

**MARRIAGE IS A STATE OF LUXURY:
THE DISPROPORTIONATE IMPACT OF THE DUAL-EARNER MARRIAGE TAX
PENALTY**

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January 22, 2017

Keywords: marriage, individual income tax, marriage tax penalty, same sex couples

JEL Codes:H24, J12,J16

Data Availability: All data are publicly available as noted in the text.

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We appreciate the comments received by Judith Sage, Daphne Lofquist of the U.S. Census Bureau, and participants at the LSU workshop and the AAA 2014 conference. All remaining errors are our own. Christine Cheng gratefully recognizes the support she received from the Donald and Velvia Crumbley Professorship.

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ABSTRACT:

Using household data and the 2013 federal recognition of same sex marriage (SSM), we provide evidence that the Dual-Earner Marriage Tax Penalty (DMTP) has an economically and statistically significant impact on marriage decisions, especially lower-to-middle income couples whose DMTP is a greater percentage of household income. For opposite sex couples, we find that the likelihood of marriage increases by 1% for every \$1,000 increase in income. To isolate the influence of the DMTP, we use a difference-in-difference analysis to examine the impact of the 2013 change. Our analysis reveals that for SSCs, income was unrelated to marriage decisions prior to 2013, but positively related following the imposition of the DMTP, so that the income-marriage relation of same sex couples resembles that seen for opposite sex couples. Following 2013, same sex couples in the highest quartile of income are 81% more likely to be married compared to those in the lowest quartile of income.

INTRODUCTION

From a utilitarian perspective, couples' marriage decisions are based on whether the expected benefits from marriage exceed those expected from remaining single (Becker, 1973, 1974). These benefits arise from social and economic factors, both of which shift over time (Stevenson and Wolfers, 2007). Based on the notion that marriage yields positive benefits to couples and society, the federal government develops and funds programs aimed at promoting marriage. For example, Covert (2014) estimates that the U.S. federal government spent \$800 million promoting the healthy marriage initiative from 2001 through 2014.

In direct contradiction of a pro-marriage policy, the U.S. individual income tax code imposes a greater tax burden on many dual-earner couples who legally marry relative to similarly situated couples who remain single. We refer to this marriage tax penalty as the Dual-Earner Marriage Tax Penalty (DMTP). Despite a costly DMTP, extant research indicates that taxation has, at best, a slight economic impact on marriage rates and/or marriage timing decisions (Alm and Whittington, 1995, 1996, 1997, 1999; Buffeteau and Echevin, 2003; Chade and Ventura, 2005; Dickert-Conlin and Houser, 2002; Fisher, 2013; Herbst, 2011; Sjoquist and Walker, 1995). These results may be influenced by the difficulty controlling for the many unmeasurable, unobserved personal preferences that influence couples' marriage decisions (e.g., religion, cost of divorce, etc.).

To overcome this difficulty, we make two innovations over prior research. The first is that we take account of the DMTP's disparate impact relative to household income using data publically available at the United States Census Bureau from the American Community Survey's (ACS) Public Use Microdata Sample (PUMS) to conduct regression analysis on individual households. Second, we take advantage of the federal recognition of same sex marriage (SSM) in

2013, an exogenous shock to the taxation of same sex couples (SSCs), to provide new evidence on a long-standing question in economics: *Does the marriage tax penalty have a significant impact on couples' marriage decisions* (Leturcq, 2012)?

To predict how the DMTP will influence households, we first examine the cost of the DMTP at different income levels using the 2015 tax code.¹ We find that the DMTP is most severe for married couples who earn similar amounts and those who support children. Further, we find that the marriage tax penalty is especially burdensome on lower- and middle-class couples. For example, our computations indicate that the marriage tax penalty can represent more than 8% of the Adjusted Gross Income for couples earning \$50,000, but only 1.8% of the Adjusted Gross Income for couples earning \$100,000. This disparate impact leads to a prediction that the DMTP has the greatest influence on the lower- and middle- income households, deterring marriage among these couples, and less of an influence on high-income couples who can afford the DMTP because it is a lower percentage of their income.

This analysis supports the first hypothesis: the likelihood of marriage increases with household income for opposite sex couples (OSCs) living in the same household. A time-series analysis of the 2008 through 2014 ACS dataset demonstrates a consistent, positive relation between household income and marriage for OSCs. Using the PUMS 2010 to 2014 sample of OSC households, we find that the likelihood of marriage increases by 1% for every \$1,000 increase in household income. These results are consistent with the prediction that wealthy couples can absorb the DMTP cost, and therefore, are more likely to get married. However, these findings are also consistent with the prediction that wealthy couples are simply more likely to marry, regardless of tax considerations.

¹ The 2016 tax code provides comparable results.

To further isolate the impact of the DMTP on marriage decisions, we examine the marriage trends of SSCs before and after the treasury department issued Revenue Ruling 2013-17 on August 29, 2013. Before 2013, all married SSCs were banned from filing as a married couple, i.e. they must file as two *Singles* or one *Single* and one *Head of Household*. Following the ruling, all married SSCs must file as a married couple, i.e. claiming *Married Filing Jointly* (MFJ) or *Married Filing Separately* (MFS) status. Consequently, Revenue Ruling 2013-17 provided an exogenous shock to the taxation of SSCs by suddenly subjecting SSCs to the DMTP. Furthermore, since SSC tend to be two-earner couples with similar incomes (Alm, Badgett, and Whittington, 2000), SSCs are generally subject to the most severe DMTP in all income tax brackets.

While the DMTP represents a significant, exogenous tax shock to SSCs' marriage decisions, a number of other factors could have influenced the income and marriage relation for same-sex couples both prior to and following Revenue Ruling 2013-17. We expect that the influence of most of these factors, e.g. religious beliefs, personal preference for legal commitment, etc., did not significantly or systematically change in 2013. There may be a subset of factors that created a systematic association between marriage and income for SSCs. For example, because only fourteen U.S. jurisdictions recognized same sex marriage (SSM)² prior to 2013, some SSC's marriage decisions may have been influenced by their belief that marriage should be available to all SSCs, which may have served as a deterrent for some couples but an impetus to others. In addition, the cost to travel to a jurisdiction that allows same-sex marriage may have deterred lower-income SSCs from legally marrying while not affecting higher-income SSCs who could afford the expense, such that the likelihood of a SSC's marriage should increase

² Appendix A provides a complete list of the states, sorted by the date each state legally recognized SSM.

with wealth. Because the number of jurisdictions increased from the original fourteen, to a total of 33 by the end of 2014, to all U.S. jurisdictions in 2015, this factor's positive influence on the income-marriage relation should have been greatest prior to 2013 and diminished thereafter. Alternatively, the need to marry for health insurance benefits may be greater for single-income rather than dual-income couples. Because it is also likely that single income couples have lower income levels, this factor should create a negative relation between income and marriage both prior to and following 2013, such that the likelihood of marriage should be greater for lower income households. A time-series analysis using the 2008 through 2014 ACS dataset suggests that lower income SSCs were more likely to be married than higher income SSCs prior to the 2013 federal recognition of SSM. This suggests that the need for health insurance benefits, or other factors which generate a negative income-marriage relation, prevailed among same-sex couples' marriage decisions prior to the 2013 federal recognition of SSM.

While there are some other factors that may influence the income-marriage relation, because we expect that the DMTP influences couples' marriage decisions, we predict that the 2013 imposition of the marriage tax penalty on same-sex couples will affect the income-marriage relation of same-sex couples. Specifically, the second hypothesis predicts that following Revenue Ruling 2013-17, the income-marriage relation of SSCs will resemble the positive relation of OSCs. Following the 2013 federal recognition of SSM, all SSCs were more likely to get married, but the second hypothesis focuses on how the SSC income-marriage relation changed. A time-series analysis of 2008 – 2014 ACS data provides evidence consistent with our prediction. Following 2013, higher income SSCs were more likely than lower income SSCs to get married, generating a positive income-marriage relation. This supports the proposition that, because higher income couples are better able to absorb the cost of the DMTP, the DMTP has

the greatest deterrent effect on lower- and middle-income SSCs following 2013, even to the extent of overwhelming the factors which contributed toward any negative income-marriage relation that may have existed prior to 2013.

