Suddenly Married: Joint Taxation And The Labor Supply Of Same-Sex Married Couples After *U.S. v. Windsor*

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Abstract

Joint taxation can exacerbate the deadweight loss of taxation due to labor supply responses, but evidence is scarce. I estimate the efficiency costs and labor supply effects of joint taxation in the United States by leveraging tax variation created by federal same-sex marriage recognition following the 2013 *United States v. Windsor* Supreme Court ruling. I find moderate hours responses among primary earners and larger labor force participation responses among secondary earners. My findings suggest that joint taxation is less efficient and generates less tax revenue than individual taxation, and that lowering tax rates for secondary earners could improve efficiency.

JEL: J22, H24, H21, D10

Keywords: taxation, labor supply, same-sex marriage, sufficient statistics

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1 Introduction

Many developed countries institute progressive tax systems, forcing them to choose the unit of taxation: the individual or the family (Rosen 1977). Choosing the family as the unit of taxation (as in the United States) achieves greater tax equity across families, but can exacerbate efficiency costs through labor supply distortions. However, direct evidence of these efficiency costs is relatively rare due to a lack of natural experiments involving a large-scale switch in systems. Another complication is that such tax regime switches generally involve a change in marriage incentives as well, introducing another margin of distortion. In this paper, I provide direct evidence of the labor supply effects, efficiency costs, and tax revenue consequences of joint taxation in the United States by leveraging tax variation created by federal recognition of existing same-sex marriages following the 2013 *United States v. Windsor* Supreme Court ruling.

The United States' 1996 Defense of Marriage Act prevented same-sex marriages from being recognized at the federal level, but states retained the authority to permit same-sex marriages at the state level. This legislative environment meant that same-sex married couples were still required to file federal taxes as two single individuals through 2012. In June 2013 over 71,000 marriages recognized by states since 2004 were suddenly recognized by the United States federal government as a result of the *United States v. Windsor* ruling (DeSilver 2013). The ruling required same-sex married couples to file federal taxes as married beginning in tax year 2013.[1]

This shift of already-married couples from the individual to the family as the unit of taxation is unusual because governments usually employ only one system at any particular time. I leverage separate variation in household after-tax income and marginal tax rates generated by federal same-sex marriage recognition to separately identify the income and substitution effects of taxation and, therefore, compensated (Hicksian) labor supply elasticities. I then use my estimates in a sufficient statistic framework to calculate the additional deadweight loss and tax revenue created by joint taxation relative to individual taxation.

[1]This paper does not examine the 2015 *Obergefell v. Hodges* Supreme Court ruling, which required all states to permit same-sex marriages. The *United States v. Windsor* ruling only required the federal government to recognize at the federal level same-sex marriages that were permitted by states.

I use the 2012–2015 waves of the American Community Survey, which are the first of the U.S. Census Bureau surveys to explicitly identify same-sex married couples. I use a generalized difference-in-differences framework, which compares predicted changes in marginal tax rates and household after-tax income for a treatment group of individuals in same-sex couples who married before the *United States v. Windsor* ruling to a control group of individuals in same-sex cohabiting couples.[2] I focus on same-sex couples who had already married before the Supreme Court ruling in order to exploit the plausibly exogenous shock to federal marital status. I also extend work by Baldwin, Allgrunn, and Ring (2011) and McClelland, Mok, and Pierce (2014) by predicting earnings and higher or lower earning status using a machine learning LASSO approach. I separately analyze the labor supplies of each partner, which is otherwise commonly accomplished by separating the couple by gender. Higher or lower earners may respond to taxation differently due, for example, to differing work preferences or attachment to the labor force. Separately analyzing each partner in same-sex couples yields separate estimates of the effects of taxation by predicted earning status while abstracting away from gender.

Distinct variation in tax rates and household income is crucial in estimating compensated labor supply elasticities. To estimate the effect of changes in tax rates on labor supply, I use the predicted percentage change in the federal marginal net-of-tax rate.[3] Variation in an individual's tax rates due to the Supreme Court ruling originates through two primary channels: differences in tax bracket definitions between the single and joint schedules, and the addition of both partners' earnings to taxable income rather than only the individual's earnings. On average, predicted higher earners in my sample faced a 2 percent increase and predicted lower earners faced a 6 percent decrease in their federal marginal net-of-tax rates as a result of the *United States v. Windsor* ruling.

To estimate the income effect, I measure changes in the couple's predicted marriage subsidy (or penalty), which is a common measure of marriage incentives under joint taxation (Alm and Whittington 1999; Eissa and Hoynes 2003; Isaac 2017), but which is new to the literature estimating income effects of taxation because shifting

[2] I use opposite-sex married couples as an alternative control group in one of my robustness checks and find that the qualitative conclusions are the same.

[3] The marginal net-of-tax rate is one minus the marginal tax rate.

from the single to joint tax schedule is endogenous in most circumstances.[4] The marriage subsidy is defined as the difference between the sum of the individuals' tax liabilities if they are single and the couple's joint tax liability if they are married. The average same-sex married couple experienced an increase of $435.02 in household after-tax income due to the marriage subsidy, with substantial variation across households depending on total household earnings and how those earnings are split between partners.

In my estimation results, I find significant extensive margin Hicksian (wage) and income elasticities only among predicted lower earners, with higher responsiveness to changes in marginal net-of-tax rates among women compared to men. I estimate relatively large extensive margin Hicksian elasticities of of 0.792 and 1.216 for men and women, respectively, and income participation elasticities of -0.026 and -0.033 for men and women, respectively.

In contrast, I find that predicted higher earners instead respond to taxation along the intensive margin. I calculate that the income and substitution effects largely off-set each other, resulting in a small uncompensated (Marshallian) hours elasticity. I estimate significant Hicksian hours elasticities between 0.268 and 0.408 and significant income hours elasticities between -0.009 and -0.011 among predicted higher earners, which do not appear to differ significantly by gender. I do not find significant hours responses among predicted lower earners at conventional levels. These hours and participation Hicksian elasticity estimates are in-line with others in the literature using different populations of interest and sources of variation (see Keane's [2011] review of estimated labor supply responses to taxation), suggesting that my estimates are applicable not just for same-sex married couples, but for opposite-sex married couples as well.[5]

Finally, I derive a sufficient statistic formula to calculate the changes in deadweight loss and tax revenue imposed by joint taxation relative to individual taxation (Feldstein 1999; Immervoll et al. 2007; Chetty 2009). My estimates suggest that the shift to joint taxation among same-sex married couples induced $11.7 million

[4] To avoid reverse causality issues associated with using reported earnings to measure tax changes, I use predicted earnings and the NBER TAXSIM model to quantify the variation in predicted tax rates and household after-tax income.

[5] In Section 5, I examine several potential influences that might confound my estimates, and find that my original results are robust to a number of alternative specifications.

in additional deadweight loss and cost $333.2 million in tax revenue. Extending my elasticity estimates to all married couples in the United States, my findings suggest that, overall, joint taxation increases deadweight loss by $2.0 billion and generates $133.3 billion less in tax revenue, relative to individual taxation.

This paper is grounded in traditional labor supply and taxation questions, but also adds to the small, but growing, literature concerning same-sex couples. Prior research of same-sex couples and LGBT individuals has focused on workplace discrimination (Badgett 1995; Carpenter 2007; Plug, Webbink, and Martin 2014), health outcomes (Buchmueller and Carpenter 2010; Gonzales and Blewett 2014; Carpenter et al. 2018), differences in labor market behavior between same- and opposite-sex couples (Tebaldi and Elmslie 2006; Oreffice 2011; Antecol and Steinberger 2013), or predicted revenue effects of same-sex marriage legalization (Stevenson 2012; Alm, Leguizamon, and Leguizamon 2014). This paper is the first, to the best of my knowledge, to leverage tax variation among same-sex married couples to identify the effects of taxation on the labor supply of married couples. My analysis provides direct evidence of the additional efficiency costs and reduced tax revenue of joint taxation relative to individual taxation, and suggests that lowering tax rates among secondary earners, so as to mitigate the efficiency costs along the extensive margin, could further improve efficiency of the United States tax system. However, whether increased efficiency is worth the lower associated tax equity across families remains an open question.

The remainder of the paper is organized as follows. Section 2 discusses policy background and prior research. Section 3 discusses the data and Section 4 presents the empirical strategy along with the results. Section 5 presents robustness checks and alternative specifications. Finally, Section 6 presents the deadweight loss and tax revenue analysis, and Section 7 concludes.

2 Background

In this section I present a brief overview of same-sex marriage legislation in the United States and prior research concerning labor supply responses to taxation and economic outcomes for same-sex couples and LGBT individuals.

2.1 Same-Sex Marriage Legislation in the United States

The Defense of Marriage Act (DOMA) was established in 1996 and 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 these definitions at the federal level, states were allowed to decide for themselves whether they would recognize same-sex marriages, and Massachusetts became the first state to do so in 2004. Figure 1 presents a timeline of same-sex marriage legalization in the U.S.[6]

DOMA's definitions of marriage and spouse prevented same-sex married couples from obtaining any federal benefits of marriage available to opposite-sex married couples, and in June 2013 the Supreme Court ruled that DOMA's definitions of marriage and spouse were unconstitutional, thereby requiring the federal government to recognize same-sex marriages at the federal level. This had immediate effects on the tax environment faced by same-sex couples who had already married by the time of the ruling, and affected all same-sex married couples regardless of where they resided or whether their state of residence recognized same-sex marriages.[7] Whereas previously these couples filed federal tax returns as two single individuals, beginning in tax year 2013 they were required to file as either married, filing jointly or married, filing separately (U.S. Department of the Treasury, Internal Revenue Service 2013).[8]

2.2 Literature on Labor Supply and Taxation

As described by Keane's (2011) survey, past researchers have generally found small, if any, effects of taxation on male labor supply, with compensated (Hicksian) elasticities ranging from 0.05–0.84, with an average of 0.31, and larger labor supply responses to taxation among women. Many of these past studies exploit tax vari-

[6] California allowed same-sex marriages beginning in May 2008, but Proposition 8 (passed and enacted in November 2008) prevented new same-sex marriage licenses until the federal ruling in *United States v. Windsor*. However, the state continued to recognize marriages among same-sex couples in California who married between May 2008 and November 2008.

[7] The tax code recognizes marriages according to where they occurred (the place-of-celebration rule) not according to the couple's current state of residence.

[8] It is also worth mentioning the case of *Obergefell v. Hodges*, a 2015 Supreme Court ruling that required states to allow and recognize same-sex marriages. My analysis ends in 2015 and focuses on same-sex couples who married before 2013, and is therefore not affected by the *Obergefell v. Hodges* ruling.

ation caused by small to moderate tax changes among a subset of tax filers. For example, Crossley and Jeon (2007), Saez, Slemrod, and Giertz (2012), and Saez (2016) use variation in tax rates at the top of the earnings distribution to estimate labor supply and earnings responses among the highest earners. Others, such as Eissa and Liebman (1996), Ellwood (2000), Eissa and Hoynes (2004), and Moulton, Graddy-Reed, and Lanahan (2016) use variation in the Earned Income Tax Credit to estimate hours and participation responses to taxes among likely low earners. Fetter and Lockwood (2017) exploit the introduction of the Old Age Assistance Program to estimate labor force participation decisions among older workers.

The *United States v. Windsor* ruling, on the other hand, created large-scale variation that is more similar to that exploited by LaLumia (2008), who uses the introduction of joint taxation in the United States in the 1940s to estimate labor force participation responses among married couples, Selin (2014), who estimates the effects of a switch from joint to individual taxation in Sweden in 1971, or Kalíšková (2014), who estimates the impact of moving to joint taxation using a voluntary switch to joint taxation in the Czech Republic in 2005. These are the only studies, to the best of my knowledge, offering direct evidence of the effects of joint taxation through natural experiments from changes in tax systems.[9] The Supreme Court ruling effectively shifted same-sex married couples from an individual taxation system to one of joint taxation, and, as a result I am able to exploit a recent natural experiment to study changes in both tax rates and tax liabilities.

It is also worth noting that most of the previously mentioned studies distinguish between male and female labor supply, often assuming that the wife is the secondary earner in the household. Blau and Kahn (2007) and Heim (2007), however, document shrinking labor supply elasticities among women over the last four decades, and suggest that women's status as secondary earners has weakened over time. Baldwin, Allgrunn, and Ring (2011) and McClelland, Mok, and Pierce (2014) consider primary or secondary earner status regardless of gender and compare the results to those using the traditional male-female split. In this paper, I am able to break this link between gender and earning status by using predicted earnings to

[9] Bick and Fuchs-Schündeln (2017) study the role of tax code progressivity and the tax treatment of married couples on married partners' labor supply from a macroeconomic perspective. They conclude that the joint tax system used in the United States suppresses married women's labor supply, which corroborates LaLumia's (2008), Selin's (2014), and Kalíšková's (2014) conclusions.

separate same-sex couples into a sample of predicted higher earners and a sample of predicted lower earners.

