)		(0.005)		(0.006)	
Fed. marriage subsidy ($1,000s)		0.011***		0.015**		0.029***
		(0.004)		(0.006)		(0.008)
St. marriage subsidy ($1,000s)		-0.015		-0.017		-0.022
		(0.014)		(0.014)		(0.015)
Male	0.002	0.003	-0.002	-0.001	0.003	0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.008)
Couple has children	0.174***	0.173***	0.174***	0.176***	0.185***	0.190***
	(0.012)	(0.012)	(0.013)	(0.013)	(0.015)	(0.015)
Number of children	0.037***	0.037***	0.035***	0.035***	0.030***	0.030***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Oldest partner's age	0.008***	0.008***	0.008***	0.008***	0.008***	0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partners' age difference	-0.008***	-0.008***	-0.008***	-0.008***	-0.008***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Most educated partner's years of education	0.006***	0.006***	0.004**	0.004**	0.002	0.001
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Partners' education difference	-0.002*	-0.002*	-0.002	-0.002	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Partners are the same race	0.036***	0.036***	0.036***	0.036***	0.037***	0.038***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Partners' earnings split			0.030	0.021	0.060***	0.050**
			(0.020)	(0.021)	(0.022)	(0.023)
Additional controls for:						
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.432	0.432	0.432	0.432	0.432
1^{st} stage coefficient 1	0.427***	0.397***	0.341***	0.264***	0.296***	0.216***
	(0.026)	(0.038)	(0.036)	(0.048)	(0.034)	(0.044)
	[472.529]	[349.573]	[216.694]	[140.324]	[173.138]	[113.337]
1^{st} stage coefficient 2		0.549***		0.555***		0.545***
		(0.021)		(0.021)		(0.021)
		[1,041.797]		[786.759]		[734.658]
Observations	37,234	37,234	37,234	37,234	37,234	37,234

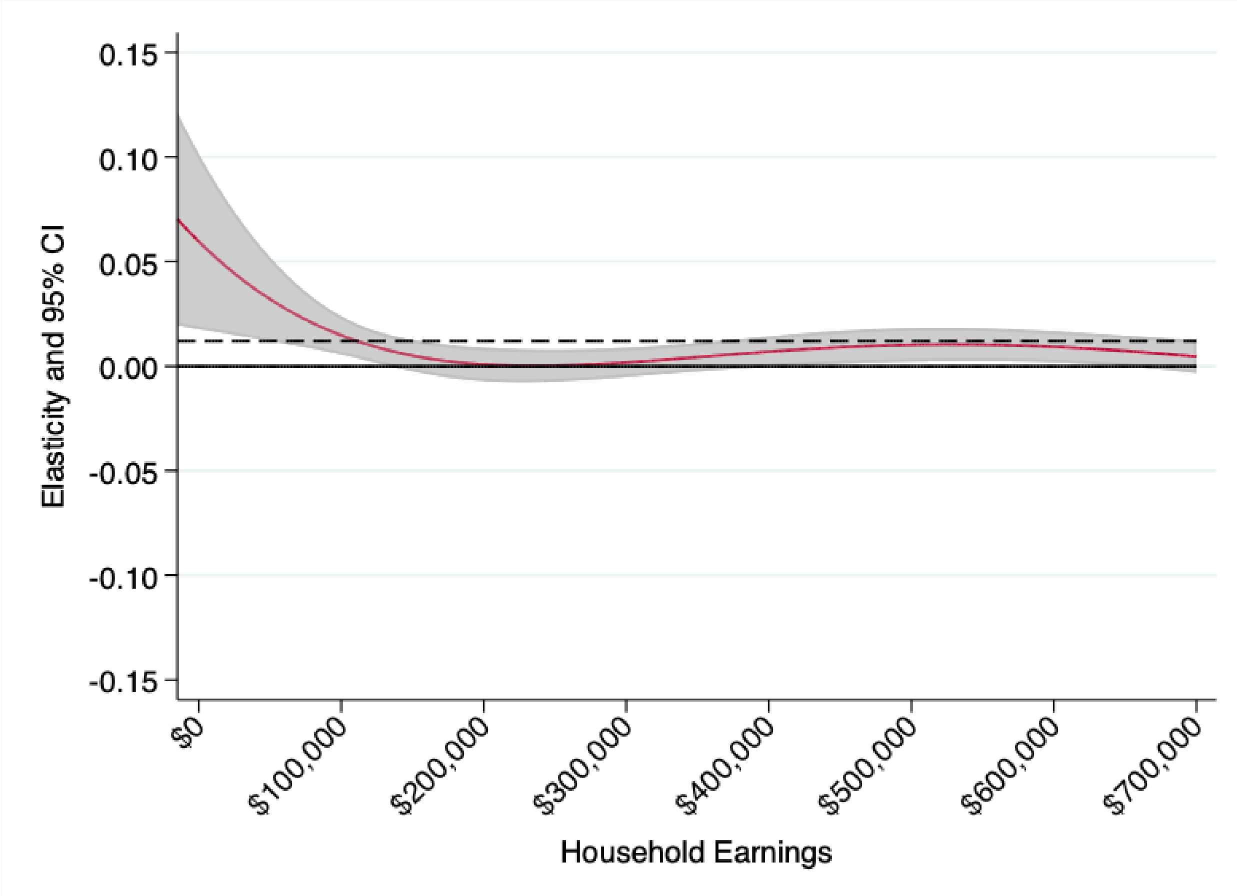
Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Bootstrapped robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications also include state-by-year fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, and the partners' ages and education levels. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s. The federal marriage subsidy variable is the marriage subsidy only from the federal tax code, and the state marriage subsidy variable is the marriage subsidy only from the state tax code. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence). The reported first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 2 is the coefficient of the Predicted Federal Marriage Subsidy variable using the outcome Observed Federal Marriage Subsidy. "Coefficient 2" in column 2 is the coefficient of the Predicted State Marriage Subsidy variable using the outcome Observed State Marriage Subsidy, and so on.

Figure A3
Implied Changes in the Probability of Being Married Due to the Tax Cuts and Jobs Act



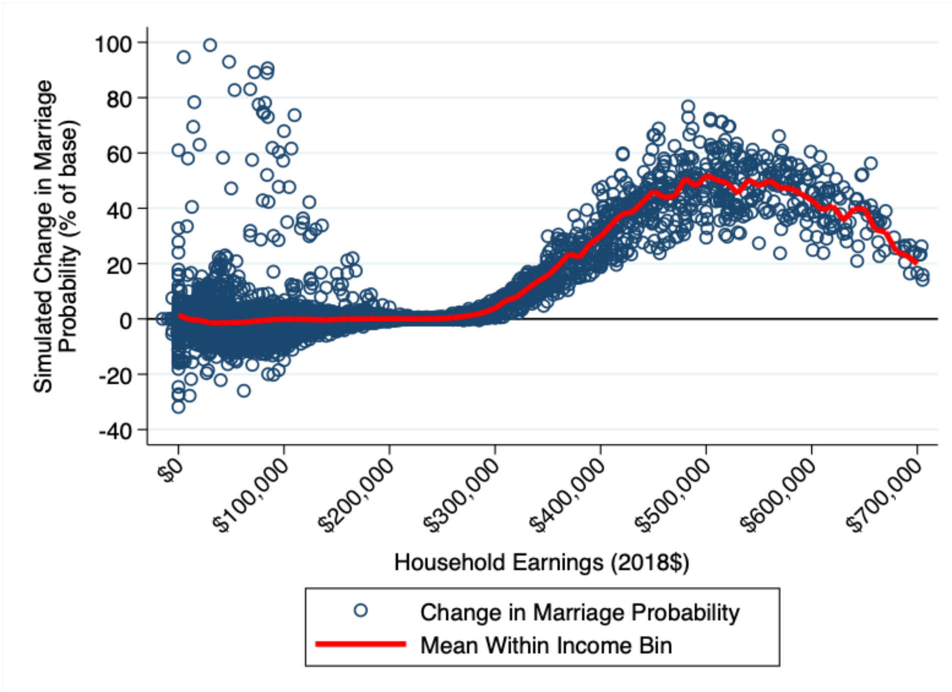
Notes: The figure translates the dollar change in the marriage subsidy due to the 2018 Tax Cuts and Jobs Act among same-sex cohabiting couples in our sample into a marriage effect based on point estimates from our household earnings heterogeneity specification (elasticities displayed in Figure 4). The baseline marriage rate in the sample is 0.432. We trim off outlier data points in this figure (those whose simulated changes are greater than 100% or less than -40%) for presentation purposes only.

Figure A4
Bootstrapped Heterogeneous Marriage Subsidy Elasticities by Household Earnings



Notes: The figure displays the marriage subsidy elasticity estimate (red line) and 95% confidence intervals (grey area) implied by point estimates from a bootstrapped instrumental variables specification that interacts the marriage subsidy with a 5^{th}-order polynomial in household earned income. The dashed black line represents our baseline elasticity estimate of 0.021 from column 6 of Table 3. This specification includes all baseline covariates described in the text in addition to the un-interacted 5^{th}-order polynomial in household earned income, but does not include the other expanded income controls. We trim off elasticities for couples earning more than $700,000 for presentation purposes only.

Figure A5
Bootstrapped Implied Changes in the Probability of Being Married Due to the Tax Cuts and Jobs Act



Notes: The figure translates the dollar change in the marriage subsidy due to the 2018 Tax Cuts and Jobs Act among same-sex cohabiting couples in our sample into a marriage effect based on point estimates from our bootstrapped household earnings heterogeneity specification (elasticities displayed in Figure A4). The baseline marriage rate in the sample is 0.433. We trim off outlier data points in this figure (those whose simulated changes are greater than 100% or less than -40%) for presentation purposes only.