In addition to the time-series analysis, we conduct a difference-in-difference regression analysis using the PUMS household level data to examine the influence of the DMTP. Revenue Ruling 2013-17 exogenously imposed the DMTP on SSCs, while the unmeasurable social factors that influence the income-marriage relation for SSM couples remained fairly stable across income groups. We eliminate 2013 as a transition year, and empirically examine how the income-marriage relation changed from 2012 to 2014, including controls for common social factors that influence marriage decisions (e.g. education, race, and the presence of children). We find that the income-marriage relation changed in 2013. Prior to the imposition of the DMTP, we find no evidence of a statistical relation between income and marriage for SSCs. With the 2013 change, we find evidence of a positive income-marriage for SSCs, similar to OSCs, suggesting that the sudden imposition of the DMTP affected couples' marriage decisions. Alternatively, the income-marriage relation of OSCs remained positive and statistically significant, with some weakening that may have been a consequence of a reduction of the DMTP in 2012.³ Using quartile divisions of income for the regression analysis indicates that SSCs whose income is in the fourth quartile are 81% more likely to be married following the 2014 ruling, compared to a SSC in the lowest quartile of income. Finally, because marriage may provide some estate tax savings for extremely wealthy couples,⁴ or be unduly influenced by other factors at extremely

³ The *American Taxpayer Relief Act of 2012* eliminated some of the DMTP, equalizing the standard deduction and lower tax brackets of two *Single* taxpayers with that of *Married Filing Jointly* couples.

⁴ It is estimated that less than 1% of the population pays any federal estate taxes <http://www.taxpolicycenter.org/briefing-book/how-many-people-pay-estate-tax>. Therefore, we assume that federal estate taxes have little to no systematic influence on couples' marriage decisions.

low levels of household income, we conduct a sensitivity analysis where we examine the income-marriage relation with the top 1% and top/bottom 1% excluded. These sensitivity tests confirm our primary results presented in this paper. Overall, our findings support the notion that the deterrent effect of the DMTP is much greater for lower-income couples than for higher-income couples.

Our results suggest that the U.S. tax code has helped to mold marriage into a luxury for the wealthy. The question for politicians going forward is whether this stance should continue, or whether the tax system should move more toward *Marriage Neutrality*. *Marriage Neutrality* is achieved when a couple's tax liability remains unchanged with marriage. Our results support Alm and Leguizamon's (2015) call for political leaders to consider how and whether the tax code should be altered as it relates to the imposition of a marriage tax penalty.

Beyond political implications, our results contribute to academic research. First, our results indicate that the impact of the DMTP varies by income levels. The DMTP has both a statistically and economically significant disproportionate negative impact on marriage decisions for lower- and middle-income couples, beyond any social welfare impacts that also may discourage marriage at these lower-income levels (Brien, Dickert-Conlin, and Weaver, 2004). Second, our study extends Leturcq's (2012) research on civil unions by examining how an exogenous shock affects marriage decisions. Couples entering into civil unions may face inherently different social factor influences than couples entering into marriage decisions. By comparing SSC marriage decisions against OSC marriage decisions over the same period, our setting also affords an additional layer of control for time or economy dependent factors that influence marriage decisions. Finally, our setting affords an opportunity to provide additional insight into the marriage-income relation. Because prior research indicates that household wealth

increases with marriage (Zagorsky, 2005), it is important to understand if marriage has a positive influence on wealth or if higher-income couples are more likely to marry, i.e. self-selection. Our evidence supports the notion that self-selection may influence the marriage-wealth relation.

Thus, our research motivates future research to follow Barg and Beblo (2009) in attempting to disentangle self-selection from other factors that can influence income and wealth differentials between married and unmarried couples.

In the next section we discuss the background of the marriage tax penalty, the prior literature, the legalization of same sex marriage, and develop the hypotheses. The third section presents sample selection of the data and the research methods. Section four presents the results. Section five concludes.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

The Marriage Tax Penalty

The Dual-Earner Marriage Tax Penalty (DMTP) has been part of the tax code since the 16th Amendment to the U.S. Constitution established the federal income tax in 1913.⁵ Currently, the tax system provides a series of provisions that increase the annual federal income tax expense of dual-earner married couples relative to unmarried couples. The disparity increases when children are supported in the home. Some of the principal sources of the DMTP in 2015 and 2016 are the progressive tax rate system, the standard deduction, and various phase-outs (e.g. the earned income tax credit, personal exemptions, itemized deductions, etc.), detailed in Tables 1 and 2. The severity of the DMTP increases with children because one partner of the unmarried

⁵ We refer readers interested in a fuller discussion of the history of the Marriage Tax Penalty to Alm and Leguizamon (2015), Gerzog (1978), and Wiggins, Crumbley, and Apostolou (1986).

couple benefits from the expanded income limits available under the *Head of Household* filing status. The cumulative effect of the DMTP depends on the taxpayers' facts and circumstances.

To illustrate the current status of the DMTP, we develop several hypothetical scenarios. Figures 1, 2, and 3 illustrate the marriage tax difference (penalty or subsidy) for a couple whose total taxable income ranges from \$0 to \$720,000 for the 2015 tax year.⁶ We assume that the couple's income is from wages and that they claim the appropriate Standard Deduction (not any elective deductions, such as itemized, IRA, or education deductions). Each Figure assumes that the couple has either no or two children, both of which are under the age of 13. Figures 1, 2, and 3 assume that the first partner earns 100%, 75%, and 50% of the couple's total wages, respectively. If unmarried, the first partner claims the personal exemptions for the children and *Head of Household* status. If unmarried, the second partner files as *Single*. The married couple files MFJ.

Consistent with prior analysis (Alm and Leguizamon, 2015; Gerzog, 1978), single-earner married couples do not pay a marriage penalty, but rather benefit from a marriage subsidy (bonus) as illustrated in Figure 1. Consequently, married couples with only one earner generally incur a lower tax liability relative to an unmarried couple similarly situated at all income levels. Figures 2 and 3 illustrate that the marriage penalty applies when both partners contribute to the household income, and that it is greatest when both partners contribute equally in Figure 3. Since 1978, the majority of married couples are dual-earner households, with income equality between the partners increasing since the early 1970s.⁷ Therefore, the majority of married households are likely to incur some DMTP.

⁶ The 2016 tax estimates are comparable to 2015.

⁷ Data Source: The Bureau of Labor Statistics on http://www.bls.gov/opub/ted/2014/ted_20140602.htm

Figures 1 (2, 3) also illustrate that the marriage subsidy (penalty) is less (greater) for couples with children, regardless of each partner's contribution to household income and the level of total household income. As a consequence, the tax code provides the greatest disincentive to marry when the federal government should arguably be providing the greatest incentive to marry: when the couple has dependent children.

Finally, Figures 2 and 3 illustrate that the marriage penalty increases with total household income. This last effect is misleading, since the largest effect of the marriage penalty as a percentage of Adjusted Gross Income, is on middle income married couples with children whose Adjusted Gross Income is between \$30,000 and \$90,000, shown in Figure 4 and discussed in greater detail below. Thus, the DMTP's discouraging impact on marriage decisions may be stronger on lower- to middle-income couples, relative to its weaker influence on higher-income couples.

The Marriage Tax Penalty's Influence on Marriage Decisions

There is no ambiguity or disagreement as to whether the federal tax code provides a DMTP. Researchers and the legislature acknowledge, and accept to some degree, that the U.S. tax code grants preferential tax treatment to dual-earner couples who remain unmarried relative to couples who legally marry. However, there is a long-standing question in economics: *Does the DMTP significantly impact couples' marriage decisions?* (Leturcq, 2012). Specifically, do couples avoid marriage to avoid the costly burden of the DMTP? Theoretically, the DMTP can impact a couple's utilitarian decision to marry if the DMTP reduces the expected positive flow of benefits from marriage sufficiently, such that the benefits attained from remaining single exceed those from marrying (Becker, 1973, 1974).