This paper is also connected to the optimal taxation literature. Kleven, Kreiner, and Saez (2009) analyze optimal income tax rates among married couples and conclude that optimal rates can exhibit negative, rather than positive, jointness. Feldstein (1999) develops a sufficient statistic approach to estimate the deadweight loss, calculating deadweight loss equal to 32 percent of total personal income tax revenue, while Immervoll et al. (2007) find deadweight loss ranging from 19 percent in low-tax European countries to 82 percent in high-benefit European countries. I use a sufficient statistic approach similar to Feldstein (1999) and Immervoll et al. (2007) and discussed more generally by Chetty (2009) to calculate the additional deadweight loss and tax revenue created by joint taxation relative to individual taxation.

2.3 Economic Research on Same-Sex Couples and LGBT Individuals

Economic research concerning same-sex couples and LGBT individuals is scarce due primarily to few available sources of data. Until recently, data editing procedures in prior waves of the census and American Community Surveys, such as changing the gender or marital status of same-sex partners, made it difficult to identify same-sex couples in the data.[10]

Oreffice (2011) and Antecol and Steinberger (2013) use the 2000 decennial census to study bargaining power in unmarried same-sex couples and labor supply differences relative to opposite-sex couples, respectively. Oreffice (2011) estimates greater bargaining power for richer and younger partners in same-sex couples, and Antecol and Steinberger (2013) finds that children explain 52 percent of the hours gap between female secondary earners in opposite- and same-sex couples.

Stevenson (2012) and Alm, Leguizamon, and Leguizamon (2014) use the American Community Survey to predict labor supply and federal tax revenue consequences of same-sex marriage legalization. Stevenson (2012) predicts a $20–40

[10] In the 1990 census, if a couple appeared to be a same-sex married couple then one partner's gender was changed so that the couple appeared to be an opposite-sex married couple. In the 2000 and 2010 censuses and in pre-2012 waves of the American Community Survey, if a couple appeared to be a same-sex married couple then their marital status was changed to "unmarried partner," sometimes without an accompanying data quality flag (U.S. Census Bureau 2009).

million increase in federal tax revenue, while Alm, Leguizamon, and Leguizamon (2014) conclude that the federal government could gain $5.7 million or lose up to $315.8 million. My calculations of the change in tax revenue as a result of *United States v. Windsor* are closer to estimates from Alm, Leguizamon, and Leguizamon (2014).

Other research on LGBT individuals has focused on workplace discrimination (Badgett 1995; Carpenter 2007; Plug, Webbink, and Martin 2014), health outcomes (Buchmueller and Carpenter 2010; Gonzales and Blewett 2014; Carpenter et al. 2018), or differences in labor market behavior between same- and opposite-sex couples (Tebaldi and Elmslie 2006). Overall, while the literature concerning same-sex couples and LGBT individuals has grown, studies are still scarce due to few available sources of data concerning same-sex couples.

3 Data

I use the 2012–2015 waves of the American Community Survey to estimate the effects of taxation on annual hours of work and labor force participation. My main sample includes same-sex married couples who married in 2012 or earlier and same-sex cohabiting couples in which both partners are between 25 and 54 years old (inclusive).[11] By focusing on same-sex couples who had already married by the time of the Supreme Court ruling, I can abstract away from the marriage decision and use tax rate and household income changes associated with the change in federal marriage recognition. I include same-sex couples with at least one earner when examining labor force participation, and further restrict the sample to couples in which both members work when examining annual hours of work, leaving me with a sample of 13,220 same-sex couples in my extensive margin sample (4,116 married and 9,104 cohabiting couples), and a sample of 10,393 same-sex couples in my intensive margin sample (3,039 married and 7,354 cohabiting couples). In my calculations below, I define tax units in the data based on reported marital status, school enrollment, age, and whether the federal government recognized same-sex

[11] I can observe when a couple married, and so can condition on marrying before the Supreme Court ruling. I cannot, however, observe when a cohabiting couple began their relationship or their cohabitation. This limitation means that the control group of same-sex cohabiting couples may contain some very recent couples, although I provide graphical evidence that mean demographic variables remained stable over time.

marriage.[12]

3.1 Predicted Earnings

An individual's labor supply decisions affect her marginal tax rate and tax liability through her earnings, introducing endogeneity through reverse causality because higher earnings are associated with higher marginal tax rates and tax liabilities. I therefore generate a plausibly exogenous measure of an individual's taxes by predicting individual earnings based on predetermined characteristics, and use predicted earnings to estimate each individual's tax rates and liabilities.

I predict individual earnings within the sample of all same-sex couples using a machine learning least absolute shrinkage and selection operator (LASSO). The LASSO is a penalized regression that selects a subset of the available variables that best fit the data (Tibshirani 2011). This powerful machine learning approach allows me to provide a large number of variable interactions while allowing the LASSO to select the most appropriate set of variables to predict earnings. Variables that I included, but which the LASSO may have ultimately ignored, include age and its square, years of education and its square, number of children and its square, fixed effects for race, gender, occupation, college major, state, and year, as well as pairwise interactions between the majority of these variables.[13] These predicted earnings slightly understate reported earnings, but I am able to correctly predict earning status for 68.0 percent of the extensive margin sample and 65.4 percent of the intensive margin sample, compared to their observed earning status using reported earnings.[14,15] Figure 2 displays the distribution of predicted household earnings and split in predicted earnings within the household using the sample of same-sex couples I analyze below. Household earnings and earnings splits are concentrated most heavily around $120,000 split relatively evenly between the two partners.

[12] 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 I assume the couple married in a state that did recognize same-sex marriages.

[13] I did not include interactions between occupation or college major with each other or with state, year, or number of children due to parameter space constraints. I cannot observe occupation information for individuals who are currently unemployed and who have never worked before or for individuals who have not been in the labor force for the past five years.

[14] The R^2 of this regression is 0.3374.

[15] The LASSO prediction procedure allows me to assign policy variables to non-workers, but it raises the Heckman concern that non-workers may have systematically lower wages than workers. This concern is not a substantial problem in my context because I use tax rates, rather than earnings, to explain labor supply behavior.

Table 1 presents summary statistics of the predicted higher and predicted lower earners in same-sex married and cohabiting couples in the 2012–2015 ACS.[16] Notably, male couples are slightly less likely to be married. Married couples are slightly older, earn slightly more, and are more educated, on average, than cohabiting couples. Conditional on working, predicted higher earners generally work full-time, full-year, whereas predicted lower earners work less, with cohabiting predicted lower earners generally working less than their married counterparts.

Figure 3 displays means of the demographic variables in Table 1. Most of the demographic variables exhibit visually similar mean trends over time, lending some support in favor of the parallel trends assumption. The presence of children is the only demographic variable with a noticeably divergent trend between 2012–2013, after which the means appear parallel between same-sex married and cohabiting couples, but controlling for children does not meaningfully affect my results, as I show in Appendix A.

3.2 The Marginal Net-of-Tax Rate

Variation in marginal tax rates due to the Supreme Court ruling comes from two sources: the shift from the single to joint tax schedule and the addition of both partners' earnings into taxable income. Figure 4 demonstrates simulated variation in the federal marginal tax rates before and after *United States v. Windsor* to provide a sense of how marginal tax rates can change following the introduction of joint taxation. These simulated households vary in total household earnings and how the earnings are split between partners. The figures show, in general, that secondary earners face higher marginal tax rates under joint taxation relative to individual taxation, while variation among primary earners is more muted.

In order to capture this variation, I first use predicted earnings and the NBER TAXSIM model to calculate the federal marginal net-of-tax rate each couple faced after the Supreme Court ruling. I then adjust the tax year to 2012 (the tax year before the policy came into effect), adjust the individual's filing status, dependents, and predicted earnings to reflect the pre-ruling tax environment, and calculate each

[16] Appendix Table A.1 presents summary statistics comparing predicted higher (lower) earners to observed higher (lower) earners. The table shows that the sample of predicted higher (lower) earners is comparable to the observed sample at the means.

individual's simulated pre-ruling federal marginal net-of-tax rate.[17] Finally, I express the percentage change in the marginal net-of-tax rate from 2013 to the observation year in order to estimate elasticities:

$$\%\Delta(1-\hat{\tau}_{it}) = \begin{cases} \frac{[1-\hat{\tau}_{it}]-[1-\hat{\tau}_{i2013}]}{1-\hat{\tau}_{i2013}}, & \text{if year } \geq 2014 \\ 0, & \text{if year } \leq 2013 \end{cases}$$

where $1-\hat{\tau}_{it}$ is individual i's predicted marginal net-of-tax rate in year $t \geq 2014$ and $1-\hat{\tau}_{i2013}$ is the predicted marginal net-of-tax rate in 2013 (tax year 2012). Table 2 provides illustrative examples of how the variable $\%\Delta(1-\hat{\tau}_{it})$ appears in the data.[18] Table 1 shows that, on average, predicted higher earners in same-sex married couples faced a 2 percent increase in their federal marginal (last-dollar) net-of-tax rates while predicted lower earners in same-sex married couples faced a 6 percent decrease in their federal marginal (last-dollar) net-of-tax rates as a result of the *United States v. Windsor* ruling.

3.3 The Marriage Subsidy

The nature of the Supreme Court ruling allows me to use the marriage subsidy as a new measure of household income changes in order to identify the income effect, and, by extension, the Hicksian wage elasticity. The marriage subsidy is defined as the difference between the sum of the individuals' tax liabilities if they are single and the couple's joint tax liability if they are married, and exists as an inevitable feature of the United States' progressive, household-based tax system. The marriage subsidy is a common measure of tax incentives to marry or divorce in the family structure literature (Alm and Whittington 1995, 1999; Ellwood 2000; Eissa and Hoynes 2003; Isaac 2017), but is new to the literature seeking to estimate income effects of taxation because shifting from the single to joint tax schedule is endogenous in most circumstances.[19]

[17] I assume that the predicted higher earner claims any dependent children for tax purposes in this case and files as "head of household." In reality, the biological parent would claim the children, but I cannot observe biological relationship status in the ACS.

[18] I calculate the $\%\Delta(1-\hat{\tau}_{it})$ variable for all individuals in the sample rather than only for same-sex married couples. Doing so allows me to capture additional variation in marginal net-of-tax rates due to other changes to the single filing schedule that is unrelated to the Supreme Court ruling, and should aid in identification.

[19] Same-sex married couples would not have faced state tax changes due to the ruling in *United States v. Windsor* because the ruling affected only federal marriage recognition. The 2015 Supreme Court ruling in *Obergefell v. Hodges*, however,

Figure 5 displays simulated variation in the marriage subsidy as a percentage of household earnings for simulated households that vary depending on total household earnings and how the earnings are split within the household. In general, couples with a single earner are more likely to receive a marriage subsidy, but, conditional on household earnings, a more even split in earnings between partners decreases the marriage subsidy and can also turn it into a penalty. Marriage penalties are more pervasive among couples with children.[20]

I follow a procedure parallel to my calculation of marginal net-of-tax rates, above. I first use predicted earnings and the NBER TAXSIM model to calculate the federal tax liability each same-sex married couple faced after the Supreme Court ruling. I then adjust the tax year to 2012 (the tax year before the policy came into effect), adjust the individual's filing status, dependents, and predicted earnings to reflect the pre-ruling tax environment, and calculate each individual's simulated pre-ruling federal tax liability:

$$\Delta \hat{T}_{ij} = \begin{cases} [\hat{T}_i + \hat{T}_j] - [\hat{T}_{ij}], & \text{if year } \geq 2014 \text{ and same-sex married couple} \\ 0, & \text{otherwise} \end{cases}$$

where $\hat{T}_i$ is individual i's predicted tax liability in 2013 (tax year 2012) under the single federal tax schedule and $\hat{T}_{ij}$ is the couple's predicted joint tax liability in year $t \geq 2014$. A positive value indicates an increase in household income due to a lower joint tax liability after the Supreme Court ruling.[21] Table 2 provides illustrative examples of how the variable $\Delta \hat{T}_{ij}$ appears in the data. Table 1 shows that, on average, same-sex married couples experienced an increase of $435.02 in household income due to the marriage subsidy, with substantial variation across households.

would have altered the state legislative landscapes faced by same-sex married couples, and it is possible that same-sex couples faced marriage incentives from their state tax code. I do not consider this in my empirical strategies, but these incentives would, in general, be substantially smaller than those created by the federal tax code. Indeed, Light and Omori (2008) find that marriage penalties created by state taxes do not have significant effects on family structure decisions.