References

Sanderson, Eleanor, and Frank Windmeijer. 2016. "A weak instrument F-test in linear IV models with multiple endogenous variables." *Journal of Econometrics* 190 (2): 212–221.

Young, Alwyn. 2021. "Leverage, Heteroskedasticity and Instrumental Variables in Practical Application." *Working Paper.*

B Appendix: Supplementary Analysis

This appendix contains supplementary analysis, including implied standard errors from prior studies, examining our assumption of a linear effect of the marriage subsidy on marriage, details about the LASSO regressors and fit, details about the Mincer prediction process, examining dynamic responses to federal and state marriage recognition, heterogeneous effects by the state's method of legalization, examining the driving forces behind the similar coefficients we estimate when ignoring the cohabitation indicator in Section 5, heterogeneity by whether the couple expects a federal subsidy or penalty, an event study placebo test, further details about our estimates' robustness to employer-sponsored health insurance, and further details about our estimates' robustness to the Affordable Care Act's premium tax credits.

B.1 Standard Errors Suggested by Prior Studies

This section contains details of a calculation we used to approximate what standard errors we would have arrived at if same-sex couples had experienced a tax reform similar to the tax reforms in the studies cited in Table 1.

To determine approximately what standard errors we would have obtained if same-sex couples had been exposed to the smaller magnitude of variation that was used in these prior studies, we used the approximation that the standard error of our coefficient is $SE(\hat{\beta}) \approx \frac{\text{SD(Married)}}{\sqrt{N}\cdot\text{SD(Marriage Subsidy)}}$, where SD(Married) is the standard deviation of our outcome variable, N is our sample size, and SD(Marriage Subsidy) is the standard deviation of the marriage subsidy. By replacing SD(Marriage Subsidy) with the appropriate measure from prior studies, but retaining our SD(Married) and N, we can approximate what our standard error would have been if same-sex couples had experienced a tax reform of similar magnitude to those in prior studies.

This calculation is not possible for Alm and Whittington (1995a, 1995b), Ellwood (2000), Michelmore (2018), and Gayle and Shephard (2019) because the authors do not report enough information. We focus on the remaining papers, Sjoquist and Walker (1995), Alm and Whittington (1999), Eissa and Hoynes (2003), Light and Omori (2008), and Fisher (2013), which use measures of the marriage subsidy that are comparable to our own. We try this in two different ways. First, we use the variance of the observed marriage subsidy in our sample. Second, taking account of our IV strategy, we use the variance of the predicted marriage subsidy. Note that this does not take account of the role of other covariates in reducing standard errors in our regressions.

Appendix Table B1 displays these calculations. These approximations suggest that our raw variation is larger, sometimes by about double and sometimes by an order of magnitude, and we would have obtained larger standard errors if we were estimating an OLS regression in all five contexts. If, instead, we compare our compressed variation in the first stage fitted value of the marriage subsidy (SD($\widehat{\text{Marriage Subsidy}}$=1,080) to the variation in prior studies, then our variation is now half as large as in three of the studies. Consequently, we would have obtained larger standard errors only compared to two. This demonstrates that the variation in the marriage subsidy resulting from same-sex marriage legalization and federal recognition is far larger than the variation leveraged in prior studies, and that we use some of it up in our IV strategy.

Table B1
Implied Standard Errors in Marriage-Subsidy Studies

Study	SD(Marriage Subsidy)	Approximate SE($\hat{\beta}$)
Sjoquist and Walker (1995)	197	0.0131
Alm and Whittington (1999)	2,290	0.0011
Eissa and Hoynes (2003)	2,269	0.0011
Light and Omori (2008)	180	0.0143
Fisher (2013)	2,868	0.0009
Friedberg and Isaac (2020)	**Observed: 4,161**	**0.0006**
	Fitted values: 1,080	**0.0024**

Notes: These calculations are based off the approximation that the standard error of the coefficient is $SE(\hat{\beta}) \approx \frac{\text{SD(Married)}}{\sqrt{N}\cdot\text{SD(Marriage Subsidy)}}$, where SD(Married) is the standard deviation of the outcome variable, N is the sample size, and SD(Marriage Subsidy) is the standard deviation of the marriage subsidy. We replace SD(Marriage Subsidy) with the appropriate measure from prior studies, but retain our SD(Married)$= 0.495$ and $N = 37234$, to approximate what our standard error would have been if same-sex couples had experienced a tax reform similar to those in prior studies. The "Observed" value of 4,161 is the standard deviation of our observed marriage subsidy, which we use in our OLS specifications, and the "Fitted values" value of 1,080 is the standard deviation of our first stage fitted value marriage subsidy, which we use in our IV specifications.

B.2 Examining the Linear Effect Assumption

To assess whether our assumption of a linear effect of the marriage subsidy on marriage is reasonable, we followed Chetty, Friedman, and Rockoff (2014a, 2014b) and plotted the residualized outcome variable against the residualized first stage marriage subsidy fitted value. We residualized both variables with respect to the full set of covariates in the control function specification while omitting the first stage marriage subsidy fitted value. This residual plot non-parametrically reproduces our IV estimates of the relationship between marriage rates and the predicted marriage subsidy to determine whether a linear effect is appropriate.

Specifically, to obtain the marriage rate residuals, we estimate the following regression:

$$\text{Married}_{cst} = \beta_0 + \beta_1 X_{cst} + \delta_t + \mu_s + v_{cst} \tag{B1}$$

X_{cst} includes all the controls we use in the full control function specification except for the first stage marriage subsidy fitted value: whether the state has legalized same-sex marriage, the couple's sex, racial composition, age, education levels, presence of children, and number of children, along with whether state s expanded Medicaid under the ACA, a 5^{th}-order polynomial in the couple's predicted earnings, the couple's predicted earnings split, and the covariates with non-zero coefficients from the predicted earnings LASSO. δ_t and μ_s are year and state fixed effects, respectively.

We then compute the marriage rate residual as $\hat{\varepsilon}_M = \text{Married}_{cst} - \widetilde{\text{Married}}_{cst}$, where Married_{cst} is the observed marriage indicator and $\widetilde{\text{Married}}_{cst}$ is the predicted value from equation B1. We also add back in the sample mean marriage rate (0.432) to facilitate interpretation of the scale.

We obtain the first stage marriage subsidy fitted value residuals following the same procedure. We estimate the following regression:

$$\widehat{\text{Marriage Subsidy}}_{cst} = \beta_0 + \beta_1 X_{cst} + \delta_t + \mu_s + \nu_{cst} \tag{B2}$$

X_{cst} includes the same controls as in equation B1, and δ_t and μ_s are year and state fixed effects, respectively. We then compute the first-stage marriage subsidy fitted value residual as $\hat{\varepsilon}_S = \widehat{\text{Marriage Subsidy}}_{cst} - \widetilde{\widehat{\text{Marriage Subsidy}}}_{cst}$, where $\widehat{\text{Marriage Subsidy}}_{cst}$ is the first stage marriage subsidy fitted value and $\widetilde{\widehat{\text{Marriage Subsidy}}}_{cst}$ is the predicted value from equation B2.

Figure B1a, below, then plots $\hat{\varepsilon}_M$ on the y-axis against $\hat{\varepsilon}_S$ (in \$50 bins) on the x-axis. Each point is weighted by the number of couples in the $\hat{\varepsilon}_S$ bin, with larger circles representing more couples.

This residual plot non-parametrically reproduces our IV estimates of the relationship between marriage rates and the predicted marriage subsidy. Indeed, the linear line-of-best-fit has a slope of 0.014, which is exactly our IV estimate using the same controls in column 6 of Table 3. However, there is some slight curvature in the line of best fit in this figure, as displayed by the quadratic line-of-best-fit: for low values of the residualized first stage marriage subsidy fitted value, marriage rates fall as the residualized value rises, whereas theory predicts that marriage rates should be constant or rising.

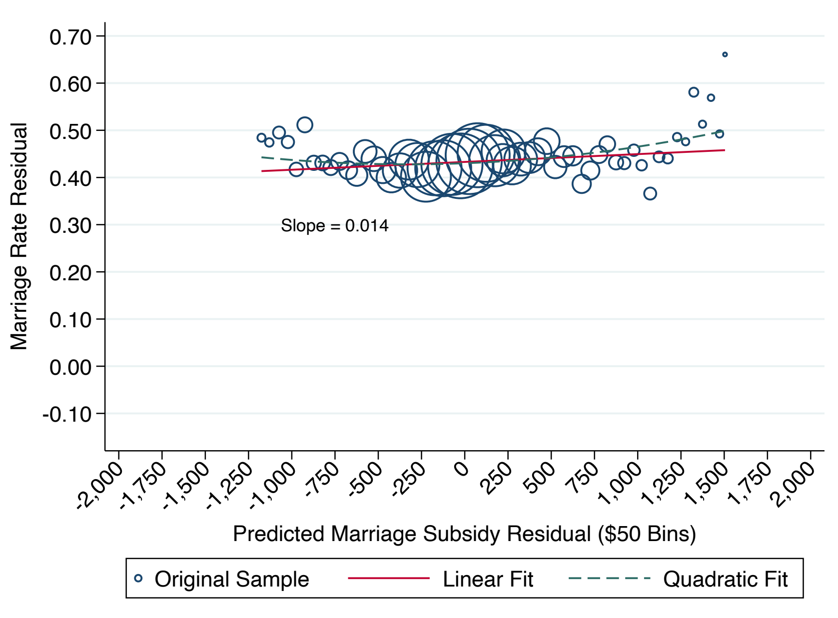
To assess the potential bias originating from a quadratic effect, we re-estimated our baseline models excluding those observations in the left and right tail of Figure B1a which are imparting some curvature to the best-fit line. Specifically, we excluded observations with marriage subsidy residual values in the bottom 2% or top 2% of the original sample, which reduced our sample size by 1,488 (from 37,234 to 35,746).