In a series of papers, Alm and Whittington (1995, 1996, 1997, and 1999) find that while the impact of taxation on marriage decisions is statistically significant, the economic impact is relatively low. Additional studies conducted by Buffeteau and Echevin (2003), Chade and Ventura (2005), and Herbst (2011) provide similar results. Other research is either unsuccessful in supporting the proposition that changes in the tax code significantly impact couples' marriage decisions (Dickert-Conlin and Houser, 2002), or, documents that the penalty influences, at most, the timing of marriage, not the marriage rate (Sjoquist and Walker, 1995).

Fisher (2013) recognized that self-selection may inhibit the ability to detect an economically significant impact on marriage decisions arising from the DMTP. To correct for self-selection, Fisher (2013) used an instrumental variable approach and found that, for each \$1,000 change in the financial incentive associated with marriage, the marriage tax penalty had a 1.7 (1.9) percent impact on marriage decisions. While Fisher's (2013) finding was four times larger than the rates documented by prior research, the economic impact is still modest by Fisher's (2013) own description. Therefore, Fisher's (2013) study joins extant research (Alm and Whittington, 1999; Eissa and Hoynes, 2000) to provide some statistically significant evidence that the DMTP influences marriage decisions, but with limited economic significance.

The dollar cost of the DMTP may not adequately capture the influence that the DMTP has on marriage decisions. Figure 4 presents the percentage cost (benefit if positive) of being married for equal earning households. Low-income households generally receive a tax benefit for marriage. For an example, a couple earning total wages of \$10,000, with two children, receives a tax benefit of \$2,367, which is a bonus of 23.7% of their Adjusted Gross Income, relative to a comparable unmarried couple. However, this marriage subsidy rapidly turns to a severe penalty for low-income couples with minor increases in income. When the couple's total

earnings surpass \$27,200, which is only \$2,950 above the poverty level,⁸ they move from benefitting from the marriage subsidy, to incurring the DMTP. At \$50,000 of earnings, when each spouse earns annual wages of \$25,000, the \$4,266 DMTP is 8.5% of their Adjusted Gross Income. In contrast, a couple earning \$200,000 per year (\$100,000 each) incurs a \$3,565 DMTP, 1.8% of their Adjusted Gross Income. As a percentage of Adjusted Gross Income, middle class couples earning from roughly \$30,000 through \$90,000 incur a DMTP that arguably imposes a disproportionate, unintended burden. The DMTP fundamentally motivates the poor to remain poor or unmarried, and the middle class to remain unmarried, to avoid the costly penalty. Thus, marriage has become a prohibitive, costly luxury for those couples who have barely moved out of poverty levels.

Thus, while the decision to marry is not commonly considered a tax decision, the cost of DMTP is more likely to be a factor in that decision for those lower- and middle-income couples to whom it imposes a greater relative burden. In contrast, because wealthy couples pay a smaller DMTP as a percentage of their Adjusted Gross Income, they should be better able to afford the luxury of marriage. Therefore, we predict that the DMTP will have the greatest influence on lower-income couples, motivating them to remain unmarried, and less of an influence on wealthy families, not interfering with their marriage decisions. Because this analysis is founded on traditional opposite sex couples (OSC), we limit this hypothesis accordingly.

Hypothesis I: For opposite sex couples living in the same household, the likelihood of marriage increases with household income.

⁸ The U.S Department of Health & Human Services sets the poverty level for a family of four is set at \$24,250, available at <https://aspe.hhs.gov/2015-poverty-guidelines>.

Results which support the first hypothesis are consistent with the notion that the DMTP has a statistically and economically significant influence on marriage decisions. Such a result would contribute beyond extant research which indicates that the DMTP has little, if any influence on couples' marriage decisions. However, results which support the first hypothesis are also consistent with wealthy couples being more likely to get married, irrespective of any influence the DMTP may have on marriage decisions. The following discussion and second hypothesis address this limitation.

The Marriage Tax Penalty and Same Sex Marriage

The imposition of the DMTP on married SSCs is a consequence of the Supreme Court of the United States' (SCOTUS) ruling in *United States v. Windsor*.⁹ Thea Spyer and Edith Windsor married in Canada and resided in New York. Edith Windsor claimed the estate marital exclusion following the death of the first spouse, Thea Spyer. The IRS denied the exclusion based upon the Defense of Marriage Act (DOMA). In 2013, SCOTUS ruled in favor of Windsor, declared a portion of DOMA unconstitutional, and ruled that the federal government must recognize any legal marriage regardless of the couple's sexual orientation. In response to the ruling in *Windsor*, the Treasury Department issued Revenue Ruling 2013-17 on August 29, 2013.

Examining the marriage trends of same sex couples (SSC) before and after Revenue Ruling 2013-17 may help disentangle the influence the DMTP has on marriage decisions relative to other factors that influence the income-marriage relation. Extant research recognizes two factors that can moderate the ability to document the DMTP's influence on marriage decisions: (1) the incremental nature of tax changes that influence marriage tax penalties/subsidies; and (2) the tax elasticity relative to other factors that influence the cost of marriage. With annual, often

⁹ 570 U.S. 12, 133 S. Ct. 2675 (2013)

small incremental changes to the tax code, it is difficult to completely disentangle the impacts of self-selection on the presence of a net marriage tax penalty/subsidy. Difficulties in isolating the influence of the DMTP may explain why prior empirical studies have had limited success documenting an economically significant influence of the DMTP on couples' marriage decisions.

Unlike the incremental change environment of prior studies evaluating the DMTP-marriage relation for OSCs, Revenue Ruling 2013-17's change was immediate and complete, such that, prior to the change, SSCs were not subject to the DMTP and, immediately following, they are. Because the federal government classified all SSCs as unmarried prior to 2013, SSCs filed separate tax returns, either filing as two *Single* taxpayers or with one claiming *Head of Household* status. Consequently, SSCs were not burdened with the DMTP, even if they were legally married and considered legally married in their resident jurisdiction. Revenue Ruling 2013-17 provides that SSCs who are legally married in jurisdictions that recognize SSM will be treated as married for federal tax purposes.¹⁰ This ruling was historic, affecting more than 1,000 federal references.¹¹ If the DMTP has a significant influence on couples' marriage decisions, we expect that, since 2013, the income-marriage relation for SSCs would more closely resemble that seen by OSCs. Specifically, we expect a stronger, positive income-marriage relation for SSCs following Revenue Ruling 2013-17, than prior to this change.

While the exogenous change to the DMTP was immediate, other factors that influence the income-marriage relation remained relatively unchanged before and after the 2013 SCOTUS decision. For example, individual religious preferences, family influences, and many unobserved

¹⁰ Appendix A provides a list of the states, sorted by the date that each state legally recognized SSM.

¹¹ The 2013 change did not legalize SSM in all jurisdictions. It only provided federal recognition. On June 26, 2015, SCOTUS officially settled the issue. In *Obergefell v. Hodges*. SCOTUS ruled that all bans on SSM are unconstitutional (576 U.S. 2015). With this decision, the court officially legalized SSM as a federal right and created uniformity throughout the United States. Appendix A contains the dates of the Supreme Court of the United States (SCOTUS) rulings that impacted SSM, and the date that Revenue Ruling 2013-17 was issued.

characteristics that affect marriage decisions would likely have not changed, or changed very little, following the issuance of Revenue Ruling 2013-17. Because single income couples may need to marry to provide the non-working partner with benefits and single income couples likely have lower total household income relative to two-earner households, this need for benefits may create a negative influence on income and marriage. However again, this factor would have the same influence both prior to and post the 2013 change. Travel costs associated with SSM may have deterred some lower income couples. Prior to Revenue Ruling 2013-17, only thirteen states, the District of Columbia, and several countries recognized SSM. By the end of 2014, an additional twenty-one states formally recognized SSM. Consequently, it may be less expensive for many SSCs to marry following the ruling because of reduced travel costs. Therefore, if the DMTP's influence on couples' marriage decisions is relatively weaker than other factors, such as travel costs, we would expect to see the greatest increase in marriage rates for the lower income SSCs following the federal recognition of SSM and as more jurisdictions legalized SSM. If the DMTP does have a meaningful, economically significant influence on SSCs marriage decisions, we would see a stronger, positive marriage-income relation following Revenue Ruling 2013-17, despite the expansion of jurisdictions recognizing SSM biasing against this prediction.