[20] 48 percent of same-sex married couples and 8 percent of same-sex cohabiting couples have children, which will enter into my calculations of the tax rate and tax liability changes.

[21] Note that the value of the variable $\Delta \hat{T}_{ij}$ will be the same for both partners in a same-sex married couple.

4 Empirical Strategy

I use a generalized difference-in-differences, or treatment intensity, framework to estimate hours and labor force participation responses to taxation for predicted higher and lower earners separately. Individuals in same-sex married couples comprise the treatment group and individuals in same-sex cohabiting couples comprise the control group.

4.1 Separating Income and Substitution Effects

Higher or lower earners may respond to taxation differently due, for example, to differing work preferences or attachment to the labor force. I estimate the following generalized difference-in-differences equation separately for predicted higher earners and predicted lower earners to allow for heterogenous responses to taxation by predicted earning status:

$$Y_{it} = \gamma_0 + \gamma_1 \%\Delta(1-\hat{\tau}_{it}) + \gamma_2 \Delta\hat{T}_{ij} + \gamma_3 SSMC_i + \gamma_4 X_{it} + \delta_t + \mu_s + \varepsilon_{it} \qquad (1)$$

Where Y_{it} is either annual hours of work or labor force participation, $\%\Delta(1-\hat{\tau}_{it})$ is the individual's predicted percentage change in federal marginal net-of-tax rate from before the *United States v. Windsor* ruling to the observation year, $\Delta\hat{T}_{ij}$ is the couple's predicted change in household income due to the marriage subsidy, $SSMC_i$ is equal to one if the couple is a same-sex married couple, X_{it} is a vector of additional covariates including age, race, education, gender, and the age difference between the predicted higher and lower earners, and δ_t and μ_s are year and state fixed effects, respectively.[22] I also include the partner's predicted earnings to control for the level of predicted earnings that enter into the tax change variables, and bootstrap standard errors to account for the predicted regressors.

The coefficients of interest are γ_1, which determines the total uncompensated (Marshallian) elasticity, and γ_2, which determines the income effect. Identification of γ_1 and γ_2 comes from individual- and couple-level tax rate and liability variation across individuals in same-sex married couples compared to individuals in same-

[22] State fixed effects will capture, among other characteristics, overall state attitudes toward same-sex relationships and local labor market discrimination against LGBT individuals, which may be correlated with the state's decision to recognize same-sex marriages (Gao and Zhang 2016).

sex cohabiting couples before and after the Supreme Court ruling conditional on other observable covariates. The identifying assumption I must make in this generalized difference-in-differences framework is that annual hours of work and labor force participation of same-sex married and cohabiting couples would have evolved parallel to each other in the absence of the Supreme Court ruling.[23]

I use an event study approach to examine whether there is statistical evidence of differential pre-trends between same-sex married and cohabiting couples. Figure 6 presents the event study coefficient estimates and confidence intervals, showing that there is no significant evidence of pre-trends (in 2012) between same-sex married and cohabiting couples.[24] As discussed in more detail below, my results are also robust to controlling for a linear, group-specific time trend, which relaxes the parallel trends assumption.

4.2 Estimating Structural Elasticities

I use the estimated coefficients from Equation 1 to estimate uncompensated (Marshallian) elasticities, income elasticities, and compensated (Hicksian) elasticities along the intensive and extensive margins. Following Gruber and Saez (2002) and Keane (2011), the total effect of a wage rate change is given by the Slutsky equation below, which I have multiplied by $\frac{w}{H}$ to convert into elasticities:

$$\frac{\partial H}{\partial w}\frac{w}{H} = \frac{\partial H}{\partial w}\frac{w}{H}\bigg|_u + \left[\frac{\partial H}{\partial Y}\frac{Y}{H}\right]\frac{wH}{Y} \tag{2}$$

Where H is hours worked, w is the hourly wage rate, and Y is total income. The left-hand side term in Equation 2 is the Marshallian elasticity. The first term on the right-hand side is the Hicksian elasticity and the second term on the right-hand side is the income effect.

To estimate these elasticities, I interpret γ_1 as the effect of a percentage change in the net-of-tax hourly wage and γ_2 as the effect of a change in household non-labor income. Given these interpretations, I estimate the Marshallian, income, and

[23] Figure 3 shows that most demographic variables for the treatment and control groups do not exhibit visual differences in mean trends over time, lending some support in favor of the parallel trends assumption.

[24] Full results from this event study specification are available upon request.

Hicksian elasticities along the intensive margin as:

$$\text{Marshallian: } \varepsilon_M = \frac{\partial H}{\partial w}\frac{w}{H} = \frac{\partial H}{\partial ln(w)}\frac{1}{H} = \hat{\gamma}_1\frac{1}{\bar{H}} \tag{3a}$$

$$\text{Income: } \varepsilon_I = \frac{\partial H}{\partial Y}\frac{Y}{H} = \hat{\gamma}_2\frac{\bar{Y}}{\bar{H}} \tag{3b}$$

$$\text{Hicksian: } \varepsilon_H = \frac{\partial H}{\partial w}\frac{w}{H} - \frac{\partial H}{\partial Y}w = \hat{\gamma}_1\frac{1}{\bar{H}} - \hat{\gamma}_2\bar{w} \tag{3c}$$

where $\bar{H}$ is the average hours worked in the sample, $\bar{Y}$ is the average household non-labor income in the sample, and $\bar{w}$ is the average hourly wage rate in the sample.

Economic theory predicts that the Hicksian elasticity is positive and, if leisure is a normal good, that the income effect is negative. Therefore, I expect $\hat{\gamma}_2 < 0$ and $\hat{\gamma}_1\frac{1}{\bar{H}} - \hat{\gamma}_2\bar{w} > 0$, but cannot predict the sign of $\hat{\gamma}_1$ along the intensive margin a priori because the Marshallian elasticity can be positive or negative depending on the dominating effect.

It is also possible to calculate the Hicksian and income elasticities along the extensive margin. In this case, the Hicksian and Marshallian elasticity concepts are the same because the income effect term in Equation 2 is zero:

$$\text{Hicksian: } \eta_H = \frac{\partial LFP}{\partial w}\frac{w}{LFP} = \frac{\partial LFP}{\partial ln(w)}\frac{1}{LFP} = \hat{\gamma}_1\frac{1}{\overline{LFP}} \tag{4a}$$

$$\text{Income: } \eta_I = \frac{\partial LFP}{\partial Y}\frac{Y}{LFP} = \hat{\gamma}_2\frac{\bar{Y}}{\overline{LFP}} \tag{4b}$$

where $\overline{LFP}$ is the average labor force participation rate in the sample. Along the extensive margin, economic theory predicts that $\hat{\gamma}_1 > 0$ and $\hat{\gamma}_2 < 0$.

4.3 Results

Tables 3–4 present extensive and intensive margin generalized difference-in-differences coefficient estimates, respectively, from Equation 1, in which I use the predicted percentage change in the marginal net-of-tax rate and the predicted change in household income due to the marriage subsidy in order to separate the income and substitution effects. I estimate small and statistically insignificant effects of taxation on

the labor force participation of predicted higher earners. In contrast, I estimate that a 10 percent increase in the marginal net-of-tax rate increases labor force participation by 9.1 percentage points (11.0 percent) and a $1,000 increase in household income decreases labor force participation by 1.0 percentage points (1.2 percent) among predicted lower earners in same-sex married couples relative to same-sex cohabiting couples. These coefficients imply a significant Hicksian participation elasticity of 1.043 and a significant income participation elasticity of -0.029 among predicted lower earners. I also estimate the model separately for male and female same-sex couples, and find significant Hicksian participation elasticities of 0.792 and 1.216 for men and women, respectively, and significant income participation elasticities of -0.026 and -0.033 for men and women, respectively.

Along the intensive margin, I estimate significant Hicksian and income hours elasticities at conventional levels only among predicted higher earners. I calculate that the income and substitution effects largely off-set each other, resulting in a small (and sometimes significant) Marshallian hours elasticity. The elasticity estimates are not statistically different when using the sample of both men and women, the sample of men, or the sample of women. I estimate Hicksian hours elasticities between 0.268 and 0.408 and income hours elasticities between -0.009 and -0.011 among predicted higher earners. I estimate smaller and statistically insignificant elasticities among predicted lower earners.

These elasticity estimates are in-line with many other estimates in the literature, as reported by Keane (2011) in his review of the literature on labor supply responses to taxation. Keane (2011) reports male Hicksian hours elasticities between 0.02 and 1.32 across 22 studies, with an average of 0.31, and female Hicksian participation elasticities between 0.01 to 1.60 across 4 studies. Chetty (2012), in his examination of micro and macro labor supply elasticities, places bounds of [0.28,0.54] on intensive margin Hicksian elasticities while accounting for optimization frictions.

Finally, at the mean values of the tax change variables, I estimate that the introduction of joint taxation decreased labor force participation of predicted lower earners by 5.543 percentage points (6.678 percent) and did not change hours worked by predicted higher earners, which is similar to past findings. For example, LaLumia (2008) and Kalíšková (2014) estimate a 2 and 3 percentage point decline in

female employment, respectively, due to the introduction of joint taxation.

5 Robustness Checks and Alternative Specifications

I examine the robustness of my estimates to several potential confounding factors and estimate a specification using an alternative control group of opposite-sex married couples. In all cases I find qualitatively similar results, indicating that my main findings are robust to a number of potential concerns.

There are two main concerns in the literature about same-sex couples that need to be explored. First, Black et al. (2007) and Gates and Steinberger (2010) document substantial measurement error of same-sex couples in the 2000 decennial census and the 2005–2007 ACS, respectively, due to opposite-sex couples mis-marking one of the partner's genders so that the couple appears to be a same-sex couple in the data. Measurement error in identifying same-sex couples likely biases my estimates toward zero. To address this concern, I estimate the model by restricting the sample to couples who responded using a computer assisted telephone or personal interview process (CATI/CAPI) rather than the traditional mail-in form.[25] Table 5, columns 1–2, show that the qualitative conclusions of the main results remain the same, indicating little effect of mis-measurement in the data.

The second concern from the same-sex couple literature is that there may not have been 100 percent take-up of joint filing among same-sex married couples after the *United States v. Windsor* ruling due to compliance barriers in some states (Fisher, Gee, and Looney 2016). Ten states in 2014 required married couples to file jointly on their state tax returns if they filed jointly on their federal tax returns, while simultaneously not allowing same-sex married couples to file jointly on state tax returns, which can create compliance barriers to filing jointly in some states and may bias my coefficient estimates toward zero.[26] To address this concern, I estimate the model by excluding from the sample same-sex couples residing in states with inconsistent tax policies. Table 5, columns 3–4, show that the coefficient estimates using this sample restriction remain stable, and the qualitative conclusions

[25] Gates and Steinberger (2010), Kreider and Lofquist (2015), and Lofquist (2015) all document much lower gender mis-marking among CATI/CAPI respondents compared to mail-in respondents due to an automatic response check.

[26] These states are Alabama, Georgia, Kansas, Kentucky, Louisiana, Michigan, Missouri, Nebraska, North Dakota, and Ohio.

of the main results remain the same, indicating little bias in the estimates due to inconsistent tax policies.

Sample selection with regards to married couples is also a notable concern. My main sample includes same-sex cohabiting couples and same-sex married couples who married in 2012 or earlier, which places greater marriage duration constraints on couples observed in later waves. To address this concern, I estimate the model on a sample of same-sex couples that restricts married couples to those who have been married for at least three years in each survey year.[27] Furthermore, missing variables in the 2012 wave of the ACS allow me to use only observations from 2013 or later in this sample.[28] Table 5, columns 5–6, show that the coefficient estimates using this sample restriction remain stable, and the qualitative conclusions of the main results remain the same.

I also estimate a specification of Equation 1 using an alternative control group of opposite-sex married couples. Same-sex cohabiting couples have similar pre-ruling tax environments, but opposite-sex married couples share a similar legal relationship status and a similar post-ruling tax environment, leaving unclear which group serves as the best control group. I am also unable to observe the duration of a cohabiting couple's relationship, limiting my ability to restrict the sample in the same way as married couples.[29] Therefore, I re-estimate my model using opposite-sex married couples as an alternative control group.[30] Table 5, columns 7–8, present the results. I estimate very similar Hicksian hours elasticities, providing evidence that my main hours findings are not driven by the choice of control group. However, I estimate a significant and smaller participation elasticity of 0.460 for predicted lower earners. Although quantitatively different, the qualitative conclusion of my main findings remains the same.