Figure B1b displays the new non-parametric residual plot using the trimmed sample, along with linear and quadratic lines of best fit. Excluding the outlier observations eliminates the curvature visible in Figure B1a and the linear line-of-best-fit has a similar slope in both the original and trimmed samples.

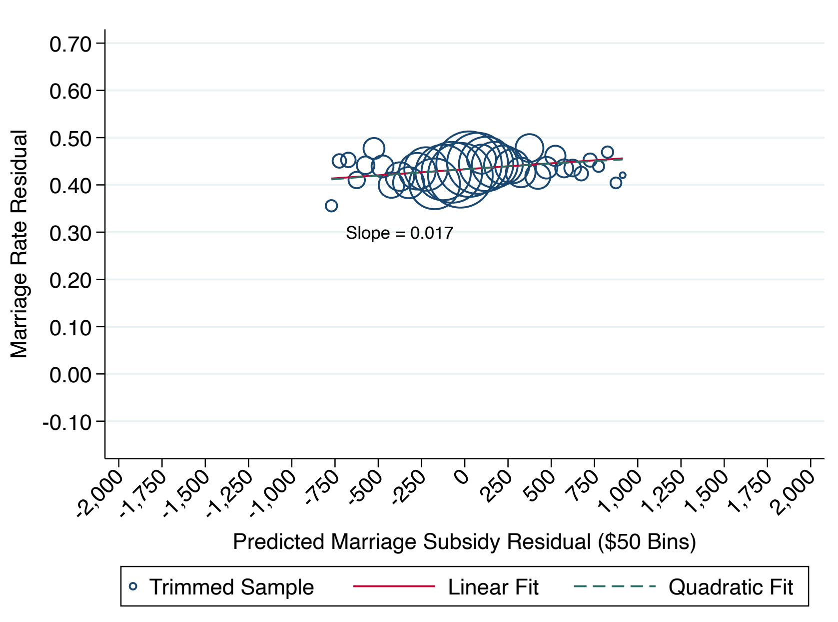
Table B2 displays coefficient estimates using this trimmed sample, alongside the original estimates. Estimates using the trimmed sample are almost the same as our original estimates, while losing some precision, apparently due to the reduction in sample size. The new coefficient estimate is 0.017 (s.e. 0.008) in our most detailed specification (versus 0.014 (0.005) using the original sample). The implied elasticity in this specification remains small, at 0.012 (versus 0.011).

We therefore use our original sample in order to increase precision. Doing so avoids introducing or exacerbating omitted variable bias (dubbed “iatrogenic” specification error by Bollinger and Chandra (2005)).

Figure B1
Marriage Rate Residuals by First Stage Marriage Subsidy Fitted Value Residuals



(a) Original Sample



(b) Trimmed Sample

Notes: The data come from the 2012–2017 waves of the American Community Survey and include same-sex married couples and same-sex cohabiting couples. Panel B1a includes the original sample, and in panel B1b we exclude observations with marriage subsidy residual values in the bottom 2% or top 2% of the original sample. The figure plots the marriage rate residual on the y-axis and the first stage marriage subsidy fitted value residual on the x-axis, where the sample mean marriage rate (0.432) has been added back in to facilitate interpretation of the y-axis scale. The residuals control for the couple's sex, racial composition, age, education levels, presence of children, and number of children, along with whether state *s* expanded Medicaid under the ACA, a 5^{th}-order polynomial in the couple's predicted earnings, the couple's predicted earnings split, the non-zero covariates from the predicted earnings LASSO, and state and year fixed effects. Households are grouped into $50 bins of their first stage marriage subsidy fitted value residual and each marriage rate residual-marriage subsidy residual cell is weighted by the number of households, with larger circles indicating more households within the cell. Each panel displays a linear line of best fit in solid red and a quadratic line of best fit in dashed green.

Table B2
IV Estimates from the Original and Trimmed Samples

	No income controls		Expanded income controls			
	Original sample	Trimmed sample	Original sample	Trimmed sample	Original sample	Trimmed sample
Outcome: Married						
Marriage subsidy ($1,000s)	0.008***	0.007*	0.009*	0.008	0.014***	0.017**
	(0.003)	(0.004)	(0.005)	(0.007)	(0.005)	(0.008)
Legal marriage	0.066***	0.066***	0.066***	0.066***	0.116***	0.114***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.008)	(0.008)
Additional controls for:						
Couple's earnings split			✓	✓	✓	✓
5^{th}-order polynomial in couple's earnings			✓	✓	✓	✓
Control function					✓	✓
Mean of dep var	0.432	0.429	0.432	0.429	0.432	0.429
1^{st} stage coefficient	0.463***	0.450***	0.408***	0.377***	0.420***	0.391***
	(0.021)	(0.024)	(0.027)	(0.033)	(0.026)	(0.030)
	[474.697]	[356.987]	[220.977]	[131.536]	[261.297]	[168.614]
Observations	37,234	35,746	37,234	35,746	37,234	35,746

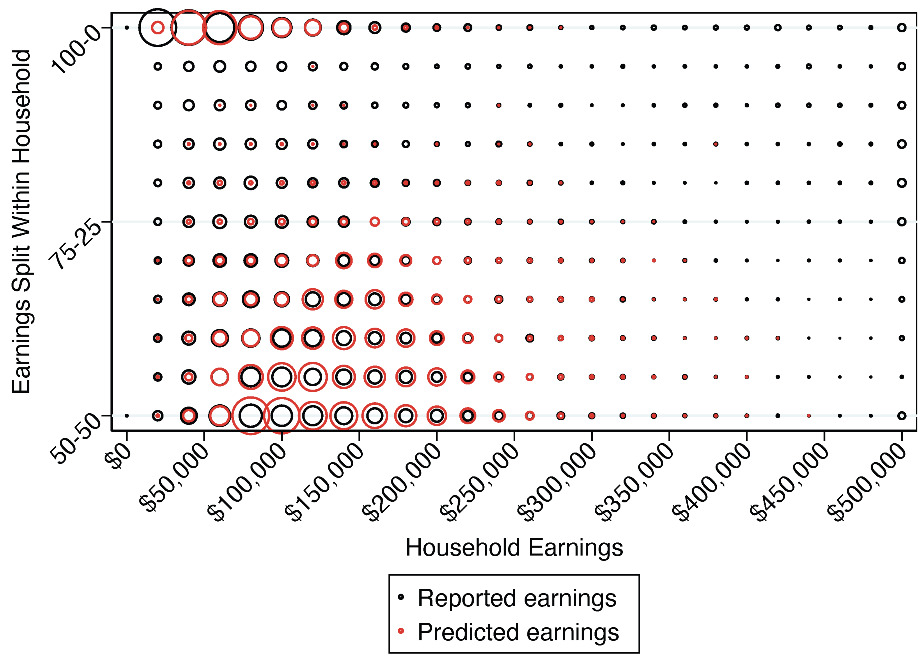
Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications also include year and state fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, the partners' ages and education levels, and for whether the couple's state of residence expanded Medicaid under the Affordable Care Act. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. In columns labelled "Trimmed sample," we exclude observations with marriage subsidy residual values in the bottom 2% or top 2% of the original sample. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence) based on a LASSO prediction process described in the text.

B.3 LASSO Earnings Prediction Details and Fit

The LASSO regression output is available upon request. The LASSO selected 381 regressors when predicting having positive earnings (7.4% of all variables we included) and selected 114 regressors when predicting earnings in levels (2.2% of all variables we included). Out of the variables and interactions that we included, the LASSO most frequently selected occupation and its interactions: 59.3% of all non-zero coefficients when predicting positive earnings and 54.4% of all non-zero coefficients when predicting earnings in levels were an interaction with occupation. The LASSO also frequently selected state of residence and its interactions: 57.2% of all non-zero coefficients when predicting positive earnings and 44.7% of all non-zero coefficients when predicting earnings in levels were an interaction with state of residence. The next largest category the LASSO selected was the respondent's age group and its interactions: 24.4% of all non-zero coefficients when predicting positive earnings and 27.2% of all non-zero coefficients when predicting earnings in levels were an interaction with age group. Note that there is some overlap in the interactions described above, so the counts add up to more than 100%.

Figure B2 compares the joint distribution of the couple's total earned income and the earnings split between partners for reported and predicted earned income. The figure makes it clear that our prediction process tends to understate earned income and the earnings split a little; for example, more of the red circles in Figure B2, indicating predicted values, appear toward the lower center, and more of the black circles, indicating observed values, appear tailing off on the right.

Figure B2
Joint Distribution of Couple Earned Income and Earnings Splits



Notes: The data come from the 2012–2017 American Community Surveys. Couples have been placed into $20,000 bins of household earned income and 5 percentage point bins of partner earned income splits. The size of each point represents the relative number of couples in that total earned income-earnings split bin.