In summary, by limiting our sample to the period immediately surrounding Revenue Ruling 2013-17 (2012 to 2014), we hope to isolate the influence of the DMTP on the income-marriage relation by focusing on a period that has an exogenous shock to SSCs DMTP while holding all other factors that influence the income-marriage relation relatively constant.¹² If the

¹² The case that brought about the federal recognition of same sex marriage involved federal estate taxes, such that the spousal exclusion benefitted the taxpayer's estate. However, less than 1% of the U.S. population pays any federal estates taxes (The Brookings Institutes estimates that only 0.2% of decedents paid estate taxes in 2015, <http://www.taxpolicycenter.org/briefing-book/how-many-people-pay-estate-tax>). Therefore, we consider any possible, positive tax consequence from federal estate taxes as negligible. To be robust, we also eliminate the wealthiest 1% from the same, re-estimate the analysis, and provide similar results.

DMTP has a significant influence on the income-marriage relation, then we predict a stronger, positive SSC income-marriage relation following Revenue Ruling 2013-17

Hypothesis II: Following Revenue Ruling 2013-17, the likelihood of marriage increases with household income for SSC living in the same house.

This approach is consistent with Leturcq (2012), who conjectures that prior studies have been unable to identify a strong influence of the marriage tax penalty because of the penalty's low elasticity relative to other factors that can influence marriage decisions. Civil unions in France have reduced costs of divorce relative to marriage, but also, up until recently, were not afforded the tax subsidies provided to married couples. Leturcq (2012) takes advantage of the change in French law that provided couples in civil unions similar tax subsidies as married couples. This increase in the positive benefits arising from civil union decisions was not accompanied by an increase in the other costs associated with marriage decisions, such as the cost of divorce. Consistent with his prediction, Leturcq's (2012) identification that civil unions increase following the exogenous shock suggests that the relative influence of other factors on the marriage decision likely limits the ability of earlier studies to isolate and examine the influence of the marriage tax penalty. Our study differs from Leturcq (2012) not only because we consider marriage decisions in the United States, but also because our study focuses on marriage decisions, which are potentially costly (e.g., divorce costs) compared to the civil union decisions examined in Leturcq's (2012) study.

**INITIAL EXAMINATION:
A TIME-SERIES ANALYSIS OF MARRIAGE RATES BY INCOME CLASS**

We first examine trends of the marriage-income relation using categorical data, as opposed to the individual household data used below. The United States Census Bureau reports

the percentage of cohabitating couples who are married by income class in the American Community Survey (ACS).¹³ The five income ranges are less than \$35,000; \$35,000 to \$49,999; \$50,000 to \$74,999; \$75,000 to \$99,999; and \$100,000 or more of total annual household income. Since 2008, the ACS has reported both opposite sex couples (OSC) and same sex couples (SSC).¹⁴ Using this data, we present the annual marriage percentage¹⁵ of SSCs and OSCs couples by income class from 2008 through 2014.

Table 3 presents the descriptive statistics for this categorical sample of households. From 2008 through 2014, the U.S. averaged 61,901,598 OSC households and 641,997 SSC households each year. Same sex couples comprise 1.03% of the 447,905,163 total observations. While 92.91% of OSCs are married, 30.70% of SSCs are married. Mean household income totaled \$97,167 (\$108,794) for married OSCs (SSCs), compared to \$66,525 (\$110,074) for unmarried OSCs (SSCs).

Figure 5 presents the time-series analysis of OSCs. Consistently from 2008 through 2014, the likelihood that an OSC is married increases with total household income across all five income categories. Figure 6 presents mean total annual household income of married and unmarried OSC from 2008 through 2014, which illustrates that mean annual household income of married couples exceeds that of unmarried couples. These findings are consistent with Hypothesis I, which predicts a positive income-marriage relation for OSCs.

¹³ <http://www.census.gov/hhes/samesex/data/>

¹⁴ At the census website, the SSC information appears to be first available in 2005. However, our investigations uncovered that the ACS improved its married classification process starting in 2008, such that the SSC married/unmarried classifications are not considered highly reliable until 2008.

¹⁵ We define the marriage percentage as the total married OSC (SSC) households in an income range divided by the total OSC (SSC) households in that respective income range.

Figure 7 presents the income-marriage relation of SSCs from 2008 through 2014, which clearly does not resemble the consistent, positive income-marriage relation demonstrated by OSCs in Figure 5. Pre-2013, Figure 7 suggests a weak, negative income-marriage relation for SSCs, which changes following 2012. In 2013, with the federal recognition of SSM, the marriage percentages increased for all classes, with the top two income groups demonstrating the greatest increase in 2013 and 2014. In 2014, SSC households with at least \$100,000 of total annual household income were more likely to be married compared to SSCs in all other income categories. This shift in the income-marriage relation of SSCs is further illustrated in Figure 8, which presents mean total annual household income for married and unmarried SSCs from 2008 through 2014. Mean total annual household income for unmarried SSCs exceed married SSCs, until 2013 when married SSCs surpass their unmarried counterparts. Figures 7 and 8 are consistent with Hypothesis II, which predicts a stronger post-2013 positive income-marriage relation for SSCs.

This time series analysis is consistent with our prediction that the DMTP influences SSCs marriage decisions. These findings illustrate the disproportionate impact of the DMTP, suggesting that the penalty has the greatest impact on low- and middle- income couples who are less able to afford the extra tax burden.

DATA AND RESEARCH DESIGN

Sample Selection

Household level data, required to answer the research questions, is obtained from the American Community Survey (ACS), publically available at the United States Census Bureau. The ACS data is the U.S.'s largest survey data source of U.S. households and includes data

obtained from the official national census taken every ten years. To update and provide annual data, the ACS examines about 3 million U.S. households using monthly surveys.¹⁶

The ACS's Public Use Microdata Sample (PUMS) provides individual household data.¹⁷ Because the PUMS data provides detailed information on confidential topics (e.g., income, children, race, and education), the ACS assigns serial numbers to households to protect identities.¹⁸ PUMS data is presented in five-year and one-year samples. To examine OSCs and test Hypothesis I, we include the most recently available five-year sample, 2010 through 2014. Since PUMS data reclassifies all SSCs as unmarried prior to 2012, we cannot use the five-year sample to examine the marriage decisions of SSCs and test Hypothesis II. Thus, we combine the 2012 through 2014 PUMS annual samples to create a three-year sample of OSCs and SSCs.

Tables 4 and 5 present the sample selection for the five-year OSC and three-year SSC and OSC samples, respectively. To focus on couples' marriage decisions, we restrict our sample to include households with a minimum of two people living together as a self-described "couple" and exclude individuals who were widowed within the last year or currently separated from their spouse. Because the marriage decisions of seniors may be greatly affected by retirement, nursing home, or estate planning issues as they leave the workforce, we exclude all households with both spouses/unmarried partners 65 years of age or older. To exclude those situations that may be biased by pressing legal considerations, we eliminate all grandparent run households with no parent present, households where both spouses/unmarried partners report no income, and all households where one of the spouses/unmarried partner is a minor, i.e. less than 18 years of age.

¹⁶ A detailed description of the ACS is provided at <http://www.census.gov/hhes/samesex/data/acs.html>.

¹⁷ <http://www.census.gov/programs-surveys/acs/data/pums.html>

¹⁸ A detailed description of PUMS data is provided at <http://www.census.gov/programs-surveys/acs/technical-documentation/pums/documentation.2014.html>.