[27] There is no additional restriction on same-sex cohabiting couples. I cannot observe when these couples began their relationship or cohabitation, and so cannot further restrict this group in the sample.

[28] 2012 ACS data editing procedures specify that the "year of marriage" variable is not defined for same-sex married couples in this wave of the American Community Survey. The absence of the year of marriage does not allow me to determine how long the couple has been married, and so I exclude 2012 observations of all couples in this specification.

[29] Appendix Table A.2 presents summary statistics of the same-sex and opposite-sex married couples in this specification.

[30] Due to computing power constraints, I am not able to obtain new LASSO estimates for predicted earnings using this sample of married couples. In addition, using my original LASSO estimates results in a poorer fit in this sample compared to a simplified OLS regression using only age and its square, years of education and its square, and fixed effects for race, gender, occupation, college major, state, and year. I therefore use the simpler OLS specification rather than the LASSO for this sample of married couples. I am able to match empirical earning status for 76.5 percent and 71.6 percent of the extensive and intensive samples, respectively, with an R^2 of 0.3506. Using my original LASSO estimates on this sample of married couples results, instead, in 72.6 percent and 67.0 percent matches, respectively.

Finally, it is possible to include stronger controls in the form of state-by-year fixed effects (Table 5, columns 9–10) or a linear, group-specific time trend (Table 5, columns 11–12). State-by-year fixed effects are possible because the *United States v. Windsor* ruling affected federal tax policy for same-sex married couples and treatment was not tied to state of residence. A group-specific linear time trend relaxes the parallel trends assumption needed for identification in my main analysis. The elasticity estimates in both of these specifications are unchanged, suggesting that my main findings are robust to idiosyncratic shocks that vary at the state-year level and also hold even under a weaker trends assumption.

I also examine several alternative specifications of Equation 1 that allow for additional effects or controls and examine heterogeneous elasticities by household earnings. These results are presented in Appendix Tables A.3–A.4.

6 Deadweight Loss and Tax Revenue Implications

In this section, I apply my Hicksian elasticities and the relative tax changes created by *United States v. Windsor* to an existing sufficient statistic framework explored in more detail by Feldstein (1999), Immervoll et al. (2007), and Chetty (2009). My calculations below provide further insight into the welfare and tax revenue consequences implied by my Hicksian elasticity estimates.

6.1 Deriving the Sufficient Statistic Formula

Figure 7 displays how deadweight loss and tax revenue change following a small tax increase. The total change in deadweight loss due to a small tax change is $dDWL = dW - dTR$, where dW is the change in consumer welfare due to the tax change and dTR is the change in tax revenue. A higher tax rate increases tax revenue through a mechanical revenue effect, dM, but decreases tax revenue through behavioral responses, dB, so that the total change in tax revenue is $dTR = dM + dB$. Appealing to the envelope theorem, the change in consumer welfare due to taxation, dW, is equal to the mechanical revenue effect, dM. Substituting these expressions into $dDWL$, we obtain $dDWL = dM - (dM + dB) = -dB$, which describes how deadweight loss changes following a change in tax rates. In order to calculate dB, I

consider Chetty's (2009) simple model to derive the sufficient statistic formula.

Each partner ($i = 1,2$) in a married couple chooses hours of work, h^i, to maximize her utility, $u^i = C^i - \psi(h^i)$, which is a function of consumption, C^i, and a disutility of work, $\psi(h^i)$, subject to a constant marginal tax rate, τ, an hourly wage, w_i, and household non-labor income, y. The price of consumption is normalized to 1. Finally, assume that the government redistributes the tax revenue through a lump sum transfer, $T = \tau(w_1h^1 + w_2h^2)$, to each household. The household budget constraint is, therefore, $(1-\tau)[w_1h^1 + w_2h^2] + y + T \geq C^1 + C^2$.

This utility function ignores income effects in order to make the derivation tractable, and is also money metric so that social welfare, below, is measured in dollars. This simplification is common in the sufficient statistic literature studying income taxation, and means that the Marshallian and Hicksian elasticity concepts are the same along the intensive margin.

I consider a utilitarian welfare function for a representative household, in which consumer welfare is equal to the sum of the partners' utilities subject to a household budget constraint. Total welfare, $\mathbf{W}$, is the sum of consumer welfare and the tax revenue raised by the government:

$$\mathbf{W}(\tau) = \left\{(1-\tau)(w_1h^1 + w_2h^2) + y + T - \psi(h^1) - \psi(h^2)\right\} + \underbrace{\tau(w_1h^1 + w_2h^2)}_{T=\text{Tax Revenue}} \quad (5)$$

The term in braces above is consumer welfare. Appealing to the envelope theorem, the change in the welfare cost of taxation is equal to:

$$dW = dM = \frac{d[(1-\tau)(w_1h^1 + w_2h^2) + y + T - \psi(h^1) - \psi(h^2)]}{d\tau} = -(w_1h^1 + w_2h^2)d\tau \quad (6)$$

The change in tax revenue is due to the mechanical change in tax revenue, dM, and the behavioral change, dB:

$$dTR = \frac{d[\tau(w_1h^1 + w_2h^2)]}{d\tau} = \underbrace{(w_1h^1 + w_2h^2)d\tau}_{dM} + \underbrace{\tau\left(w_1\frac{dh^1}{d\tau} + w_2\frac{dh^2}{d\tau}\right)d\tau}_{dB} \quad (7)$$

From equations 6 and 7, we obtain:

$$\begin{aligned} dDWL &= -d\mathbf{W}(\tau) = -(dW + dTR) \\ &= \frac{\tau}{1-\tau}\left(w_1 h^1 \varepsilon_H^1 + w_2 h^2 \varepsilon_H^2\right) d\tau \end{aligned} \tag{8}$$

Where $\varepsilon_H^i = \frac{dh^i}{d(1-\tau)} \frac{1-\tau}{h^i}$ is the Hicksian hours elasticity for individual i. Equation 8 shows that the change in deadweight loss along the intensive margin due to a tax change can be expressed as a function of the marginal tax rate, earnings, and the compensated Hicksian hours elasticity. A symmetric equation holds for extensive margin responses with the extensive compensated elasticity, η_H^i, substituted for ε_H^i, and the average tax rate, α, substituted for τ, which is similar to the formulation derived by Immervoll et al. (2007).

6.2 Empirical Implementation and Findings

I use the sample means of τ, α, $d\tau$, $d\alpha$, and $w_i h^i$ along with my Hicksian elasticity estimates and household weights in the American Community Survey to compute $dDWL$ in Equation 8 and dTR in Equation 7. I consider heterogeneous changes in deadweight loss and tax revenue according to either the household earnings split between partners or the level of household earnings. Figure 8 displays the distribution of earnings splits and household earnings level among same-sex and opposite-sex married couples in my samples.[31]

I plot my deadweight loss calculations in Figure 9A–9B, where a positive value indicates more deadweight loss under joint taxation relative to individual taxation and a negative value indicates less deadweight loss. The figure shows that, in general, joint taxation creates more deadweight loss than individual taxation for all but single-earner couples. Examining changes in deadweight loss by household earnings level reveals that deadweight loss due to joint taxation increases with earnings, growing rapidly for households earning above $200,000.

When considering earnings splits, I find that *United States v. Windsor* increased

[31] These distributions understate the absolute number of households in each earnings split or earnings level category because I use only observations of single- or dual-earner families who responded to the American Community Survey using computer assisted telephone or personal interviews in order to avoid the possibility of misclassification between same-sex and opposite-sex married couples.

deadweight loss by $11.7 million among same-sex married couples, and (extending my elasticity estimates to opposite-sex married couples) that joint taxation increases deadweight loss by $2.0 billion among opposite-sex married couples overall. Considering household earnings levels, instead, suggests that *United States v. Windsor* increased deadweight loss by $127.6 million among same-sex married couples, and that joint taxation increases deadweight loss by $16.8 billion among opposite-sex married couples overall.[32]

I plot my tax revenue calculations in Figure 9C–9D, where a positive value represents an increase in tax revenue and a negative value indicates a decrease. The figure shows that, in general, joint taxation increases tax revenue relative to individual taxation for relatively equal-earning couples due to the marriage penalty, but decreases tax revenue for other couples. The figure also shows that tax revenue gains increase in household earnings, growing rapidly for households earning above $200,000. Considering earnings splits implies that *United States v. Windsor* cost the federal government $333.2 million among same-sex married couples and (extending my elasticity estimates to opposite-sex married couples) generates $133.3 billion less in tax revenue among opposite-sex married couples overall. Considering household earnings levels, instead, suggests that *United States v. Windsor* increased tax revenue by $351.1 million, and that joint taxation increases tax revenue by $26.6 billion among opposite-sex married couples overall. Modeling labor supply decisions taking into account both sources of heterogeneity is outside the scope of this paper, but future research incorporating both sources of heterogeneity in labor supply decisions will be useful in reconciling these behavioral tax revenue effects of joint taxation.

Finally, the tax revenue effects above are due only to behavioral responses to changes in tax rates, and does not include any measure of the marriage subsidy associated with the *United States v. Windsor* ruling. My calculations suggest that federal tax revenue declined by $245.2 million due to the marriage subsidy following the Supreme Court ruling, which is consistent with other calculations of the federal tax revenue consequences of same-sex marriage legalization, such as those

[32]These calculations do not tell us the total efficiency cost of taxation, only the additional cost of joint taxation relative to individual taxation. Feldstein (1999), for example, finds that the personal income tax creates deadweight loss equal to 32.2 percent of tax revenue.

by Stevenson (2012) and Alm, Leguizamon, and Leguizamon (2014), who find decreases of $38 million and $95–237 million in federal tax revenue, respectively.[33]

7 Conclusion

The June 2013 Supreme Court decision in *United States v. Windsor* has been heralded as a landmark civil rights case. While many commentators have focused on the legal and social effects of defining who can marry, the Supreme Court ruling also had immediate consequences for the tax environment faced by same-sex couples who were already married by the time of the ruling. I leverage improved data quality of same-sex married couples and new tax variation among this understudied population to examine classic economic questions concerning the labor supply effects, efficiency costs, and tax revenue consequences of joint taxation.

I use the 2012–2015 waves of the American Community Survey, which are the first of the Census Bureau surveys to explicitly identify same-sex married couples. I also predict individual earnings using a machine learning LASSO approach to construct samples of predicted higher and lower earners. My main specifications use a generalized difference-in-differences framework in order to compare a treatment group of same-sex married couples to a control group of same-sex cohabiting couples. I quantify variation in federal marginal tax rates due to the sudden movement from the single tax schedule to the joint filing tax schedule, and variation in household after-tax income due to the marriage subsidy. These sources of variation allow me to separate the income and substitution effects of taxation.

I estimate a significant compensated (Hicksian) participation elasticity of 1.043 and a significant income participation elasticity of -0.029 among predicted lower earners, but find no evidence of participation effects among predicted higher earners. Along the intensive margin, I estimate a significant Hicksian hours elasticity of 0.355 and a significant income hours elasticity of -0.011 among predicted higher earners, and no significant evidence of hours responses among predicted lower earners at conventional levels. My estimates are in-line with others from the literature using different populations of interest and sources of variation, suggesting that my

[33] Note that this measure of the marriage penalty assumes no labor supply responses to taxation.

estimates are applicable not just for same-sex married couples, but for opposite-sex married couples as well. My results are robust to a number of potential confounding factors and alternative specifications.

Finally, I use my Hicksian elasticity estimates in a sufficient statistic framework to calculate the additional deadweight loss and tax revenue created by joint taxation relative to individual taxation, which is equal across marital status rather than family income. My estimates suggest that *United States v. Windsor* induced $11.7 million in additional deadweight loss and cost $333.2 million in tax revenue from same-sex married couples relative to individual taxation. Extending my elasticity estimates to all married couples, I find that joint taxation increases deadweight loss by $2.0 billion and reduces tax revenue by $133.3 billion relative to individual taxation.

My findings suggest that there may be efficiency gains to lowering tax rates among secondary earners so as to mitigate the efficiency costs along the extensive margin. Improved data quality combined with important legal victories for same-sex couples in the United States offer the possibility of further understanding not only the particular economic changes and challenges faced by same-sex couples, but also an opportunity to learn more about married couples' responses to legislation more generally.