B.4 Mincer Earnings Prediction Details and Fit

Heckman, Lochner, and Todd (2006) provide an overview of the Mincer regression and suggest a specification with indicator variables for each year of schooling earned and a quadratic in potential experience (age minus years of education minus 6). Therefore, we predict earnings using the following specification:

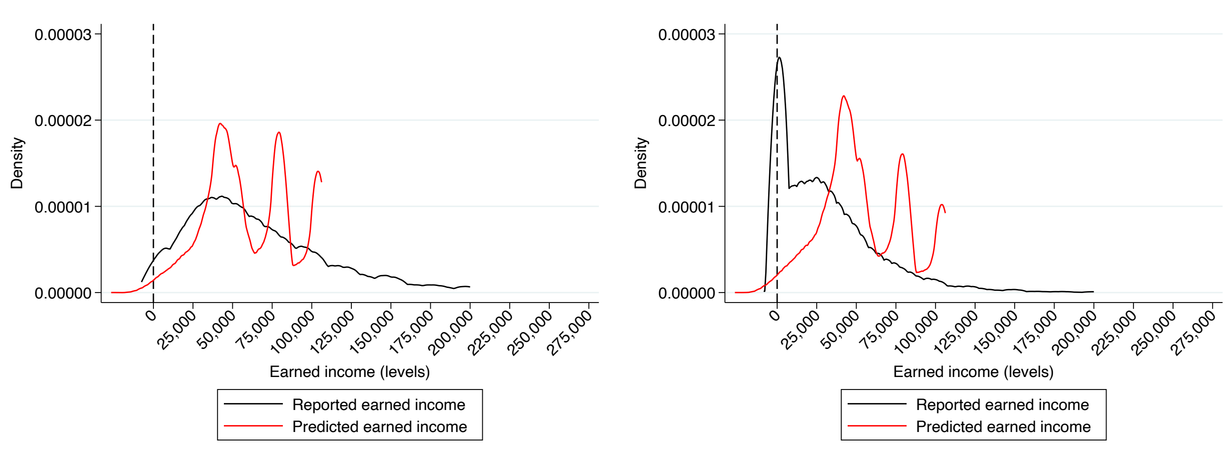
$$Y_{it} = \beta_0 + \sum_{s=0}^{18} \beta_{1,s} s_{it} + \beta_2 \text{Exp}_{it} + \beta_3 \text{Exp}_{it}^2 + \varepsilon_{it}$$

Where Y_{it} is reported earned income, s_{it} is a vector of dummy variables for years of schooling (0 years up to 18 years, as in our main sample), and Exp_{it} is potential experience.

Table B3 presents summary statistics of the predicted earnings and marriage subsidy measures using the Mincer prediction process relative to the observed values. Although the Mincer process matches the mean earnings relatively well, it suggests much lower earnings splits between partners, leading to predicted marriage penalties rather than the observed subsidies.

Figure B3 displays kernel densities for reported and predicted earned income using a traditional Mincer approach instead of the LASSO. The data are split to show the higher-earning and lower-earning member of each couple. Figure B3 makes clear that the traditional Mincer earnings prediction does not match the observed data well.

Figure B3
Earnings Densities Using a Mincer Earnings Prediction



(a) Higher earners

(b) Lower earners

Notes: The figure displays the reported earnings distribution and the predicted earnings distribution using a Mincer earnings prediction. For illustrative purposes, we display reported and predicted earned income for higher and lower earners separately, although we calculate household predicted earned income as the sum of the partners' individual predicted earned incomes for estimation.

B.5 Dynamic Marriage Responses

To examine whether marriage responds gradually to the marriage subsidy, we split the federal and state marriage subsidies into their separate components (since the timing of federal and state tax recognition often differs), and we tried controlling for lagged effects of each.

Table B3
Earnings and Marriage Subsidy Summary Statistics Using a Mincer Prediction Process

	Married couples	Cohabiting couples
Reported earnings	125,286.76	105,188.00
	(119,779.91)	(105,191.59)
Predicted earnings	123,931.63	110,349.89
	(48,049.90)	(49,175.61)
Reported earnings split	0.745	0.723
	(0.200)	(0.174)
Predicted earnings split	0.591	0.611
	(0.512)	(0.845)
Fed + st marriage subsidy	442.45	263.79
(reported income)	(5,116.62)	(3,247.05)
Fed + st marriage subsidy	-619.62	-132.77
(predicted earned income)	(1,476.31)	(1,045.27)
Fed marriage subsidy	395.05	231.80
(reported income)	(4,563.36)	(3,055.28)
Fed marriage subsidy	-471.09	-72.53
(predicted earned income)	(1,245.29)	(921.16)
St marriage subsidy	47.41	31.99
(reported income)	(974.14)	(584.34)
St marriage subsidy	-148.53	-60.24
(predicted earned income)	(396.75)	(256.21)
Observations	16,098	21,136

Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys and include same-sex married and cohabiting couples as well as unrelated same-sex householders where both partners are between 18–60 years old. Predicted earnings and marriage subsidies are based on a Mincer prediction process described in the text. The earnings split means are conditional on the couple having positive reported earnings.

Table B4
IV Estimates Using a Mincer Earnings Prediction Process

	No income controls	Expanded income controls	
Outcome: Married			
Marriage subsidy ($1,000s)	-0.025***	-0.010	0.006
	(0.009)	(0.011)	(0.011)
Legal marriage	0.066***	0.066***	0.119***
	(0.010)	(0.010)	(0.008)
Additional controls for:			
Couple's earnings split		✓	✓
5^{th}-order polynomial in couple's earnings		✓	✓
Control function			✓
Mean of dep var	0.432	0.432	0.432
1^{st} stage coefficient	0.349***	0.271***	0.301***
	(0.031)	(0.032)	(0.031)
	[128.130]	[70.737]	[94.269]
Observations	37,234	37,234	37,234

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 include year and state fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, the partners' ages and education levels, and for whether the couple's state of residence expanded Medicaid under the Affordable Care Act. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence) based on a Mincer prediction process described in the text.

The empirical specification is:

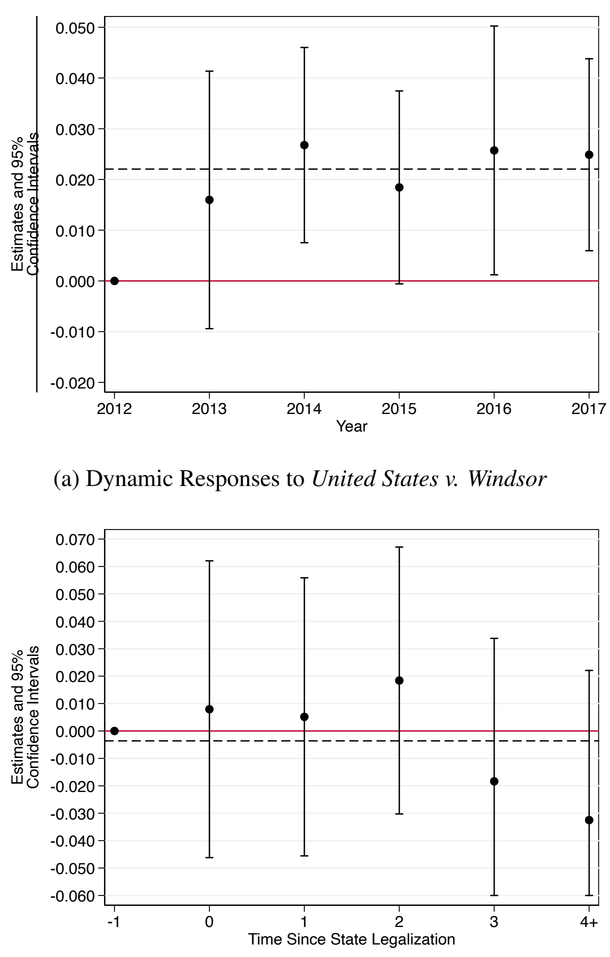
$$\begin{aligned}\text{Married}_{cst} =& \beta_0 + \sum_{W=2013}^{2017} \beta_{1,W} \text{Federal } \widehat{\text{Marriage}} \text{ Subsidy}_{cst} \times \gamma_t \\ &+ \sum_{W=0}^{4+} \beta_{1,W} \text{State } \widehat{\text{Marriage}} \text{ Subsidy}_{cst} \times 1(W \text{ Years Since Legalization}) \\ &+ \beta_2 \text{Legal Marriage}_{st} + \beta_3 X_{cst} + \delta_t + \mu_s + \varepsilon_{cst}\end{aligned} \tag{B3}$$

Where Federal $\widehat{\text{Marriage}}$ Subsidy$_{cst}$ and State $\widehat{\text{Marriage}}$ Subsidy$_{cst}$ are the fitted values from the first stage. W indexes the years since tax recognition occurred. The 2012 coefficient in the federal specification and the $t = -1$ coefficient in the state specification are omitted because there is no subsidy variation in those periods.

Figure B4 displays the coefficient estimates and standard errors for these event-time analyses using our control function specification. Panel B4a shows that the federal coefficient estimates in 2013 through 2017, which turn on when the *Windsor* court decision occurred, are similar in magnitude to the baseline estimates we report in Table 4 (displayed as the dashed line in Figure B4). Therefore, Figure B4 suggests that there were not differential dynamic responses to *Windsor*. Panel B4b again shows that there are no statistically significant differences between the effect of the state subsidy across years, although the confidence intervals are wide.

Overall, these figures suggest little in the way of dynamic responses to the federal or state marriage subsidies in our context.