For the five-year (2010 to 2014) OSC sample, we further exclude all SSCs. Table 4 shows that we have a final sample of 2,728,102 observations. PUMS data is a weighted sample, wherein each observation provided in the dataset effectively represents a greater number of households. To examine and test the sample, PUMS data includes individual and replicate weights for each observation. We use these weights for all analyses provided in this paper, including estimating sample means and regressions. Using the provided weights, we estimate that the 2,728,102 observations in the five-year OSC sample represent 53,320,230 U.S. households, which include a married or unmarried cohabitating OSC.

For the SSC and OSC combined sample, Table 5 shows that the three-year (2012 to 2014) sample has 1,649,871 observations, including 20,632 SSC observations. Using the provided weights, we estimate that these 20,632 SSC observations represent 375,092 married or unmarried cohabitating SSC households. To test Hypothesis II, we exclude 2013 as a transition year and examine OSCs and SSCs in 2012 and 2014, as discussed in research design section below.¹⁹ In addition, we exclude all SSCs who resided in the 11 jurisdictions that recognized same sex marriage prior to the federal government, listed in the Appendix. Since the marriage decisions of SSCs in these 11 jurisdictions were made prior to federal recognition of SSM, the income-marriage relation in these 11 jurisdictions may be unduly influenced by factors unrelated to the DMTP. Furthermore, taxpayers in these 11 jurisdictions may have some exposure to a state level marriage tax penalty prior to 2013,²⁰ thus, the federal recognition did not provide these taxpayers with a complete DMTP exogenous shock, i.e. a sudden exposure to the penalty.

¹⁹ Testing Hypothesis II using the 2012 through 2014 sample does not change our conclusions.

²⁰ Of the 11 jurisdictions that recognized same sex marriage prior to 2013, 8 of the jurisdictions have progressive individual tax structures, a tax component that contributes to DMTP. In untabulated results, we estimated Equations (5) through (8) including the SSCs in these 11 jurisdictions and find results that support the conclusions reached from the tabulated analysis.

The Table 5 two-year (2012 and 2014) sample of OSCs and SSCs includes 1,091,513 observations, which represents 20,867,398 married or unmarried households, 162,423 SSCs and 20,704,975 OSCs.

Table 6 presents some descriptive statistics of the five-year sample of OSC. For the sample as a whole, Panel A shows that 89% of the sample's OSCs are married, consistent with the trending decline of marriage among OSCs. Married OSC have mean (median) total household income of \$102,452 (\$80,798) compared to their unmarried counterparts with \$67,454 (\$53,498). For the whole sample, mean (median) income from the man of the house equals \$62,850 (\$44,998), compared to the woman of the house with \$31,289 (\$21,092). On average, the lower income partner,²¹ either male or female, contributes 24% (27%) toward the couple's joint annual income.²²

Panel B shows annual information and the decreasing marriage rate for OSCs. Panel C presents some characteristics of the whole sample, and separately depending on marital status. While 21% of married households report that one of the spouses contributes no income to the household, 15% of unmarried households have one non-income partner. On average, all individuals have graduated high school and have some formal education beyond high school, with the exception of unmarried males whose mean (median) education stops with high school graduation. Minor children reside in 51% (44%) of married (unmarried) households. Households that self-described as white comprise 67% (57%) of the married (unmarried) households.

²¹ We refer to each member of the couple as a "partner." If we refer to the member of a married (unmarried) couple, we refer to each member as the "spouse" ("unmarried partner").

²² We define the lower income partner percentage as the lower income partner's positive annual income, divided by the sum of both partner's positive annual income. Positive annual income is the partner's annual income as reported by PUMS, set equal to zero if below zero.

Table 7 presents some descriptive statistics of the three-year sample of SSC. Panel A shows that 32% of the sample's SSCs are married, with little difference between male (31%) and female (32%) couples. Mean (median) household income equals \$117,384 (\$89,700) for the whole sample. Mean (median) total annual income for each man equals \$64,822 (\$47,978) compared to each woman with \$48,689 (\$38,289).²³ The lower income partner, either male or female, contributes 29% (32%) toward the couple joint annual income.

Panel B shows the annual information, with the increasing marriage rate for SSCs. Panel C of Table 6 shows that 10% of all SSCs have only one spouse/unmarried partner contribute to household income. On average, all same sex spouse/unmarried partners are high school graduates, with some formal education beyond high school. Minor children reside in 31% (16%) of married (unmarried) households. Households that self-described as white comprise 66% (66%) of the married (unmarried) households. A quick comparison of the descriptive statistics presented in Tables 6 and 7 indicate that SSCs are more likely than OSCs to be dual income households, with the lower income partner contributing more toward the joint annual income, and are less likely to have minor children.

Research Design

We test Hypothesis I using the PUMS household data. We hypothesize that the likelihood of marriage increases with household income. Therefore, we test Hypothesis I by estimating and tabulating Equations (1) through (4), which tests the income-marriage relation.

$$MARRIED = \beta_0 + \beta_1 INCOME + \beta_2 CHILDREN + \epsilon \quad (1)$$

²³ Although the regression analyses uses cpi adjusted numbers, Tables 6 and 7 report non-cpi adjusted annual income. Because Table 6 includes 2010 and 2011, household and partner income should not be compared as listed.

$$MARRIED = \beta_0 + \beta_1 INCOME + \beta_2 CHILDREN + \beta_3 SPLIT INCOME + \beta_4 EQUAL EARNERS + \beta_5 WHITE + \epsilon \quad (2)$$

$$MARRIED = \beta_0 + \beta_1 INCOME + \beta_2 CHILDREN + \beta_3 SPLIT INCOME + \beta_4 EQUAL EARNERS + \beta_5 WHITE + \sum_{i=2}^4 \theta_i MALE EDUC_i + \sum_{j=2}^4 \delta_j FEMALE EDUC_j + \epsilon \quad (3)$$

$$MARRIED = \beta_0 + \beta_1 2Q INCOME + \beta_2 3Q INCOME + \beta_3 4Q INCOME + \beta_4 CHILDREN + \beta_5 SPLIT INCOME + \beta_6 EQUAL EARNERS + \beta_7 WHITE + \sum_{i=2}^4 \theta_i MALE EDUC_i + \sum_{j=2}^4 \delta_j FEMALE EDUC_j + \epsilon \quad (4)$$

We tabulate all four regressions for completeness. *MARRIED* is the dependent variable in all four equations, which equals 1 if the couple is married, and 0 otherwise. Because *MARRIED* is an indicator variable, we estimate logistic regressions, using the observation weights and replicate weights and the jackknife method of variance estimation.

To test the income-marriage relation, we measure household income two ways. First, we measure income using total household income in thousands of U.S. dollars, *INCOME*, which we define as cpi-adjusted, winsorized at 1/99 levels total household income divided by 1,000. We include *INCOME* as an independent variable in Equations (1) – (3), and its coefficient estimates the income-marriage relation, testing Hypothesis I. Second, we measure household income with four quartile indicators to examine the income-marriage relation by economic class. The class indicator, *1Q INCOME/ 2Q INCOME/ 3Q INCOME/ 4Q INCOME*, equals 1 if the household's total income is in the sample's first/ second/ third/ fourth quartile of income based upon the sample's cpi-adjusted total household income, and 0 otherwise. We include *2Q INCOME*, *3Q INCOME*, and *4Q INCOME* as independent variables in Equation (4), and the coefficients on each measure how the income-marriage relation for that quartile compares to households in the

lowest income quartile. Hypothesis I predicts that the coefficients on *2Q INCOME*, *3Q INCOME*, and *4Q INCOME* are positive, and increasing with each income class.

We include independent variables to control for household characteristics that influence marriage decisions. Marriage decisions are influenced by different demographics, e.g. children, the couple's earnings ratio, and race (Alm and Leguizamon, 2015; Brown and Wright, 2016). Because the decision to marry may be greatly influenced by the presence of minor children (Alm and Leguizamon, 2015; Brown and Wright, 2016), we include *CHILDREN* in all equations. *CHILDREN* equals 1 if there are minor children living in the household, and 0 otherwise.