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Table 1: Summary Statistics of Couples in the 2012–2015 American Community Survey

	Married couples		Cohabiting couples	
	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners
Male	0.47	0.47	0.55	0.55
	(0.50)	(0.50)	(0.50)	(0.50)
Black	0.06	0.06	0.05	0.06
	(0.24)	(0.25)	(0.22)	(0.23)
Other	0.10	0.12	0.08	0.11
	(0.31)	(0.33)	(0.28)	(0.31)
Age	42.50	41.51	40.85	39.37
	(7.44)	(7.95)	(8.31)	(8.72)
Years of education	15.22	14.10	15.39	14.12
	(2.90)	(3.17)	(2.30)	(2.51)
Any dependent children	0.48	0.48	0.08	0.08
	(0.50)	(0.50)	(0.27)	(0.27)
Conditional number of dependent children	1.93	1.93	1.53	1.53
	(1.00)	(1.00)	(0.76)	(0.76)
Labor force participation	0.97	0.83	0.97	0.89
	(0.17)	(0.38)	(0.17)	(0.31)
Conditional annual hours worked	2,058.58	1,858.80	2,069.08	1,926.44
	(577.88)	(663.47)	(562.24)	(605.44)
Reported earnings	81,610.01	45,726.38	70,094.79	45,461.71
	(92,129.02)	(59,240.86)	(75,018.61)	(52,196.09)
Predicted earnings	71,727.21	45,033.96	68,834.67	42,140.05
	(33,894.90)	(28,446.99)	(32,665.12)	(25,947.87)
% change in marginal net-of-tax rate[a]	0.02	-0.06	0.00	0.00
	(0.09)	(0.08)	(0.02)	(0.02)
Change in HH income due to marriage subsidy[a]	435.02	435.02	0	0
	(5,157.83)	(5,157.83)		
Observations	4,116	4,116	9,104	9,104
Worker observations	3,039	3,039	7,354	7,354

Note: The data come from the 2012–2015 waves of the American Community Survey. The samples includes same-sex cohabiting couples and same-sex married couples who married in 2012 or earlier, who do not live with any other couple, and who have at least one earner in the household. Annual hours worked is the product of "usual hours worked per week" and "weeks worked last year." There is some variation within the first-dollar marginal net-of-tax rate variable among same-sex cohabiting couples due to other changes in the tax code between tax years 2012–2013.
a: These summary statistics are for post-period observations in 2014–2015.

Table 2: Illustration of How the Taxation Variables Are Constructed

Couple	Individual	Type	Year	Predicted Earnings	$1-\hat{\tau}_{it}$	$1-\hat{\tau}_{i2013}$	$\%\Delta(1-\hat{\tau}_{it})$	$\hat{T}^{ij}$	$\hat{T}^{i}+\hat{T}^{j}$	$\Delta\hat{T}_{ij}$
A	1	Cohabiting	2012	\$14,182			0			0
A	2	Cohabiting	2012	\$43,773			0			0
B	1	Married	2012	\$ 32,693			0			0
B	2	Married	2012	\$ 39,350			0			0
C	1	Cohabiting	2013	\$34,163			0			0
C	2	Cohabiting	2013	\$114,550			0			0
D	1	Married	2013	\$54,592			0			0
D	2	Married	2013	\$58,529			0			0
E	1	Cohabiting	2014	\$37,873	0.85	0.85	0			0
E	2	Cohabiting	2014	\$59,853	0.75	0.75	0			0
F	1	Married	2014	\$9,208	0.85	1	-0.15	\$5,207	\$5,877	\$670
F	2	Married	2014	\$62,018	0.85	0.70	0.21	\$5,207	\$5,877	\$670
G	1	Cohabiting	2015	\$70,266	0.75	0.75	0			0
G	2	Cohabiting	2015	\$80,397	0.75	0.75	0			0
H	1	Married	2015	\$67,084	0.77	0.77	0	\$21,617	\$17,048	-\$4,569
H	2	Married	2015	\$88,271	0.77	0.72	0.07	\$21,617	\$17,048	-\$4,569

Note: Recall that $\%\Delta(1-\hat{\tau}_{it}) = \frac{1-\hat{\tau}_{it}-1-\hat{\tau}_{i2013}}{1-\hat{\tau}_{i2013}}$ if the year is 2014 or later (and 0 otherwise), and $\Delta\hat{T}_{ij} = [\hat{T}^{i}+\hat{T}^{j}]-[\hat{T}^{ij}]$ if the year is 2014 or later and the couple is a same-sex married couple (and 0 otherwise). The couple type indicates whether the couple is treated (married) or untreated (cohabiting). I describe the predicted earnings process in Section 3. $1-\hat{\tau}_{it}$ is individual i's predicted marginal net-of-tax rate in year $t \geq 2014$ and $1-\hat{\tau}_{i2013}$ is the predicted marginal net-of-tax rate in 2013 (tax year 2012). A positive value of the change in marginal net-of-tax rates, $\%\Delta(1-\hat{\tau}_{it})$, indicates an increase in the individual's marginal net-of-tax rate due to the Supreme Court ruling. $\hat{T}^{i}$ is individual i's predicted tax liability in 2013 (tax year 2012) under the single federal tax schedule and $\hat{T}^{ij}$ is the couple's predicted tax liability in year $t \geq 2014$. A positive value of the marriage subsidy, $\Delta\hat{T}_{ij}$, indicates an increase in household income due to a lower joint tax liability after the Supreme Court ruling. I calculate $\hat{\tau}_{it}$, T^{ij}, and $T^{i}+T^{j}$ variables using an individual's predicted earnings and the NBER TAXSIM model.

Table 3: Generalized Difference-in-Differences Effects of the *United States v. Windsor* Ruling on Labor Force Participation Among Same-Sex Couples

	Men and Women		Men		Women	
	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners
Outcome: LFP						
% change in marginal net-of-tax rate (10s)	-0.004 (0.005)	0.091*** (0.012)	0.001 (0.005)	0.070*** (0.018)	-0.011 (0.008)	0.105*** (0.017)
Change in HH income due to marriage subsidy ($1,000s)	-0.003** (0.002)	-0.010*** (0.003)	-0.001 (0.001)	-0.010** (0.004)	-0.005* (0.003)	-0.011** (0.005)
Spouse's predicted earnings ($10,000s)	-0.001 (0.001)	0.010*** (0.001)	-0.000 (0.001)	0.010*** (0.002)	-0.001 (0.001)	0.012*** (0.002)
Same-sex married couple	0.002 (0.003)	-0.033*** (0.007)	0.003 (0.005)	-0.039*** (0.010)	0.002 (0.005)	-0.031*** (0.011)
Year = 2013	0.003 (0.004)	0.007 (0.008)	0.009 (0.006)	0.019* (0.011)	-0.001 (0.007)	-0.003 (0.011)
Year = 2014	0.009** (0.004)	0.017** (0.008)	0.007 (0.006)	0.032*** (0.010)	0.012* (0.006)	0.001 (0.012)
Year = 2015	0.015*** (0.004)	0.016* (0.008)	0.019*** (0.006)	0.017 (0.011)	0.010 (0.007)	0.017 (0.012)
Age	-0.000 (0.000)	-0.005*** (0.000)	-0.000 (0.000)	-0.005*** (0.001)	-0.000 (0.000)	-0.005*** (0.001)
Age difference	0.000* (0.000)	-0.002*** (0.001)	0.001* (0.000)	-0.003*** (0.001)	0.000 (0.000)	-0.002** (0.001)
Years of education	0.006*** (0.001)	0.013*** (0.002)	0.005*** (0.001)	0.011*** (0.002)	0.007*** (0.001)	0.014*** (0.002)
Black	-0.017** (0.008)	-0.024* (0.014)	-0.034** (0.014)	-0.018 (0.019)	-0.004 (0.010)	-0.029 (0.019)
Other race	-0.009 (0.006)	-0.021** (0.010)	-0.013 (0.008)	-0.024* (0.013)	-0.002 (0.009)	-0.016 (0.015)
Female	-0.005 (0.003)	0.002 (0.006)				
Hicksian elasticity (substitution effect)	-0.045 (0.053)	1.043*** (0.140)	0.015 (0.056)	0.792*** (0.203)	-0.112 (0.082)	1.216*** (0.191)
Income elasticity (income effect)	-0.010** (0.005)	-0.029*** (0.009)	-0.004 (0.004)	-0.026** (0.010)	-0.015* (0.008)	-0.033** (0.016)
Number of Observations	13,220	13,220	6,973	6,973	6,247	6,247

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Bootstrapped standard errors are in parentheses. The data come from the 2012-2015 waves of the American Community Survey. The sample includes same-sex cohabiting couples and same-sex married couples who married in 2012 or earlier, who do not live with any other couple, and who have at least one earner in the household. Labor force participation is equal to 1 if the individual has positive annual hours of work. All specifications include state fixed effects.

Table 4: Generalized Difference-in-Differences Effects of the *United States v. Windsor* Ruling on Annual Hours of Work Among Same-Sex Couples

	Men and Women		Men		Women	
	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners
Outcome: Annual hours of work/1000						
% change in marginal	-0.005	0.042*	-0.003	0.082**	-0.005	0.005
net-of-tax rate (10s)	(0.018)	(0.024)	(0.029)	(0.036)	(0.026)	(0.031)
Change in HH income due	-0.011***	-0.010*	-0.011**	-0.011	-0.009*	-0.009
to marriage subsidy ($1,000s)	(0.003)	(0.005)	(0.005)	(0.007)	(0.005)	(0.008)
Spouse's predicted	0.024***	0.014***	0.021***	0.008**	0.031***	0.024***
earnings ($10,000s)	(0.003)	(0.003)	(0.004)	(0.003)	(0.005)	(0.005)
Same-sex married couple	-0.004	-0.066***	-0.002	-0.048**	-0.007	-0.083***
	(0.013)	(0.016)	(0.019)	(0.022)	(0.018)	(0.021)
Year = 2013	0.006	0.003	0.022	-0.021	-0.007	0.029
	(0.016)	(0.017)	(0.021)	(0.025)	(0.023)	(0.024)
Year = 2014	-0.008	0.038**	0.018	0.050**	-0.033	0.022
	(0.015)	(0.017)	(0.022)	(0.024)	(0.023)	(0.024)
Year = 2015	0.015	0.037**	0.013	0.025	0.017	0.049*
	(0.015)	(0.017)	(0.022)	(0.024)	(0.023)	(0.025)
Age	-0.000	0.003***	-0.002	0.001	0.000	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age difference	0.002	-0.004***	0.003**	-0.005***	-0.000	-0.002
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Years of education	0.020***	0.021***	0.019***	0.029***	0.019***	0.013***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
Black	-0.070***	-0.087***	-0.115***	-0.088**	-0.027	-0.085**
	(0.024)	(0.027)	(0.037)	(0.043)	(0.033)	(0.038)
Other race	-0.051**	-0.016	-0.059**	0.004	-0.032	-0.042
	(0.021)	(0.020)	(0.028)	(0.027)	(0.032)	(0.033)
Female	-0.053***	-0.038***				
	(0.011)	(0.013)				
Marshallian elasticity	-0.000	0.002*	-0.000	0.004**	-0.000	0.000
(income + substitution effects)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Hicksian elasticity	0.355***	0.253*	0.408**	0.307	0.268*	0.200
(substitution effect)	(0.111)	(0.130)	(0.184)	(0.198)	(0.142)	(0.186)
Income elasticity	-0.011***	-0.009*	-0.011**	-0.009	-0.009*	-0.009
(income effect)	(0.003)	(0.005)	(0.005)	(0.006)	(0.005)	(0.008)
Number of Observations	10,393	10,393	5,471	5,471	4,922	4,922

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Bootstrapped standard errors are in parentheses. The data come from the 2012-2015 waves of the American Community Survey. The sample includes same-sex cohabiting couples and same-sex married couples who married in 2012 or earlier, who do not live with any other couple, and who have two earners in the household. Annual hours of work is equal to usual hours worked per week multiplied by weeks worked last year. All specifications include state fixed effects.