Figure B4
Dynamic Responses to the Marriage Subsidy



(a) Dynamic Responses to *United States v. Windsor*

(b) Dynamic Responses to State Legalization

Notes: The data come from the 2012–2017 waves of the American Community Survey and include same-sex married and cohabiting couples. Panel A displays coefficient estimates and 95% confidence intervals for the effect of the federal marriage subsidy on marriage in that year using the control function specification. Panel B displays coefficient estimates and 95% confidence intervals for the effect of the state marriage subsidy on marriage in the year relative to state legalization. The dashed horizontal lines display the relevant marriage subsidy estimate (either federal or state) from the control function specification that splits apart the federal and state subsidies. All marriage subsidy variables are measured in $1,000s.

B.6 Heterogeneity by State's Method of Legalization

We also considered heterogeneity by the state's method of same-sex marriage legalization (i.e., through a court ruling or through legislation). Legislative changes may be predictable and confounded by state-level attitudes toward same-sex relationships, so leveraging court-mandated legalization of same-sex marriages may offer better identification because court rulings are less predictable than legislative changes.

We have followed Hansen, Martell, and Roncolato (2019) and coded each state's method of legalization as occurring through the courts or by legislation/referendum. We then interacted this indicator with the combined federal and state marriage subsidy to estimate heterogeneous effects by method of legalization. Appendix Table B5 reports these results. We do not estimate statistically significant differences in the effect of the combined marriage subsidy by a state's method of legalization, when comparing the results to our baseline specification in Table 3 of the draft. The point estimates of the marriage subsidy response are larger for couples living in states that granted recognition of same-sex marriage through legislation than through the courts.

There are two possible explanations for different responses, even though they are not significantly different. First, it may be that court decisions are exogenous while legislative or voter action is not. Our specification with state-by-year fixed effects is relevant for this interpretation, as it would absorb varying state-level attitudes toward same-sex relationships that may be correlated with both law changes and marriage behavior. In those results, we found that the estimated effect of the tax-induced marriage subsidy is essentially unchanged, although this specification no longer allows us to identify and estimate coefficients on the *Legal Marriage* or the method that it is obtained.

A second possible explanation for finding a greater effect of marriage recognition that occurs through legislation than through court action is that legislation may induce greater social acceptance or a greater comfort level among same-sex couples in responding.

Overall, this heterogeneous treatment effect specification points to positive and significant effects of the marriage subsidy when it is generated by court rulings, which may be more plausibly exogenous in our baseline specification, and also possibly greater responsiveness when marriage recognition occurs through legislative action.

B.7 Ignoring the Cohabition Indicator

To demonstrate the usefulness of the cohabitation distinction in the ACS, we re-estimated our main specifications on an expanded sample of same-sex householders constructed by ignoring the cohabitation variable. This process added 66,756 same-sex households to our original sample: 86.8% are same-sex roommates and 13.2% are other same-sex non-relatives. Appendix Table B6 displays select summary statistics for the original sample compared to the new additions of non-partner roommates. The roommate pairs are younger, a little less educated, and much less likely to have children in the household. They have considerably lower mean earnings (which may explain their co-residence) but quite similar employment patterns and a similar earnings split. This results in similar average though less dispersed marriage subsidies, at $341 for the original sample of cohabiting and married partners and $398 for the non-partner roommates.

Table B4, columns 4–6, in the main text displays our baseline specification estimates using this expanded sample. Appendix Figure B5 displays residual scatter plots of the residualized outcome variable against the residualized first stage marriage subsidy fitted values conditional on the full set of covariates in the control function specification, which non-parametrically reproduces our baseline IV estimates among this expanded sample, to visually demonstrate why

Table B5
Heterogeneous IV Estimates by Method of State Legalization

	No income controls	Expanded income controls	
Outcome: Married			
Marriage subsidy × legalized through courts	0.007**	0.007	0.014***
	(0.003)	(0.005)	(0.005)
Marriage subsidy × legalized through legislation	0.013**	0.014**	0.024***
	(0.006)	(0.007)	(0.008)
Legal marriage through courts	0.069***	0.069***	0.108***
	(0.010)	(0.010)	(0.009)
Legal marriage through legislation	0.044**	0.043**	0.128***
	(0.021)	(0.021)	(0.010)
Additional controls for:			
Couple's earnings split		✓	✓
5^{th}-order polynomial in couple's earnings		✓	✓
Control function			✓
Mean of dep var	0.432	0.432	0.432
1^{st} stage coefficient 1	0.476***	0.450***	0.464***
	(0.020)	(0.024)	(0.023)
	[551.626]	[276.301]	[311.052]
1^{st} stage coefficient 2	0.499***	0.469***	0.456***
	(0.054)	(0.057)	(0.056)
	[106.497]	[119.555]	[157.375]
Observations	37,234	37,234	37,234

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 include year and state fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, the partners' ages and education levels, and for whether the couple's state of residence expanded Medicaid under the Affordable Care Act. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence). The reported first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted Marriage Subsidy × Legalized through Courts variable using the outcome Observed Marriage Subsidy × Legalized through Courts. "Coefficient 2" in column 1 is the coefficient of the Predicted Marriage Subsidy × Legalized through Legislation variable using the outcome Observed Marriage Subsidy × Legalized through Legislation, and so on. The mean marriage rate is 0.421 among couples living in states that legalized same-sex marriage through courts, and 0.477 among couples living in states that legalized same-sex marriage through legislation.

we obtain a similar estimate relative to our main sample.

Specifically, to obtain the marriage rate residuals, we estimate the following regression:

$$\text{Married}_{cst} = \beta_0 + \beta_1 X_{cst} + \delta_t + \mu_s + v_{cst} \tag{B4}$$

X_{cst} includes all the controls we use in the full control function specification except for the first stage marriage subsidy fitted value: whether the state has legalized same-sex marriage, the couple's sex, racial composition, age, education levels, presence of children, and number of children, along with whether state s expanded Medicaid under the ACA, a 5^{th}-order polynomial in the couple's predicted earnings, the couple's predicted earnings split, and the covariates with non-zero coefficients from the predicted earnings LASSO. δ_t and μ_s are year and state fixed effects, respectively.

We then compute the first stage marriage rate fitted value residual as $\hat{\varepsilon}_M = \text{Married}_{cst} - \widetilde{\text{Married}}_{cst}$, where Married_{cst} is the observed marriage indicator and $\widetilde{\text{Married}}_{cst}$ is the predicted value from equation B4. We also add back in the sample mean marriage rate (0.432) to facilitate interpretation of the scale.

We obtain the first stage marriage subsidy fitted value residuals following the same procedure. We estimate the following regression:

$$\widehat{\text{Marriage Subsidy}}_{cst} = \beta_0 + \beta_1 X_{cst} + \delta_t + \mu_s + v_{cst} \tag{B5}$$

X_{cst} includes the same controls as in equation B4, and δ_t and μ_s are year and state fixed effects, respectively. We then compute the predicted marriage subsidy residual as $\hat{\varepsilon}_S = \widehat{\text{Marriage Subsidy}}_{cst} - \text{Predicted } \widetilde{\widehat{\text{Marriage}}} \text{ Subsidy}_{cst}$, where $\widehat{\text{Marriage Subsidy}}_{cst}$ is the first stage marriage subsidy fitted value and $\text{Predicted } \widetilde{\widehat{\text{Marriage}}} \text{ Subsidy}_{cst}$ is the predicted value from equation B5.

Appendix Figure B5 then plots $\hat{\varepsilon}_M$ on the y-axis against $\hat{\varepsilon}_S$ (in \$50 bins) on the x-axis. Each point is weighted by the number of couples in the $\hat{\varepsilon}_S$ bin, with larger circles representing more couples. This residual plot non-parametrically reproduces our IV estimates of the relationship between marriage rates and the predicted marriage subsidy within the expanded sample. Indeed, the linear line of best fit has a slope of 0.012, which is exactly our IV estimate using the same controls in column 3 of Table B7.[42]

Panel B5a shows the expanded sample split to differentiate between the original sample and the new additions, panel B5b shows the combined expanded sample that includes same-sex householders who are not in a relationship, and panel B5c shows the original sample. Each figure also displays a linear best-fit that reproduces our IV estimate (yielding the same best-fit in panel B5a and B5b because it is estimated on the same sample, although the subsamples of the original and new observations are visually separated in panel B5a).

42. Note that the IV estimate in Panel B5c varies slightly from the original estimate in column 6 of Table 3 because we re-estimated the LASSO to predict earnings in this sample, thereby creating some differences in predicted earnings within the subsample of original observations. The estimates are not statistically different.

Panel B5a shows that all the new additions, who are obviously unmarried, are concentrated around a 0 first stage fitted value residual with some skewed toward positive residuals. Panel B5b makes it clear that this induces a level effect in the mean marriage rate within the sample since the new additions are all unmarried, but does very little to pull the slope downward, leaving the positive relationship generally intact.

We have also returned to our examination of the elasticity estimates from the literature of the last 10 years, which we describe in Table 1 in the paper (i.e., Herbst 2011; Fisher 2013; Bastian 2017; Michelmore 2018; Gayle and Shephard 2019; Isaac 2020). Notably, our estimate is the smallest significant elasticity. All but one of those papers use either all unmarried individuals or non-cohabiting single individuals as their control group (the exception being Fisher (2013), but she must infer cohabitation for 9 years out of her 25 year sample period). Based on our analysis here, this may bias their elasticity estimates upward compared to ours due to smaller baseline marriage rates because they must explain what appears to be a relatively low marriage rate, given that their samples include many people who are not on the margin of marrying. Nevertheless, the particular approach of assuming that roommates are cohabiting, in order to focus on a sample of people on the margin of marrying, may be less of a problem for different-sex householders (who are somewhat less likely to be unrelated roommates) than for same-sex householders.