The couple's earnings ratio may influence the couple's marriage decision (Alm and Leguizamon, 2015), partly because, as demonstrated in the Background and Hypothesis Development section, the DMTP generally increases as the partners' individual annual income equalizes. As such, we divide our sample into three income types, *SOLE EARNER*, *SPLIT INCOME*, and *EQUAL EARNERS*, based upon the percentage of income contributed by the lower income partner (*LI%*).²⁴ We define *LI%* as the lower income partner's positive annual income, divided by the sum of both partner's positive annual income.²⁵ If only one of the partners has any positive income, *LI%* is 0%. Then, *SOLE EARNER* equals 1, and 0 otherwise. If *LI%* is greater than 0% but less than or equal to 25%, i.e. the couple has up to a 25%/75% shared income contribution, *SPLIT INCOME* equals 1, and 0 otherwise. If *LI%* is greater than 25%, the partners have greater income equality within the household, and *EQUAL EARNERS* equals 1, and 0 otherwise. We include *SPLIT INCOME* and *EQUAL EARNERS* as independent variables

²⁴ In untabulated results, we estimate all regressions using *LI%*, as a continuous variable instead of as an indicator variable, and obtain similar results.

²⁵ Positive annual income is the partner's annual income as reported by PUMS, set equal to zero if below zero.

in Equations (2) – (4) to control for and examine how the couple’s dual-earner income status affects marriage decisions.

Marriage decisions may also be related to race (Alm and Leguizamon, 2015; Brown and Wright, 2016), thus, in Equations (2) – (4), we include *WHITE*,²⁶ an indicator variable equal to 1 if the household describes their race as “white,” and 0 otherwise. Consistent with the Brown and Wright (2016) study, Equations (3) and (4) include education indicators that mark four levels of education achievement, *EDUC1* /*EDUC2*/ *EDUC3*/ *EDUC4* that indicate no high school degree/ high school graduate/ some college education/ bachelor’s degree or greater.²⁷ Because educational achievement may be highly correlated with household income, we estimate Equation (2) without the education indicators, and Equations (3) and (4) with the education indicators to allow for a comparison.²⁸

The second hypothesis takes advantage of the exogenous shock of Revenue Ruling 2013-17, which suddenly subjected SSCs to the DMTP. A difference-in-difference regression may be used to isolate the influence of an exogenous change (Leturcq, 2012). Therefore, we use the PUMS household data to test Hypothesis II, using a difference-in-difference regression to evaluate how the imposition of the DMTP in 2013 affected the income-marriage relation, to examine how the imposition of the DMTP on SSCs affected marriage decisions. We include OSCs to compare and control for general economic and societal changes that can influence the income-marriage relation over the same time period. Because Revenue Ruling 2013-17 was not officially issued until August of 2013, we exclude 2013 observations as a transition period.

²⁶ In untabulated results, we estimate all regressions including additional race indicators, including *BLACK*, *HISPANIC*, and *ASIAN*, and obtain similar results.

²⁷ In untabulated results, we estimate all regressions including a continuous education measure, with seven markers of education achievement and obtain similar results.

²⁸ In untabulated results, we estimate all regressions including year indicators and obtain similar results.

Therefore, we examine a two year event window, with one year prior to the change of the law, 2012,²⁹ and one year post, 2014.

We estimate Equations (5) - (8) to test Hypothesis II, with *MARRIED* as the dependent variable. We estimate logistic regressions, using the observation weights and replicate weights and the jackknife method of variance estimation. The independent variables include *CHILDREN*, *SPLIT INCOME*, *EQUAL EARNERS*, and *WHITE* for the reasons detailed above. Because SSC partners cannot be divided into both a male and female partner, we include a single education variable, $\mu(EDUC)$, which we define as the couple's mean education level calculated on a seven-point scale ranging from no education to a completed post-graduate degree.³⁰

To examine the income-marriage relation, we include the two measures of household income discussed above, *INCOME*, in Equations (5) and (7) and *2Q INCOME/ 3Q INCOME/ 4Q INCOME* in Equations (6) and (8). To measure how the likelihood of marriage increased following 2013, we include *POST*, an indicator equal to 1 if the observation follows the change of the law, and 0 otherwise. Equations (5) and (7) include *INCOME*POST* to examine how the income-marriage relation changed in 2013. Equations (6) and (8) include *2Q INCOME*POST*, *3Q INCOME*POST*, and *4Q INCOME*POST* to examine how the likelihood of marriage changed for each of the four income classes.

We estimate Equations (5) and (6) separately for OSCs and SSCs to compare how the 2013 change affected each type of couple. Based on the preceding development, Hypothesis II predicts that in Equation (5) the coefficient on the interaction term, *INCOME*POST*, will be positive and significant for SSCs, and that in Equation (6) the coefficients on the quartile

²⁹ PUMS data does not classify any SSCs as married prior to 2012.

³⁰ In untabulated results, we estimate all regressions including the same four education indicators provided in Equations (3) and (4), and obtain similar results. In addition, we estimate all regressions excluding all education controls and obtain similar results.

interaction terms, $[2-4]Q\ INCOME*POST$, will demonstrate a stronger relation between income and marriage following 2013. In other words, for SSCs, we expect a progressively greater, positive coefficient on the interaction terms of the income classes, greatest for the higher income quartiles, $3Q\ INCOME*POST$ and $4Q\ INCOME*POST$.

Hypothesis I predicts a strong, positive relation between *INCOME* and *MARRIED* for all OSCs, both prior to and following Revenue Ruling 2013-17. Because married couples received some relief from the DMTP in 2012,³¹ if there is any change for OSCs, it is likely that the income-marriage relation of OSCs weakened from 2012 to 2014 as couples adapt to the tax change. In other words, while SSCs are subjected to the DMTP for the first time from 2012 to 2014, which we predict strengthens the SSC income-marriage positive relation; the reduction of the DMTP in 2012 may have weakened the OSC income-marriage positive relation during that same period.

$$MARRIED = \beta_0 + \beta_1 INCOME + \beta_2 POST + \beta_3 INCOME * POST + \beta_4 CHILDREN + \beta_5 SPLIT\ INCOME + \beta_6 EQUAL\ EARNERS + \beta_7 WHITE + \beta_8 \mu(EDUC) + \epsilon \quad (5)$$

$$MARRIED = \beta_0 + \beta_1 2Q\ INCOME + \beta_2 3Q\ INCOME + \beta_3 4Q\ INCOME + \beta_4 POST + \beta_5 2Q\ INCOME * POST + \beta_6 3Q\ INCOME * POST + \beta_7 4Q\ INCOME * POST + \beta_8 CHILDREN + \beta_9 SPLIT\ INCOME + \beta_{10} EQUAL\ EARNERS + \beta_{11} WHITE + \beta_8 \mu(EDUC) + \epsilon \quad (6)$$

Equations (7) and (8) examine OSCs and SSCs together. To compare the marriage rate of SSCs to OSCs, the independent variables include an indicator, *SSC*, which equals 1 for same sex couples, and 0 otherwise. To control for the influence of the 2013 change on all SSCs, the

³¹ The American Taxpayer Relief Act of 2012 set the standard deduction and the 15% bracket of two singles equal to that of a married couple filing a joint tax return.

independent variables include the interaction of *SSC* with *POST*. To control for the influence of the 2013 change on the income-marriage relation for all households, we include the interaction of *POST* with *INCOME* and *2Q INCOME/ 3Q INCOME/ 4Q INCOME* in Equations (7) and (8), respectively. To control for the income-marriage relation of SSCs prior to the change, we include the interaction of *SSC* with *INCOME* and *2Q INCOME/ 3Q INCOME/ 4Q INCOME* in Equations (7) and (8), respectively.