Table 5: Robustness Specifications: Generalized Difference-in-Differences Effects of the *United States v. Windsor* Ruling on Labor Force Participation and Annual Hours of Work Among Same-Sex Couples

	CATI/CAPI interview		Inconsistent laws		Married 3 years		Opposite-Sex		State-by-year FE		Linear time trend	
	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners
Outcome: LFP												
Hicksian elasticity	-0.035	1.079***	-0.085	1.061***	-0.037	1.119***	0.006	0.460***	-0.041	1.053***	-0.042	1.133***
(substitution effect)	(0.047)	(0.159)	(0.054)	(0.146)	(0.055)	(0.145)	(0.007)	(0.025)	(0.052)	(0.135)	(0.057)	(0.150)
Income elasticity	-0.010*	-0.026***	-0.011**	-0.029***	-0.013**	-0.035***	-0.006	-0.080***	-0.010**	-0.029***	-0.009**	-0.029***
(income effect)	(0.005)	(0.010)	(0.005)	(0.009)	(0.006)	(0.011)	(0.006)	(0.023)	(0.004)	(0.008)	(0.004)	(0.009)
Number of Observations	8,380	8,380	11,335	11,335	9,181	9,181	1,082,995	1,082,995	13,220	13,220	13,220	13,220
Outcome: Annual hours of work/1000												
Marshallian elasticity	-0.000	0.002	-0.000	0.002*	-0.000	0.002	0.000	0.001***	-0.000	0.002*	-0.000	0.002
(income + substitution effects)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Hicksian elasticity	0.308***	0.272*	0.410***	0.306**	0.353***	0.251*	0.241**	-0.041	0.339***	0.245*	0.353***	0.255*
(substitution effect)	(0.114)	(0.146)	(0.123)	(0.136)	(0.115)	(0.129)	(0.101)	(0.142)	(0.095)	(0.127)	(0.112)	(0.130)
Income elasticity	-0.011***	-0.012*	-0.013***	-0.011**	-0.012***	-0.011*	-0.023**	0.006	-0.010***	-0.009*	-0.011***	-0.009*
(income effect)	(0.004)	(0.006)	(0.004)	(0.005)	(0.004)	(0.005)	(0.009)	(0.022)	(0.003)	(0.005)	(0.003)	(0.005)
Number of Observations	6,598	6,598	8,951	8,951	7,211	7,211	737,219	737,219	10,393	10,393	10,393	10,393

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Bootstrapped standard errors are in parentheses. The data come from the 2012-2015 waves of the American Community Survey. The sample includes same-sex cohabiting couples and same-sex married couples who married in 2012 or earlier, who do not live with any other couple, and who have two earners in the household. Annual hours of work is equal to usual hours worked per week multiplied by weeks worked last year. The CATI/CAPI sample includes only couples who responded to the American Community Survey using computer assisted telephone or personal interviews. The "Inconsistent Laws" sample excludes couples residing in states with inconsistent tax policies surrounding same-sex married couples. The "Married 3 Years" sample includes same-sex married couples who have been married for at least three years and same-sex cohabiting couples. The "Opposite-Sex" sample uses an alternative control group of opposite-sex married couples who married in 2012 or earlier in which both partners are between 25–54 years old. The "State-by-Year FE" sample uses state-by-year fixed effects in place of separate state and year fixed effects.

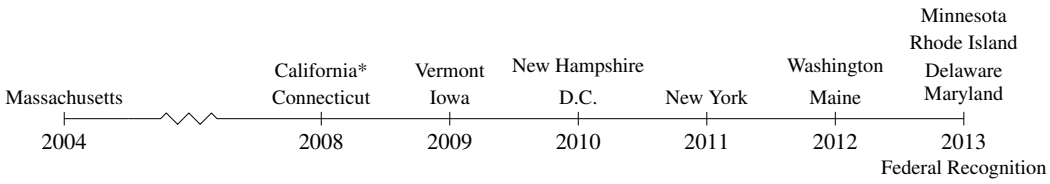


Figure 1: Timeline of Same-Sex Marriage Legalization

Notes: This figure does not include civil union or domestic partnership legislation, as these institutions are not legally identical to marriage. California legalized same-sex marriage in 2008, but the statute was suspended by Proposition 8 until the Supreme Court decision in 2013. Same-sex marriage licenses issued in California before Proposition 8 continued to be honored as legal. States listed in 2013 are only those states that had either enacted or voted to enact same-sex marriage recognition before the Supreme Court ruling in June.

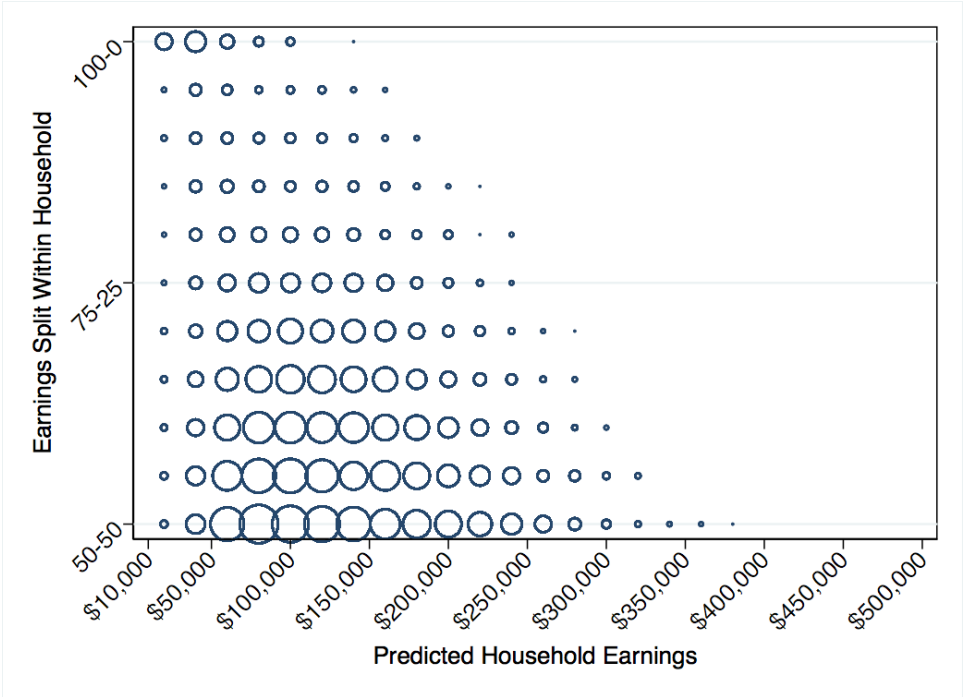
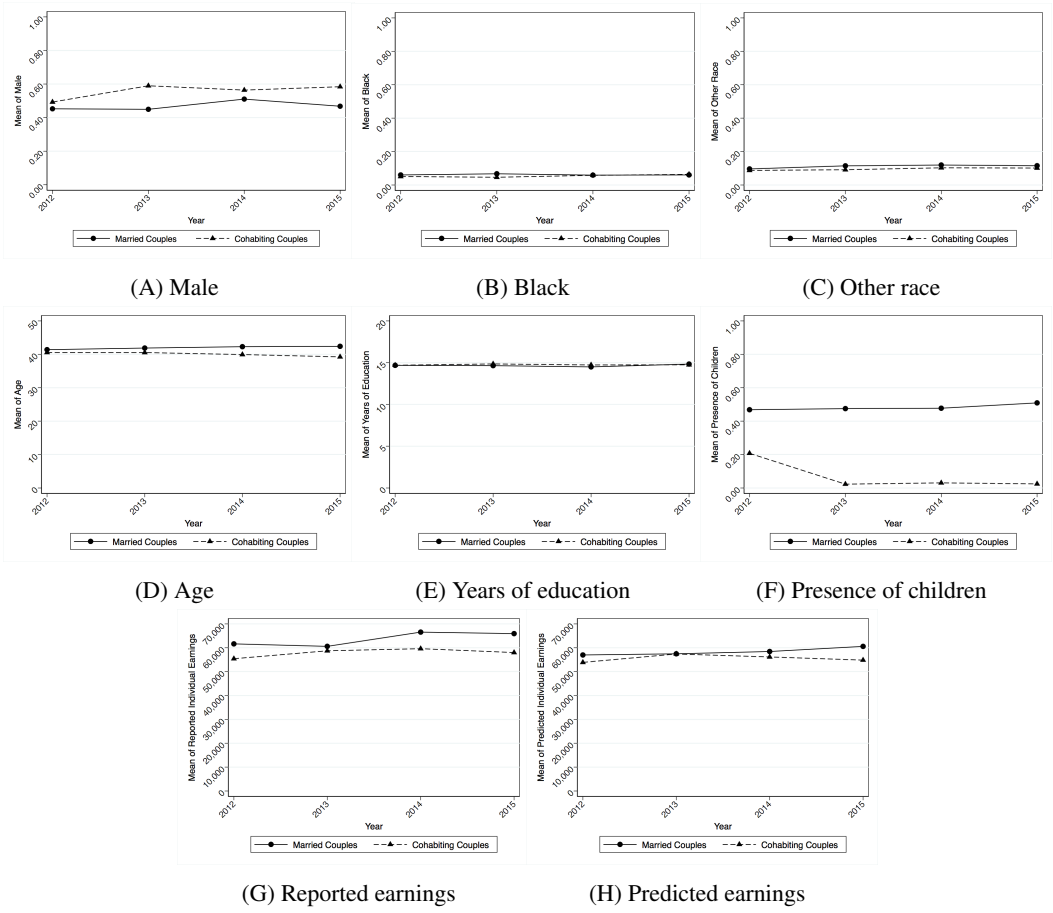


Figure 2: Distribution of Predicted Household Earnings and Earnings Splits Among Same-Sex Couples

Notes: The data in Figure 2 come from the sample of same-sex couples I analyze in this paper, and are weighted to reflect the number of observations in each predicted household earnings-earnings split bin. Observations of same-sex married and cohabiting couples are included in the figure.



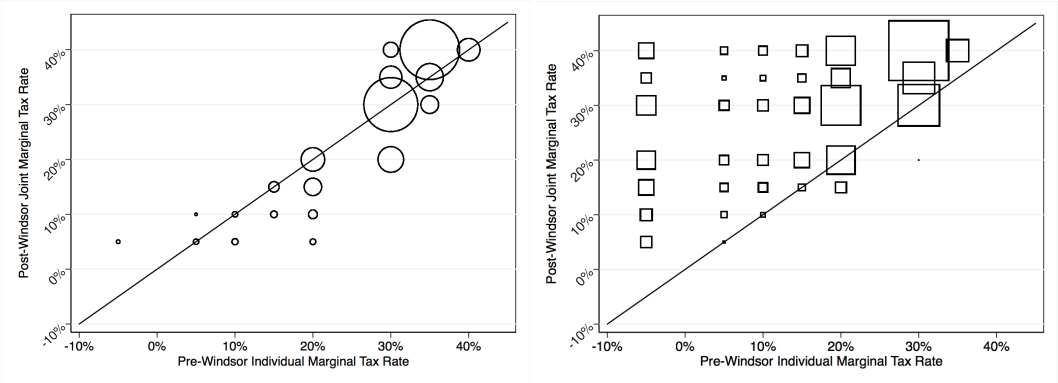
(A) Male (B) Black (C) Other race

(D) Age (E) Years of education (F) Presence of children

(G) Reported earnings (H) Predicted earnings

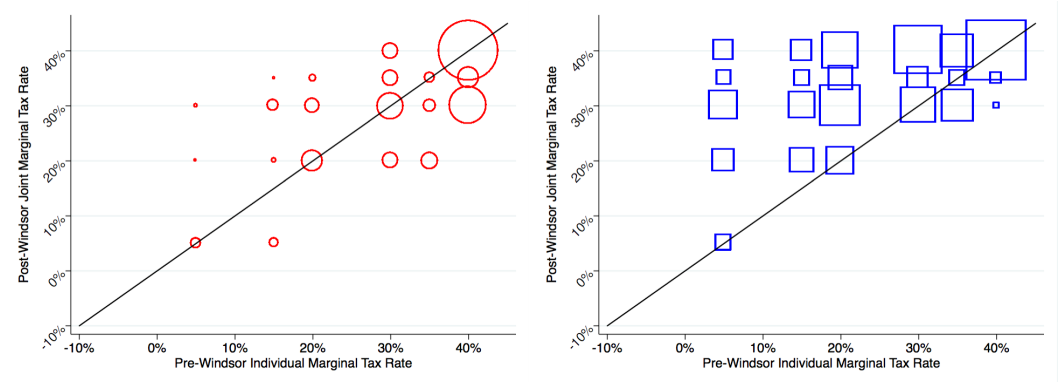
Figure 3: Mean Demographic Variables Among Same-Sex Couples Over Time

Notes: The data come from the 2012–2015 waves of the American Community Survey. Each data point presents the mean value of the demographic variable in that year. The samples includes same-sex cohabiting couples and same-sex married couples who married in 2012 or earlier, who do not live with any other couple, and who have at least one earner in the household.