In sum, this provides evidence that our approach improves upon prior studies that do not include the cohabitation indicator because the expanded sample would have led us to estimate a substantially upwardly biased elasticity of marriage with respect to the tax-induced marriage subsidy.

Table B6
Summary Statistics of Original Sample and New Additions Ignoring the Cohabitation Indicator

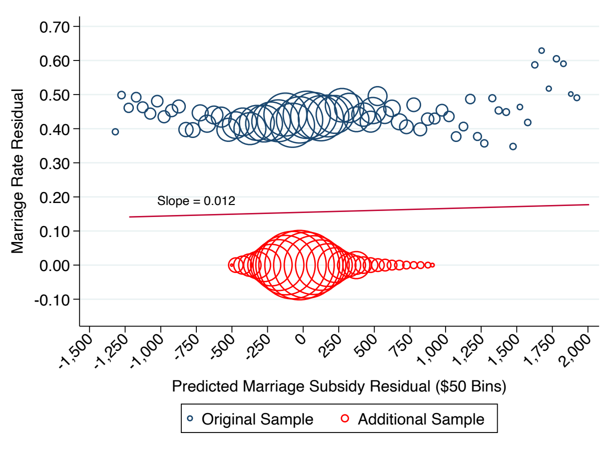
	Original sample	New additions
Age of older partner	44.586	34.002
	(10.468)	(11.986)
Age of younger partner	39.326	29.416
	(10.320)	(9.672)
Education of more educated partner	15.463	14.712
	(2.357)	(2.402)
Education of less educated partner	13.602	13.238
	(2.804)	(2.852)
Any dependent children	0.228	0.016
	(0.420)	(0.127)
Conditional number of dependent children	1.765	1.378
	(0.970)	(0.769)
Both partners work	0.796	0.796
	(0.403)	(0.403)
Only 1 partner works	0.175	0.147
	(0.380)	(0.354)
Neither partner works	0.029	0.057
	(0.168)	(0.233)
Reported earnings	113,877.63	61,500.24
	(112,174.01)	(59,737.50)
Reported earnings split	0.733	0.712
	(0.186)	(0.279)
Fed + st marriage subsidy (reported income)	341.04	398.38
	(4,160.65)	(1,499.97)
Fed marriage subsidy (reported income)	302.38	370.77
	(3,782.63)	(1,351.11)
St marriage subsidy (reported income)	38.66	27.61
	(777.27)	(347.27)
Observations	37,234	66,756

Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys and include same-sex married and cohabiting couples as well as unrelated same-sex householders where both partners are between 18–60 years old. Years of education are constructed using the detailed educational codes in the ACS, which reports the individual's highest grade completed through 12^{th} grade. We assign 13 years of schooling for 1 or more years of college credit and no degree, 14 years for an associate's degree, 16 years for a bachelor's degree, and 18 years for a master's, professional, or doctoral degree. The earnings split means are conditional on the couple having positive reported earnings.

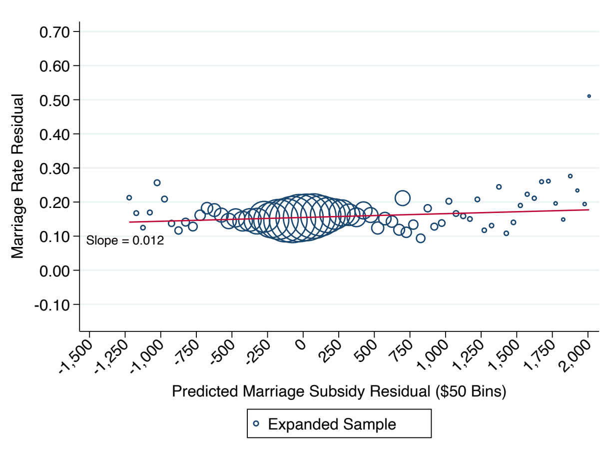
Table B7
IV Estimates Using an Expanded Sample of Same-Sex Householders

	No income controls	Expanded income controls	
Outcome: Married			
Marriage subsidy ($1,000s)	-0.006**	0.007**	0.012***
	(0.002)	(0.003)	(0.003)
Legal marriage	0.019***	0.018***	0.031***
	(0.004)	(0.004)	(0.003)
Additional controls for:			
Couple's earnings split		✓	✓
5^{th}-order polynomial in couple's earnings		✓	✓
Control function			✓
Mean of dep var	0.155	0.155	0.155
1^{st} stage coefficient	0.493***	0.447***	0.453***
	(0.015)	(0.017)	(0.018)
	[1,059.847]	[667.612]	[659.871]
Observations	103,990	103,990	103,990

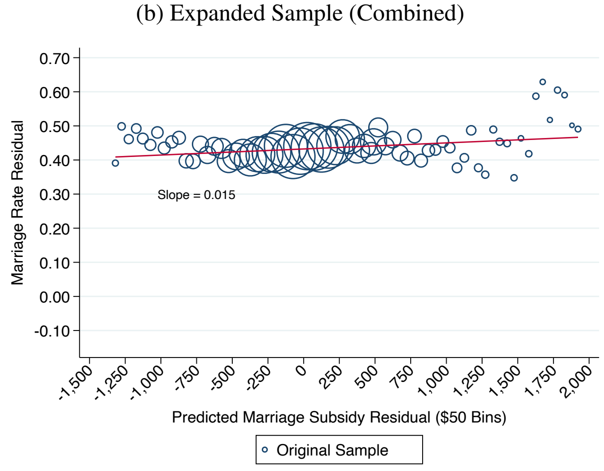
Notes: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Robust standard errors are in parentheses and Sanderson and Windmeijer (2016) F-statistics are in brackets. All specifications also include year and state fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, the partners' ages and education levels, and for whether the couple's state of residence expanded Medicaid under the Affordable Care Act. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys using an expanded sample that includes unrelated same-sex householders who are both between 18–60 years old. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence) based on a LASSO prediction process described in the text.



(a) Expanded Sample (Separated)



(b) Expanded Sample (Combined)



(c) Original Sample

Figure B5
IV Estimates Using an Expanded Sample of Same-Sex Householders

Notes: The data come from the 2012–2017 waves of the American Community Survey and include same-sex married couples, same-sex cohabiting couples, and unrelated same-sex householders. The figure plots the residualized outcome variable on the y-axis against the residualized first stage marriage subsidy fitted value on the x-axis. We residualized both variables with respect to the full set of covariates in the control function specification while omitting the first stage marriage subsidy fitted value. Households are grouped into $50 bins of their first stage marriage subsidy fitted value residual and each marriage rate-marriage subsidy cell is weighted by the number of households, with larger circles indicating more households within the cell. The figure displays linear lines of best fit.

B.8 Heterogeneity by Federal Marriage Subsidy or Penalty

Table B8 presents IV estimates that distinguish a federal marriage subsidy treatment from a federal marriage penalty treatment. We find that our main estimates are driven by a positive marriage effect among couples expecting a federal subsidy (with a point estimate that is a larger than our baseline IV estimate), and the coefficient is opposite-signed and insignificant among couples expecting a federal penalty. This suggests that the response to tax reforms, like the recent one, that reduce average marriage penalties may be noteworthy, but that tax reforms that increase average marriage penalties may have little effect. It should be noted, however, that there are three times as many couples expecting to face a subsidy rather than a penalty so there is more identifying variation among that group.

B.9 Placebo Test

We estimated a specification in which the federal marriage subsidy is (counterfactually) active for the full sample period to assess whether the policy treatment was anticipated, so couples started reacting early, or whether underlying trends (in this case, in the propensity of same-sex couples with disparate earnings to marry at a higher rate than same-sex couples with similar earnings) are correlated with the policy treatment. Nevertheless, it is complicated to implement in our setting, for three reasons described below, and therefore we have designed a limited approach, by falsely setting the occurrence of *Windsor* one year early (when our data set starts) and restricting the sample to states that had not yet legalized marriage.

A first complication is that our treatment, the continuous marriage subsidy, involves multiple sources of variation – progressivity of state and federal tax schedules, state and federal marriage recognition, and the earnings levels and split of households. The variation over time, though, arises largely from marriage recognition, and *Windsor* is a big part of that, so we can consider ways to move around its timing.

A second complication is that we have a stock marriage variable, and couples' earnings are likely to display inertia, all of which means that using a false *later* date for federal marriage recognition should still yield a positive coefficient on the federal marriage subsidy, even if the marriages did not happen in that year. For these first two reasons, the cleanest way to set up a falsification test with fake timing is to pretend that *Windsor* occurs before it actually does. Our data start in 2012, so this gives us one year in advance of the *Windsor* decision in 2013 to test for responses that occur too early.

A third complication is that when we use 2012 as the *Windsor* date, we can no longer distinguish the federal marriage subsidy and the marriage legalization effect for states that legalized same-sex marriage before 2012. Once again, because of our stock marriage variable, and because many state tax schedules lack progressivity (Massachusetts, for example), this shifts some weight to the federal tax subsidy instead.