To examine how the income-marriage relation changed in 2013 for SSCs, Equation (7) includes the three-way interaction term, *SSC*POST*INCOME*, and Equation (8) includes the three-way interaction terms, *SSC*POST*2Q INCOME*, *SSC*POST*3Q INCOME*, and *SSC*POST*4Q INCOME*. The coefficients on the three-way interaction terms test Hypothesis II, which predicts a positive coefficient on *SSC*POST*INCOME*, and progressively greater, positive coefficients on the quartile three-way interaction terms.

$$\begin{aligned}
 MARRIED = & \beta_0 + \beta_1 SSC + \beta_2 POST + \beta_3 SSC * POST + \beta_4 INCOME + \beta_5 INCOME * POST \\
 & + \beta_6 SSC * INCOME + \beta_7 SSC * POST * INCOME + \beta_8 CHILDREN \\
 & + \beta_9 SPLIT INCOME + \beta_{10} EQUAL EARNERS + \beta_{11} WHITE + \beta_{12} \mu(EDUC) + \epsilon \quad (7)
 \end{aligned}$$

$$\begin{aligned}
 MARRIED = & \beta_0 + \beta_1 SSE + \beta_2 POST + \beta_3 SSC * POST + \beta_4 2Q INCOME + \beta_5 3Q INCOME \\
 & + \beta_6 4Q INCOME + \beta_7 2Q INCOME * POST + \beta_8 3Q INCOME * POST \\
 & + \beta_9 4Q INCOME * POST + \beta_{10} SSC * 2Q INCOME + \beta_{11} SSC * 3Q INCOME \\
 & + \beta_{12} SSC * 4Q INCOME + \beta_{13} SSC * POST * 2Q INCOME \\
 & + \beta_{14} SSC * POST * 3Q INCOME + \beta_{15} SSC * POST * 4Q INCOME + \beta_{16} CHILDREN \\
 & + \beta_{17} SPLIT INCOME + \beta_{18} EQUAL EARNERS + \beta_{19} WHITE + \beta_{20} \mu(EDUC) + \epsilon \quad (8)
 \end{aligned}$$

RESULTS

Table 8 presents the estimation results of Equations (1) through (4), testing Hypothesis I using the PUMS 2010 through 2014 OSC household data. Consistently, all results provide

evidence that the likelihood of marriage increases with household wealth, supporting Hypothesis I. The coefficient on *INCOME* estimates the income-marriage relation, and is consistently positive and statistically significant, estimated at .009 to .010 ($p < .0001$) with the tabulated controls. Therefore, Equations (1) through (3) provide consistent evidence that the likelihood that a couple is married increases by 1% for every \$1,000 increase in household income.³²

Equation (4) measures household income using quartile indicators. The positive, significant coefficient on the second quartile indicator, *2Q INCOME* (0.627, $p < .0001$), suggests that a couple in the second quartile is more likely to be married than a couple in the lower quartile. Further, each progressively greater quartile indicator, *3Q INCOME* (1.043, $p < .0001$) and *4Q INCOME* (1.422, $p < .0001$), suggests that the likelihood of marriage increases as the couple “moves-up” the income classes. Therefore, Equation (4) also provides evidence that the likelihood of marriage increases with household income, supporting Hypothesis I.

Other coefficients of interest are *SPLIT INCOME* and *EQUAL EARNERS*, which are both negative and significant in Equations (2) through (4). These findings suggest that a couple is less likely to be married when both partners contribute to the household’s income, consistent with the proposition that an unmarried individual is more likely maintain financial independence relative a married individual. However, this is also consistent with the application of the DMTP. The federal tax system does not penalize single earner married couples, only dual earners with the penalty increasing as the partners’ income equalizes. Therefore, the negative coefficient on *SPLIT INCOME* and the greater, negative coefficient on *EQUAL EARNERS* are consistent with couples more likely to elect unmarried cohabitation as the cost of their DMTP increases.

³² We find consistent results if we include individual state indicators, including the District of Columbia.

To further examine the influence of income on marriage and whether the household's class affects the income-marriage relation, we divide our sample into four quartiles, based on household income, and estimate Equation (3) on each quartile class separately. Table 9 presents the results. The percentage of married households in each of the quartiles increases with each income class. The coefficient on *INCOME* estimates the income-marriage relation for each quartile class, decreasing from .024 ($p < .0001$) in the lowest quartile to .001 ($p < .0001$) in the highest. With each higher income class, the coefficient on *INCOME* is significantly less than the preceding quartile ($p < .001$).³³ In other words, as income increases, the income-marriage relation weakens. For those households in the lowest quartile, every \$1,000 increase in household income increases the likelihood that the couple is married by 2.4%. For the upper quartile, a \$1,000 increase in income increases the likelihood of marriage by only 0.1%. This finding is consistent with the expectation that the DMTP should have the greatest influence on low- to middle- class households as a percentage of their adjusted gross income.

Table 10 presents the results of Equations (5) and (6), which test Hypothesis II using the PUMS household data, examining SSCs and OSCs separately, and provide evidence supporting Hypothesis II. While *INCOME* ((2-4)Q *INCOME*) estimates the pre-2013 income-marriage relation, *INCOME*POST* ((2-4)Q *INCOME*POST*) estimates how the income-marriage relation changed following 2013 in Equation (5) (Equation (6)).

In Equation (5), while the coefficient on *INCOME* is positive and significant for OSCs (0.009, $p < .0001$), it is insignificant for SSCs. Following the 2013 change, *INCOME*POST* is negative and significant for OSCs (-0.001, $p = 0.003$), but positive and significant for SSCs (0.002, $p = 0.001$). Therefore, while the OSC income-marriage relation weakens, possibly as

³³ Based upon a Z test comparison of the coefficients between two groups.

opposite sex couples adapt to the partial relief from the DMTP granted in 2012, the income-marriage positive relation first develops for same-sex couples following Revenue Ruling 2013-17. Therefore, Equation (5) provides evidence that the SSC income-marriage relation changed in 2013, and that this change differed from that experienced by OSCs in 2013. Following 2013, the SSC income-marriage relation is positive, consistent with the DMTP shifting the income-marriage relation of SSCs to more closely resemble that seen by OSCs who have long been affected by the DMTP.

To accommodate the potential that marriage decisions may be unduly influenced by factors other than the DMTP for both extremely wealthy couples and extremely low income couples, we estimate Equation (5) using two additional subsamples of SSCs. In the first, we exclude those couples whose total household income places them in the top one percentile of our sample. In the second, we exclude those couples whose total household income places them in the bottom and top one percentiles. These untabulated results are consistent with our predictions and do not modify our conclusions.

For completeness, we also estimate Equation (5) including, first, individual state indicators (including the District of Columbia) and, second, including a control for the couple's age,³⁴ both in untabulated results. We expect that couples' marriage decisions are influenced by a variety of factors that are not included in the PUMS data, e.g. religion. Because we expect that the influence of these factors was generally unchanged from 2012 to 2014, the difference-in-difference design helps to control for their respective influences. While it would be better to include individual measures of each household's religious beliefs, because surveys indicate that some states are more religious relative to others,³⁵ we first include state indicators to provide

³⁴ To control for the couples age, we include the natural log of the couple's mean age, winsorized at 1/99.

³⁵ For example: <http://www.gallup.com/poll/189038/new-hampshire-least-religious-state.aspx>.

some degree of additional control for these factors, such as religion, community morays, etc. As age may also affect couples' marriage preferences, we second include the natural log of each couple's mean age as an independent variable. In both of these robustness tests, the results are consistent with the tabulated results and support our conclusions. Prior to the imposition of the DMTP on same-sex couples, household income was not significantly related to marriage, but positive and statistically significantly related following the change.