(A) Higher earners, no children

(B) Lower earners, no children

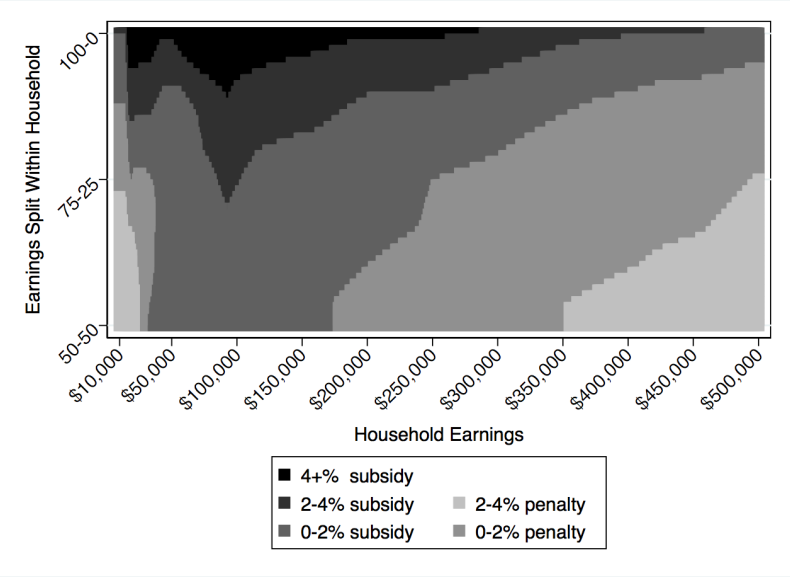


(C) Higher earners, one child

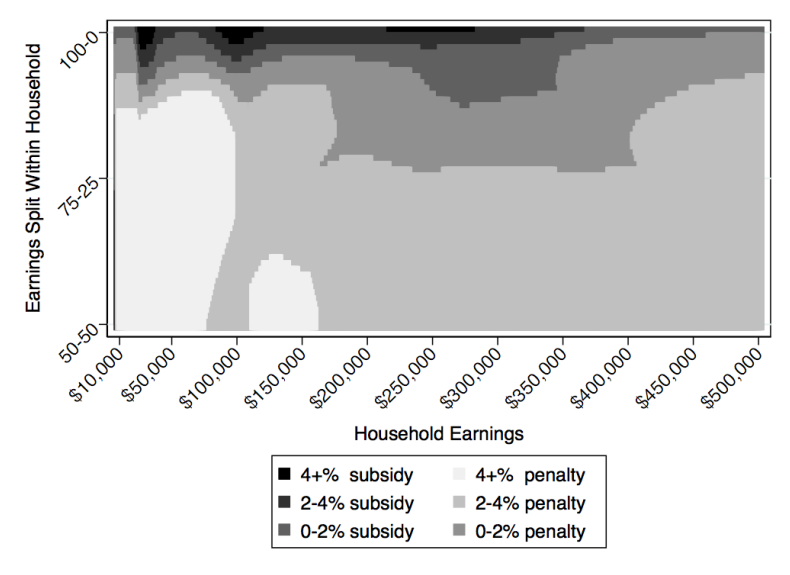
(D) Lower earners, one child

Figure 4: Variation in Marginal Tax Rates Among Primary and Secondary Earners

Notes: The data in Figure 4 are generated, and do not originate from the sample I analyze. I group marginal tax rates into 5 percentage point bins. Figures 4A and 4B demonstrate how marginal tax rates vary following *United States v. Windsor* among primary and secondary earners in childless couples, respectively. Figures 4C and 4D demonstrate how marginal tax rates vary following *United States v. Windsor* among primary and secondary earners in childless couples, respectively. Each data point is weighted by the number of individuals in the same pre- and post-Windsor tax movement bin.



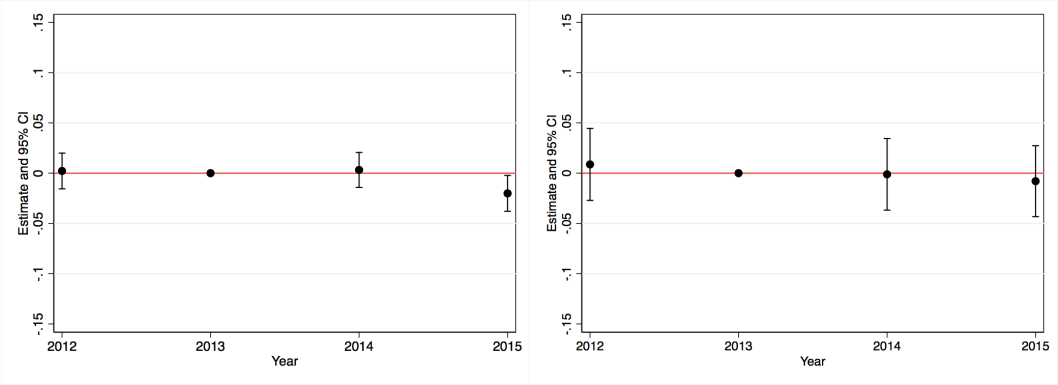
(A) Couples Without Children



(B) Couples With Children

Figure 5: Variation in the 2012–2013 Marriage Penalty Among Childless Couples and Couples with One Child

Notes: The data in Figure 5 are generated, and do not originate from the sample I analyze. Figure 5 was inspired by a similar figure published by Amanda Cox for *The New York Times* (Cox 2015). I calculate the marriage subsidy in 2013 (i.e., married in 2013, single in 2012) assuming that all household income is earned through wages. Other inputs into the TAXSIM model, such as other deductions or credits, will create additional variation in the marriage subsidy in practice. I express the marriage subsidy as a percentage of total household earnings.



(A) Labor Force Participation, Predicted Higher Earn-(B) Labor Force Participation, Predicted Lower Earners
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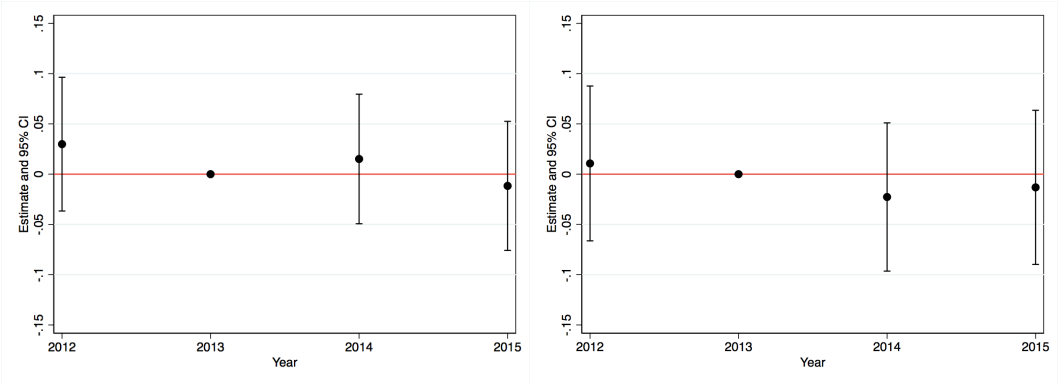


(C) Annual Hours Worked, Predicted Higher Earners (D) Annual Hours Worked, Predicted Lower Earners

Figure 6: Event Study Results

Notes: The data come from the 2012–2015 waves of the American Community Survey. The figures plot coefficient estimates and 95% confidence intervals of θ_1^t from the regression $Y_{it} = \theta_0 + \theta_1^{2012} SSMC_i \times 2012 + \theta_1^{2014} SSMC_i \times 2014 + \theta_1^{2015} SSMC_i \times 2015 + \theta_2 SSMC_i + \theta_3 X_{it} + \delta_t + \mu_s + \varepsilon_{it}$.

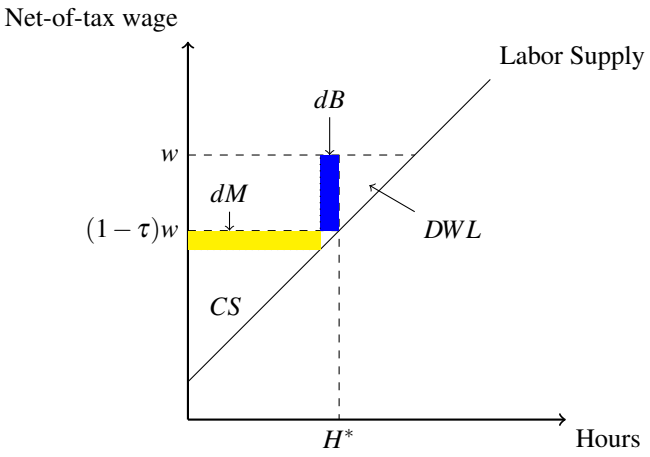
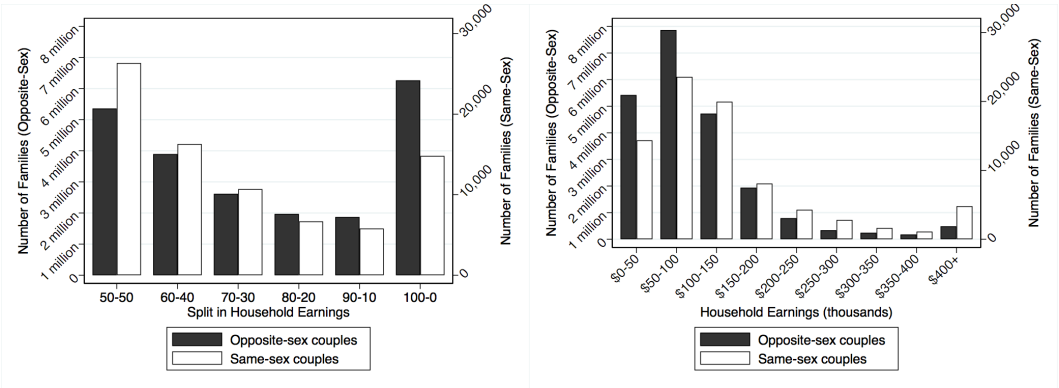


Figure 7: Welfare Consequences of a Tax Increase

Notes: The figure graphs the effect of a small increase in the marginal tax rate from τ to $\tau+\varepsilon$. The total change in tax revenue is $dTR = dM + dB$, where dM is the mechanical change in tax revenue and dB is the behavioral change in tax revenue following a small tax increase. The change in deadweight loss is equal to $-dB$, as described in Section 6.

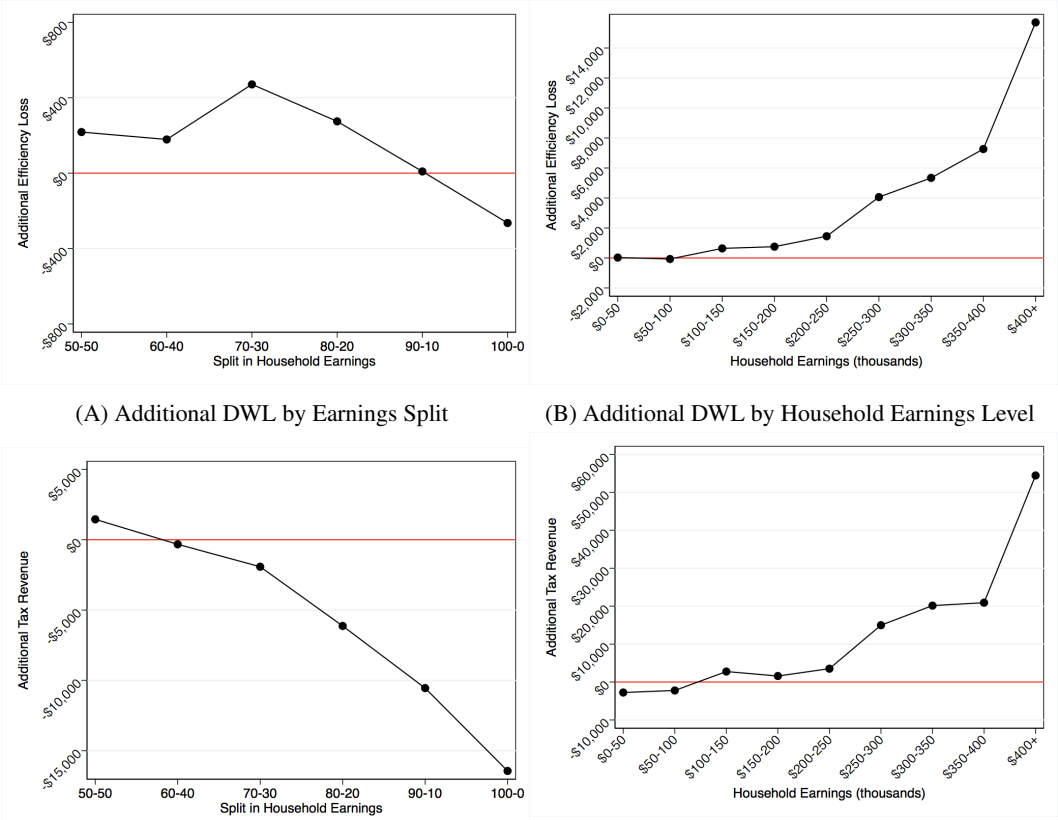


(A) Distribution by Earnings Split

(B) Distribution by Household Earnings Level

Figure 8: Distribution of Married Couples by Earnings Split and Household Earnings Level

Notes: The data come from the 2012–2015 waves of the American Community Survey. Population estimates are computed using household weights among households in the main analysis sample, which includes couples who married in 2012 or earlier in which at least one partner works and both partners are between 25–54 years old. I further limit the population estimates to households who responded to the American Community Survey using a computer assisted telephone or personal interview to reduce the risk of misclassification between same-sex and opposite-sex married couples.