Consequently, for this exercise we run our IV marriage regressions with *Windsor* occurring in 2012 instead of

Table B8
Heterogeneous IV Estimates by Expected Federal Subsidy or Penalty

	No income controls	Expanded income controls	
Outcome: Married			
Fed. marriage subsidy × predicted subsidy	0.023***	0.022***	0.034***
	(0.005)	(0.007)	(0.009)
Fed. marriage subsidy × predicted penalty	-0.008	-0.017	-0.011
	(0.005)	(0.011)	(0.011)
Legal marriage	0.067***	0.067***	0.115***
	(0.010)	(0.010)	(0.008)
Additional controls for:			
Couple's earnings split		✓	✓
5^{th}-order polynomial in couple's earnings		✓	✓
Control function			✓
Mean of dep var	0.432	0.432	0.432
1^{st} stage coefficient 1	0.377***	0.403***	0.356***
	(0.016)	(0.022)	(0.022)
	[542.842]	[310.288]	[269.398]
1^{st} stage coefficient 2	0.655***	0.400***	0.389***
	(0.058)	(0.037)	(0.035)
	[132.865]	[115.709]	[122.057]
Observations	37,234	37,234	37,234

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 include year and state fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, the partners' ages and education levels, and for whether the couple's state of residence expanded Medicaid under the Affordable Care Act. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include only federal taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence). The reported first stage coefficients are only those for the relevant instrument. For example, "coefficient 1" in column 1 is the coefficient of the Predicted Federal Marriage Subsidy × 1(Predicted Federal Subsidy) variable using the outcome Observed Federal Marriage Subsidy × 1(Observed Federal Subsidy). "Coefficient 2" in column 1 is the coefficient of the Predicted Federal Marriage Subsidy × 1(Predicted Federal Penalty) variable using the outcome Observed Federal Marriage Subsidy × 1(Observed Federal Penalty), and so on. The mean marriage rate is 0.404 among couples with an observed federal marriage subsidy and 0.512 among couples with an observed federal marriage penalty.

2013; with the marriage subsidy split between its federal and state components (and with the state marriage subsidy and marriage legalization variables evolving as they actually transpired but with the federal marriage subsidy turning on in 2012); for states that legalized marriage in 2013 or later. This allows us to check whether couples who would benefit from the federal tax code may have anticipated the *Windsor* decision or may have married sooner for unrelated reasons. These regressions are of the form:

$$\begin{aligned}\text{Married}_{cst} = \beta_0 + \sum_{t=2012}^{2017}\Big[\beta_{1,t}\text{Fed. }\widehat{\text{Marriage}}\text{ Subsidy}_{cst} \times \text{Year}_t\Big] + \beta_2\text{St. }\widehat{\text{Marriage}}\text{ Subsidy}_{cst} \\ + \beta_3\text{Legal Marriage}_{st} + \beta_4 X_{cst} + \delta_t + \mu_s + \varepsilon_{cst}\end{aligned} \tag{B6}$$

Figure B6, below, displays $\beta_{1,t}$, the IV coefficients and confidence intervals from a specification that uses this placebo timing of the federal marriage subsidy. Figure B6 shows that the coefficient estimate in 2012 is slightly smaller (at 0.019) than the estimated effect of the federal marriage subsidy (at 0.022) when specified correctly in Table 4 and is not precisely estimated in any year. This placebo analysis provides some support for our identifying assumptions, though the confidence intervals are wide and the coefficients and confidence intervals are similar in magnitude for all years.[43]

43. As in any such event-time specification, confidence intervals are large because the year-specific coefficients are identified from a fraction of the observations.

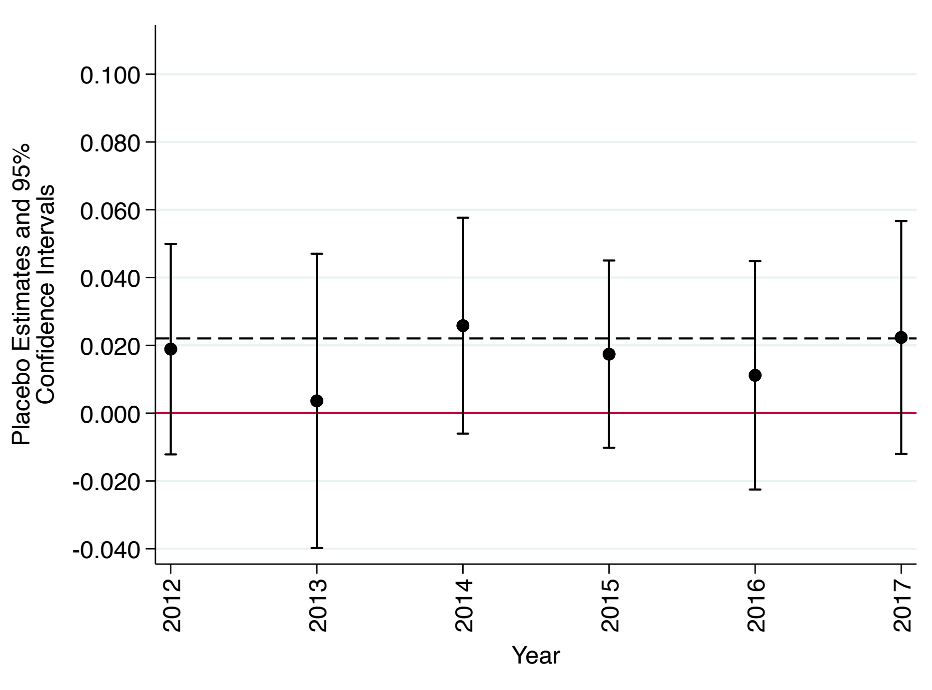


Figure B6
Federal Marriage Subsidy Placebo Coefficients Assuming *United States v. Windsor* occurred in 2012

Notes: The data come from the 2012–2017 American Community Survey and include same-sex married and cohabiting couples living in states that legalized same-sex marriage in 2013 or later. The figure plots the coefficient estimates and 95% confidence intervals for $\beta_{1,t}$ in Equation B6, where *United States v. Windsor* is counterfactually assumed to have occurred in 2012.

B.10 Robustness to Employer-Sponsored Health Insurance Coverage

One concern we explore in the paper is that the marriage effects we estimate are instead driven by new access to spousal health insurance coverage through one spouse's employer. However, neither *United States v. Windsor* nor *Obergefell v. Hodges*, as federal rulings, mandated employer-sponsored health insurance (ESHI) coverage for same-sex spouses in the private sector (Dawson, Kates, and Rae 2018). Rather, access to ESHI spousal coverage would have been affected by state marriage legalization or alternative partnership policies (e.g., civil unions). For example, Buchmueller and Carpenter (2012) find that a 2005 California law that required private employers to extend ESHI coverage to same-sex partners in committed relationships caused an increase in partnership among female couples, but did not affect partnership among male couples. Moreover, couples with very different levels of earnings (who face a marriage subsidy from the income tax code) may also have differing access to ESHI that may generate an incentive to marry. Beyond the Affordable Care Act incentives that we previously considered, we thought through other ways in which marriage incentives from ESHI might be confounding our estimates, and we do not believe that there are major concerns for several reasons.

First, *United States v. Windsor*, as a ruling requiring the federal government to recognize same-sex marriages, did

Table B9
Correlations and Implied Sign of Bias

	Correlation with ESHI					
	Marriage	$\widehat{\text{Marriage Subsidy}}_{cst}$	Marriage Subsidy_{cst}	Sign of bias in $\hat{\alpha}_1$	Sign of bias in $\hat{\gamma}_1$	Sign of bias in $\hat{\beta}_1$
Situation 1:	+	+	+	+	+	Ambiguous
Situation 2:	+	+	−	+	−	+
Situation 3:	+	−	+	−	−	Ambiguous
Situation 4:	+	−	−	−	+	−
Situation 5:	−	+	+	−	+	−
Situation 6:	−	+	−	−	−	Ambiguous
Situation 7:	−	−	+	+	−	+
Situation 8:	−	−	−	+	+	Ambiguous

Notes: Marriage is the outcome variable, $\widehat{\text{Marriage Subsidy}}_{cst}$ is the instrument, and Marriage Subsidy_{cst} is the endogenous variable.

allow same-sex spouses of federal government employees to be covered under the Self and Family enrollment plan (Hicks 2013). However, private insurance is governed by state law and therefore by state marriage legalization. Thus, Carpenter et al. (2021) estimate the effect of state legalization on insurance coverage among same-sex couples, but do not separately consider any effect of *Windsor*.

Second, to the extent that state-level policies other than marriage recognition altered health insurance options for same-sex couples, our state-by-year fixed effects specification (Table 6 in the main text) controls for such policies. Our estimates of the effect of the marriage subsidy in this specification are essentially identical to our main set of results, which we believe indicates that marriage incentives generated by spousal ESHI coverage is not confounding our estimates.

Third, it remains possible that marriage recognition generated differential incentives to marry in order to obtain ESHI when comparing couples whose earnings differ a lot or a little. We have explored the possible bias that would result if this were a concern. Our 2SLS estimate in our baseline specification can be written as $\hat{\beta}_1 = \frac{\hat{\alpha}_1}{\hat{\gamma}_1}$, where $\hat{\alpha}_1$ is the reduced-form effect of the predicted marriage subsidy on the probability of being married and $\hat{\gamma}_1$ is the first-stage effect of the predicted marriage subsidy on the observed marriage subsidy (Angrist and Pischke 2009). If marriage incentives from ESHI coverage are omitted, then our first-stage and reduced-form estimates will be biased if ESHI coverage is correlated with marriage, the *predicted* marriage subsidy, and the *observed* marriage subsidy, leading to a biased 2SLS estimate. Table B9 summarizes the eight possibilities. For example, if marriage incentives from ESHI coverage are negatively correlated with the predicted and observed marriage subsidy and positively correlated with marriage, then $\hat{\alpha}_1$ is negatively biased, $\hat{\gamma}_1$ is positively biased, and $\hat{\beta}_1$ is negatively biased.

To examine which situation in Table B9 may be most likely, we estimated regressions to determine the signs of these relationships, using ACS data on whether both partners are covered by ESHI – the possibly endogenous variable we're concerned about. Table B10, below, displays the estimates using a binary indicator for both spouses having ESHI as an outcome variable and Table B11 displays the estimates for marriage as an outcome, controlling for ESHI. The correlations in the IV, reduced form, and OLS specifications in Table B10 suggest that both spouses having ESHI is positively correlated with being married (the outcome, based on Table B11), slightly negatively correlated with the predicted marriage subsidy (the instrument, based on the reduced-form estimates in Table B10), and negatively correlated with the observed marriage subsidy (the endogenous variable, based on the OLS estimates in Table B10). The latter suggests that the overall correlations align with Situation 4 in Table B9. This indicates that a negative bias in our 2SLS estimate is most likely. Indeed, in Table B11 the IV specification without any income controls is larger when controlling for ESHI, suggesting a negative bias in the main specification, but the expanded income controls in Table B10 appear to drive the remaining correlation between ESHI coverage and the marriage subsidy to 0, which reduces the concern about bias in our 2SLS estimates.

Given these concerns, we have re-estimated our baseline models with additional controls for one or both partners having ESHI and our estimated effects of the marriage subsidy and state legalization remain qualitatively unchanged. Table B11 below displays these results.

B.11 Robustness to the Affordable Care Act's Premium Tax Credit

One possible concern is that other policy changes altered marriage incentives over the same time period we study, thereby confounding our estimates of the effect of the marriage subsidy on marriage. In particular, the ACA introduced marriage incentives in 2014 via the tax credit available to households with income between 100–400% of the federal poverty line who purchased health insurance through the federal or state marketplaces. The ACA tax credit can introduce marriage incentives depending upon the age-adjusted premium for each partner and the partners' income split because unmarried couples are considered separate health insurance units for the purposes of the tax credit.

Following Frean, Gruber, and Sommers (2017), we use data on ACA plan premiums for the second-lowest-cost Silver plan, and the ACA age multipliers to obtain age-specific premiums. We use data from the HIX Compare dataset, made available by the Robert Wood Johnson Foundation, which allows us to identify the second-lowest-cost Silver plan in each rating area. We map the rating areas to counties, using the mean county premium for counties that fall within multiple rating areas. We are only able to match 60% of our 2015–2017 observations (tax years 2014–2016) to the plan premium data because the publicly available ACS does not identify all counties and because the HIX Compare data do not include premiums in 2014 from states that operated their own marketplaces. We also account for interactions between Medicaid eligibility and the ACA premium tax credit, so that individuals in our sample (and their children) who are eligible for Medicaid are not eligible to receive a premium tax credit. We obtained Medicaid income limits for childless adults, parents, children less than 1, children between 1-5 years old, and children between 6-18 years old from

Table B10
Using Employer Sponsored Health Insurance as an Outcome

	OLS		Reduced form		IV	
	No income controls	Expanded income controls	No income controls	Expanded income controls	No income controls	Expanded income controls
Outcome: Both partners have ESHI						
Marriage subsidy ($1,000s)	-0.007***	-0.004***	-0.020***	-0.003	-0.043***	-0.006
	(0.001)	(0.001)	(0.001)	(0.002)	(0.004)	(0.005)
Legal marriage	0.020**	0.017**	0.019**	0.027***	0.020*	0.027***
	(0.010)	(0.008)	(0.010)	(0.008)	(0.010)	(0.008)
Alternative partnership policy	0.107***	-0.009	0.112***	0.008	0.099***	0.009
	(0.032)	(0.006)	(0.032)	(0.006)	(0.032)	(0.006)
Married	0.156***	0.137***	0.155***	0.149***	0.170***	0.151***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)
Additional controls for:						
Couple's earnings split		✓		✓		✓
5^{th}-order polynomial in couple's earnings		✓		✓		✓
Control function		✓		✓		✓
Mean of dep var	0.618	0.618	0.618	0.618	0.618	0.618
1^{st} stage coefficient					0.462***	0.411***
					(0.021)	(0.026)
					[472.472]	[251.190]
Observations	37,234	37,234	37,234	37,234	37,234	37,234

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 include year and state fixed effects. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence).

Table B11
Using Employer Sponsored Health Insurance as a Control

	No income controls	Expanded income controls	
Marriage subsidy ($1,000s)	0.015***	0.008	0.010*
	(0.003)	(0.005)	(0.005)
Legal marriage	0.059***	0.060***	0.093***
	(0.009)	(0.009)	(0.008)
Alternative partnership policy	-0.056*	-0.057*	0.041***
	(0.032)	(0.032)	(0.007)
Both partners have ESHI	0.082***	0.087***	0.082***
	(0.007)	(0.007)	(0.007)
Only one partner has ESHI	-0.143***	-0.137***	-0.139***
	(0.008)	(0.008)	(0.008)
Additional controls for:			
Couple's earnings split		✓	✓
5^{th}-order polynomial in couple's earnings		✓	✓
Control function			✓
Mean of dep var	0.432	0.432	0.432
1^{st} stage coefficient	0.456***	0.409***	0.413***
	(0.021)	(0.027)	(0.026)
	[457.301]	[221.837]	[252.366]
Observations	37,234	37,234	37,234

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 include year and state fixed effects. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence).

Table B12
Couple-Level ACA Premium Tax Credit Statistics

	Married couples	Cohabiting couples
ACA marriage subsidy[a]	4.21	5.46
	(69.85)	(71.92)
Conditional ACA marriage subsidy[b]	404.20	420.44
	(556.73)	(475.15)
Observations	16,098	21,136

Notes: Standard deviations in parentheses. The data come from the 2012–2017 American Community Surveys and include same-sex married and cohabiting couples where both partners are between 18–60 years old. The earnings split means are conditional on the couple having positive reported earnings.
a: This ACA marriage subsidy measure is for 2015–2017 observations only (tax years 2014–2016).
b: This ACA marriage subsidy measure is for 2015–2017 observations only (tax years 2014–2016) and is conditional on having a non-zero subsidy or penalty.

the Kaiser Family Foundation (Kaiser 2018). We define the ACA marriage subsidy as the difference between the joint tax credit if the couple is married and the sum of the individual tax credits if the couple is unmarried. We calculate the ACA tax credit based on federal adjusted gross income obtained from TAXSIM, assuming that each individual pays the same premium for the entire calendar year and the predicted higher earner claims any dependent children if the couple is unmarried, and follow IRS form 8962 to calculate each health insurance unit's ACA tax credit. Appendix Table B12 displays summary statistics of our resulting ACA marriage subsidy measure. The ACA marriage subsidy is small relative to the federal marriage subsidy from the income tax code. Same-sex couples in 2015–2017 (tax years 2014–2016) in our sample faced an average ACA marriage subsidy of only $4-5, but, conditional on receiving any ACA marriage subsidy or penalty, couples faced an ACA marriage subsidy of approximately $400, on average.

Appendix Table B13 presents estimates controlling for the ACA marriage subsidy. All of our first stage estimates continue to be highly significant. Our main estimates of the effect of the marriage subsidy on the probability of marrying are slightly smaller, but not significantly so, and the coefficient on the marriage subsidy from the ACA tax credit is negative and insignificant in all specifications. We also estimate a slight decrease in the impact of access to legal same-sex marriage. Overall, we conclude that marriage incentives created by the ACA tax credit do not confound our main estimated effect of the marriage subsidy.

Table B13
IV Estimates Controlling for the ACA Tax Credit

	No income controls	Expanded income controls	
Outcome: Married			
Marriage subsidy ($1,000s)	0.008**	0.006	0.010*
	(0.003)	(0.005)	(0.006)
Legal marriage	0.056***	0.056***	0.116***
	(0.010)	(0.010)	(0.008)
Marriage subsidy from ACA tax credit ($1,000s)	-0.048	-0.050	-0.040
	(0.049)	(0.049)	(0.049)
Additional controls for:			
Couple's earnings split		✓	✓
5^{th}-order polynomial in couple's earnings		✓	✓
Control function			✓
Mean of dep var	0.403	0.403	0.403
1^{st} stage coefficient	0.474***	0.423***	0.426***
	(0.024)	(0.030)	(0.029)
	[404.497]	[194.410]	[215.951]
Observations	29,104	29,104	29,104

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 include year and state fixed effects, as well as controls for the couple's sex, racial composition, the presence of children, the number of children, the partners' ages and education levels, and for whether the couple's state of residence expanded Medicaid under the Affordable Care Act. In specifications using expanded income controls, the earnings measures are based on predicted earnings. The data come from the 2012–2017 American Community Surveys, but we are only able to match 60% of our 2015–2017 observations (tax years 2014–2016) to the plan premium data because the publicly available ACS does not identify all counties and because the HIX Compare data do not include premiums in 2014 from states that operated their own marketplaces. All marriage subsidy variables are measured in $1,000s and include both federal and state taxes. We instrument for the observed marriage subsidy (calculated from reported income from all available sources, number of children, and state of residence) with the predicted marriage subsidy (calculated from predicted earned income, number of children, and state of residence).

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