(A) Additional DWL by Earnings Split

(B) Additional DWL by Household Earnings Level

(C) Additional Tax Revenue by Earnings Split

(D) Additional Tax Revenue by Household Earnings Level

Figure 9: Additional Deadweight Loss and Tax Revenue Under Joint Taxation Relative to Individual Taxation

Notes: Each data point represents the average net additional deadweight loss or net additional tax revenue created by joint taxation relative to individual taxation along the intensive and extensive margins per family for households in the same earnings split or household earnings bins. Households with earnings splits between 50-50 and 59-41 are included in the 50-50 split bin, households with earnings splits between 60-40 and 69-31 are included in the 60-40 split bin, and so on.

A Appendix

This appendix presents additional tables that complement the analysis in the main text. Table A.1 presents summary statistics comparing predicted higher (lower) earners to observed higher (lower) earners (according to reported earnings). Table A.2 presents summary statistics of the predicted higher and lower earner samples using the alternative control group of opposite-sex married couples, with the results presented in Table 5 in the main text. Table A.3 presents elasticity estimates using two alternative specifications that control for the partner's percentage change in marginal net-of-tax rate or the presence of children, respectively. Finally, Table A.4 examines heterogeneity in participation and hours elasticities by household earnings levels.

Table A.1: Summary Statistics of Couples in the 2012–2015 American Community Survey by Observed and Predicted Earning Status

	Married couples				Cohabiting couples			
	Primary earners		Secondary earners		Primary earners		Secondary earners	
	Observed	Predicted	Observed	Predicted	Observed	Predicted	Observed	Predicted
Male	0.47	0.47	0.47	0.47	0.55	0.55	0.55	0.55
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)
Black	0.06	0.06	0.06	0.06	0.05	0.05	0.06	0.06
	(0.24)	(0.24)	(0.24)	(0.25)	(0.22)	(0.22)	(0.23)	(0.23)
Other	0.10	0.10	0.12	0.12	0.09	0.08	0.10	0.11
	(0.31)	(0.31)	(0.32)	(0.33)	(0.29)	(0.28)	(0.30)	(0.31)
Age	42.37	42.50	41.64	41.51	40.58	40.85	39.64	39.37
	(7.57)	(7.44)	(7.84)	(7.95)	(8.43)	(8.31)	(8.64)	(8.72)
Years of education	14.94	15.22	14.38	14.10	15.08	15.39	14.42	14.12
	(3.02)	(2.90)	(3.13)	(3.17)	(2.42)	(2.30)	(2.52)	(2.51)
Any dependent children	0.48	0.48	0.48	0.48	0.08	0.08	0.08	0.08
	(0.50)	(0.50)	(0.50)	(0.50)	(0.27)	(0.27)	(0.27)	(0.27)
Conditional number of dependent children	1.93	1.93	1.93	1.93	1.53	1.53	1.53	1.53
	(1.00)	(1.00)	(1.00)	(1.00)	(0.76)	(0.76)	(0.76)	(0.76)
Labor force participation	1.00	0.97	0.80	0.83	1.00	0.97	0.86	0.89
	(0.00)	(0.17)	(0.40)	(0.38)	(0.01)	(0.17)	(0.34)	(0.31)
Conditional annual hours worked	2,170.73	2,058.58	1,746.65	1,858.80	2,182.11	2,069.08	1,813.41	1,926.44
	(447.39)	(577.88)	(709.92)	(663.47)	(435.77)	(562.24)	(659.52)	(605.44)
Reported earnings	93,476.76	81,610.01	33,859.62	45,726.38	81,032.74	70,094.79	34,523.76	45,461.71
	(95,941.09)	(92,129.02)	(40,730.62)	(59,240.86)	(79,159.10)	(75,018.61)	(36,163.87)	(52,196.09)
Predicted earnings	66,377.47	71,727.21	50,383.71	45,033.96	62,533.58	68,834.67	48,441.14	42,140.05
	(34,442.32)	(33,894.90)	(31,626.60)	(28,446.99)	(33,215.85)	(32,665.12)	(29,900.51)	(25,947.87)
Observations	4,116	4,116	4,116	4,116	9,104	9,104	9,104	9,104
Worker observations	3,039	3,039	3,039	3,039	7,354	7,354	7,354	7,354

Note: The data come from the 2012–2015 waves of the American Community Survey. The samples includes same-sex married couples and opposite-sex married couples who married in 2012 or earlier, who do not live with any other couple, and who have at least one earner in the household. Annual hours worked is the product of "usual hours worked per week" and "weeks worked last year." Columns labeled "Observed" represent higher/lower earners as determined by reported earnings, whereas columns labeled "Predicted" represent the higher/lower earner samples I use in estimation based on predicted earnings.

Table A.2: Summary Statistics of Couples in the 2012–2015 American Community Survey

	Married couples		Cohabiting couples	
	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners
Male	0.47	0.47	0.85	0.15
	(0.50)	(0.50)	(0.35)	(0.35)
Black	0.06	0.07	0.06	0.06
	(0.24)	(0.25)	(0.23)	(0.23)
Other	0.10	0.12	0.12	0.14
	(0.30)	(0.33)	(0.33)	(0.34)
Age	42.43	41.58	41.98	40.60
	(7.36)	(8.03)	(7.59)	(7.79)
Years of education	15.21	14.11	14.16	13.75
	(3.02)	(3.06)	(2.99)	(2.88)
Any dependent children	0.48	0.48	0.78	0.78
	(0.50)	(0.50)	(0.41)	(0.41)
Conditional number of dependent children	1.93	1.93	2.06	2.06
	(1.00)	(1.00)	(1.01)	(1.01)
Labor force participation	0.97	0.83	0.97	0.76
	(0.18)	(0.37)	(0.17)	(0.43)
Conditional annual hours worked	2,045.58	1,872.02	2,103.22	1,750.41
	(580.25)	(661.21)	(531.74)	(678.24)
Reported earnings	80,659.08	46,677.31	72,004.77	31,867.63
	(91,393.70)	(60,917.00)	(76,604.95)	(42,872.60)
Predicted earnings	67,803.75	43,841.69	66,048.75	31,340.04
	(30,170.36)	(27,568.97)	(26,727.38)	(24,645.46)
% change in marginal net-of-tax rate[a]	0.01	-0.04	0.00	0.00
	(0.09)	(0.09)	(0.03)	(0.03)
Change in HH income due to marriage subsidy[a]	-762.37	-762.37	0	0
	(5,082.70)	(5,082.70)		
Observations	4,116	4,116	1,078,879	1,078,879
Worker observations	3,022	3,022	734,197	734,197

Note: The data come from the 2012–2015 waves of the American Community Survey. The samples includes same-sex married couples and opposite-sex married couples who married in 2012 or earlier, who do not live with any other couple, and who have at least one earner in the household. Annual hours worked is the product of "usual hours worked per week" and "weeks worked last year." There is some variation within the first-dollar marginal net-of-tax rate variable among opposite-sex married couples due to other changes in the tax code between tax years 2012–2013. The number of children statistics are conditional on having any children.

a: These summary statistics are for post-period observations in 2014–2015.

Table A.3: Labor Force Participation and Hours Elasticities Using Alternative Specifications

	Original		Spouse's $\%\Delta(1-\tau)$		Include Children	
	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners	Predicted higher earners	Predicted lower earners
Outcome: LFP						
Hicksian elasticity	-0.036	1.233***	-0.004	1.421***	-0.033	1.200***
(substitution effect)	(0.052)	(0.137)	(0.051)	(0.137)	(0.053)	(0.134)
Income elasticity	-0.008*	-0.022***	-0.009**	-0.022***	-0.008**	-0.022***
(income effect)	(0.004)	(0.006)	(0.004)	(0.006)	(0.004)	(0.006)
Cross-wage Hicksian elasticity			-0.115***	-0.663***		
			(0.045)	(0.123)		
Number of Observations	13,220	13,220	13,220	13,220	13,220	13,220
Outcome: Annual hours of work/1000						
Marshallian elasticity	-0.000	0.002*	0.001	0.003**	0.000	0.002*
(income + substitution effects)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Hicksian elasticity	0.286***	0.207	0.303***	0.202	0.280***	0.225
(substitution effect)	(0.093)	(0.135)	(0.100)	(0.127)	(0.100)	(0.141)
Income elasticity	-0.009***	-0.007	-0.009***	-0.007	-0.008***	-0.008
(income effect)	(0.003)	(0.005)	(0.003)	(0.005)	(0.003)	(0.005)
Cross-wage Hicksian elasticity			0.231***	0.253		
			(0.077)	(0.164)		
Number of Observations	10,393	10,393	10,393	10,393	10,393	10,393

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Bootstrapped standard errors are in parentheses. The data come from the 2012-2015 waves of the American Community Survey. The sample includes same-sex cohabiting couples and same-sex married couples who married in 2012 or earlier, who do not live with any other couple, and who have two earners in the household. Labor force participation is equal to 1 if the individual has positive annual hours of work, and annual hours of work is equal to usual hours worked per week multiplied by weeks worked last year. The column labeled "Spouse's $\%\Delta(1-\tau)$" includes the spouse's percentage change in marginal net-of-tax rate to allow for substitutability in labor supply. The column labeled "Include Children" includes an indicator variable equal to one if the couple has any children to control for their effect on labor supply.

Table A.4: Heterogeneity in Labor Force Participation and Hours Elasticities by Household Earnings Tercile

	Original		Predicted higher earners			Predicted lower earners		
	Predicted higher earners	Predicted lower earners	HH earnings $\leq$ \$50,000	HH earnings $>$ \$50,000 & $\leq$ \$100,000	HH earnings $>$ \$100,000	HH earnings $\leq$ \$50,000	HH earnings $>$ \$50,000 & $\leq$ \$100,000	HH earnings $>$ \$100,000
Outcome: LFP								
Hicksian elasticity	-0.045	1.043***	-0.058	-0.077	-0.051	1.342***	0.691***	1.122***
(substitution effect)	(0.053)	(0.140)	(0.138)	(0.075)	(0.037)	(0.304)	(0.236)	(0.152)
Income elasticity	-0.010**	-0.029***	-0.001	-0.016	-0.004	-0.069*	-0.013	-0.025**
(income effect)	(0.005)	(0.009)	(0.013)	(0.010)	(0.004)	(0.039)	(0.015)	(0.011)
Number of Observations	13,220	13,220	13,220	13,220	13,220	13,220	13,220	13,220
Outcome: Annual hours of work/1000								
Marshallian elasticity	-0.000	0.002*	-0.001	-0.001	-0.000	0.002	-0.000	0.003**
(income + substitution effects)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.005)	(0.002)	(0.001)
Hicksian elasticity	0.355***	0.253*	0.311	0.076	0.415***	0.258	0.247*	0.084
(substitution effect)	(0.111)	(0.130)	(0.347)	(0.165)	(0.160)	(0.303)	(0.147)	(0.200)
Income elasticity	-0.011***	-0.009*	-0.035	-0.003	-0.009***	-0.032	-0.010*	-0.002
(income effect)	(0.003)	(0.005)	(0.039)	(0.007)	(0.003)	(0.037)	(0.006)	(0.005)
Number of Observations	10,393	10,393	10,393	10,393	10,393	10,393	10,393	10,393

Note: *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. Bootstrapped standard errors are in parentheses. The data come from the 2012-2015 waves of the American Community Survey. The sample includes same-sex cohabiting couples and same-sex married couples who married in 2012 or earlier, who do not live with any other couple, and who have two earners in the household. Labor force participation is equal to 1 if the individual has positive annual hours of work, and annual hours of work is equal to usual hours worked per week multiplied by weeks worked last year. I estimate heterogeneous elasticities by interacting the tax change measures with indicator variables for the household's predicted earnings tercile.