Equation (6) suggests that in 2012 the likelihood of marriage was greatest for SSCs in the upper income quartile. However, the positive, significant coefficients on $3Q\ INCOME*POST$ and $4Q\ INCOME*POST$ provide evidence that in 2014 the greatest increase in the likelihood of marriage was for those SSCs above the median income levels, consistent with Figure 8's SSC time-trend analysis and supporting Hypothesis II. Following the imposition of the DMTP, a SSC couple in the third income quartile is 82% (.0817 on $3Q\ INCOME*POST$) more likely to be married than a SSC couple in the lowest quartile, while a SSC couple in the upper quartile is 81% (.230 on $4Q\ INCOME$ plus .575 on $4Q\ INCOME*POST$) more likely. For OSCs, Equation (6) shows that the likelihood of marriage increases with income class for OSCs, both before and after 2013 with little change,³⁶ consistent with the OSC time-trend analysis presented in Figure 8.

Equations (7) and (8) examine SSCs and OSCs together, and provide results consistent with Hypothesis II. In Equation (7), the coefficient of interest, $SSC*POST*INCOME$ is positive and significant (0.003, $p < 0.0001$), documenting a stronger, positive income-marriage relation for SSCs following 2013. In contrast, the negative coefficient on $POST*INCOME$ (-0.001, $p = 0.003$) documents that the income-marriage relation weakened for OSCs from 2012 to 2014. These findings suggest that, following the 2013 change, the income-marriage relation strengthened only

³⁶ There is some evidence that the OSC second quartile class likelihood weakened, but this was insufficient to change the progressive increase in the likelihood of marriage for the four classes of income.

for SSCs. In Equation (8), $SSC*POST*3Q INCOME$ and $SSC*POST*4Q INCOME$ are positive and significant, while $3Q INCOME*POST$ and $4Q INCOME *POST$ are not significantly different from zero. These findings suggest that following the 2013 imposition of the DMTP on SSCs, the likelihood of marriage increased for the upper classes of SSCs, but not for OSCs.

In summary, the time-series analyses and the regression analyses provide evidence consistent with both Hypotheses I and II. From 2008 through 2014, for OSCs who have long been subject to the DMTP, there is a consistent positive relation between income and marriage, which remains after the federal recognition of same sex marriage. For SSCs, the income-marriage relation changed from 2008 – 2014, resulting in SSCs having a positive income-marriage relation following Revenue Ruling 2013-17, similar to OSCs who were subject to the DMTP for our whole sample period. Regression analysis is consistent with the imposition of the DMTP strengthening the positive income-marriage relation and increasing the likelihood of marriage among those SSCs in the upper income classes in the post-Revenue Ruling 2013-17 period. Overall, our findings support the notion that the DMTP has both an economically and statistically significant influence on the income-marriage relation, particularly by disproportionately inhibiting marriage for lower-income households.

CONCLUSION

The 2013 Supreme Court ruling in *United States v. Windsor* provided an exogenous shock to SSC, suddenly imposing the DMTP. In this study, we take advantage of this shock to test whether the DMTP significantly influences marriage decisions. Our evidence indicates that the DMTP has an economically significant impact on couples' marriage decisions, and that this impact is disproportionately large for lower-income couples. Further, the tax incentive to remain unmarried increases for those households supporting minor children.

In this regard, our results support the importance of the question raised by Alm and Leguizamon (2015): Should the government move toward implementing a tax system that promotes *Marriage Neutrality*? By generally subsidizing single-earner households while penalizing dual-earner couples, the federal government is arguably taking sides by attempting to discourage working spouses, which can have serious implications for the education and independence of the non-working spouse (Zelenak, 1994). Furthermore, in *Johnson v. U.S.*, 422 F. Supp. 958 (N.D.Ind., 1976), *aff'd sub nom*, the plaintiff argued that the tax code, by taxing married couples more than unmarried couples, violated the Fifth Amendment right to due process and equal protection under the law. The court rejected the argument, fundamentally stating that, because the legislature does not know how to fix the problem, the DMTP can remain (Gerzog, 1978). Even though the DMTP was ruled constitutional, our results can inform legislatures seeking to eliminate the DMTP to promote *Marriage Neutrality*.

Beyond having policy implications, our results contribute to extant research in several areas. First, our results provide some evidence that the DTMP has an economically and statistically significant impact on marriage decisions. Specifically, our results indicate that the likelihood of marriage increases by 1% for every \$1,000 increase in household income. Our results indicating the change in the income-marriage relation of SSCs following Revenue Ruling 2013-17 further support the notion that the income-marriage relation is influenced by the DMTP. SSCs in the highest quartile of income are 81% more likely to be married following 2013, compared to SSCs in the lowest quartile of income.

Second, while much of the research focuses on analyzing macro-economic level effects (see Alm and Leguizamon, 2015, and Leturcq, 2012, for recent examples), our results indicate that influences of tax law changes disproportionately impact couples in different income

categories. We find that the DMTP has a disproportionately negative impact on lower-income couples' marriage decisions, beyond any social welfare impacts that also may discourage marriage at these levels (Brien, Dickert-Conlin, and Weaver, 2004). Finally, we contribute to research that examines income and wealth differentials between married and unmarried couples (Barg and Beblo, 2009; Zagorsky, 2005). Our evidence supports the notion that self-selection has a significant impact on total household income, and may motivate future research to follow Barg and Beblo's (2009) attempt to disentangle self-selection from other factors that influence the marriage-wealth relation. Our results generate an expectation that the self-selection impacts will be greatest on lower-income individuals. Our evidence of DMTP's disproportionate effect on lower and middle class couples is particularly concerning in light of Zagorsky's (2005) evidence that a married individual's net worth increases at a 77 percent faster rate than a single individual, and that married couples tend to have double the wealth of single people who never married. Combining our results with Zagorsky's (2005) findings suggest that DMTP's disparate effect on lower-income couples' marriage decisions may significantly impact the financial security of those couples and the growth potential of society as a whole. Whether this result is due to self-selection into marriage (Barg and Beblo, 2009) or *something*³⁷ associated with marriage remains an open question.

³⁷ In a 2013 article, Allison Linn discussed some of the nuances involved in answering the question of why married people tend to be wealthier. Purported reasons include: (1) individuals in marriages are more likely to seek higher paying job opportunities; (2) greater stability for married couples; and, (3) economy of scales enjoyed by married couples. See "Why Married People Tend to Be Wealthier: It's Complicated." *Today*, February 13, 2013, <http://www.today.com/money/why-married-people-tend-be-wealthier-its-complicated-1C8364877>.

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Appendix A: State Recognition of Same-Sex Marriage Sorted by the Date Each State Legally Recognized Same Sex Marriage.

State/Event	Date Legally Recognized	Source
Massachusetts	5/17/2004	State Court Decision
California*	6/16/2008	State Court Decision*
Conneticut	11/12/2008	State Court Decision
Iowa	4/27/2009	State Court Decision
Vermont	9/1/2009	Legislative Statute
New Hampshire	1/1/2010	Legislative Statute
District of Columbia	3/9/2010	Legislative Statute
New York	7/24/2011	Legislative Statute
Washington	12/6/2012	Legislative Statute, Public Vote
Maine	12/29/2012	Public Vote
Maryland	1/1/2013	Legislative Statute, Public Vote

*Same Sex Couples could legally marry from 6/16/2008 until 11/5/2008 in the state of California. During that time period, approximately 18,000 same sex couples became married. However, the state court decision was overturned by a constitutional ban after proposition 8 passed on November 8, 2008. On August 4, 2010 Judge Walker of the U.S. District Court for the Northern District of California ruled that Proposition 8 was unconstitutional in Perry v. Schwarzenegger 704 F. Supp. 2d 921 (N.C. Cal., 2010). This ruling was stayed during appeal on August 16, 2010 by a 3-judge panel in the Ninth Circuit (Edward Leavy, Michael Daly Hawkins, and Sidney Thomas). After several additional rulings, Proposition 8 was affirmed as unconstitutional and same sex couples could legally marry beginning on 6/28/2013.

**Appendix A: State Recognition of Same-Sex Marriage Sorted by the Date Each State Legally
Recognized Same Sex Marriage**

State/Event	Date Legally Recognized	Source
Sig. Ruling	6/26/2013	Supreme Court of the United States**
Delaware	7/1/2013	Legislative Statute
Minnesota	8/1/2013	Legislative Statute
Rhode Island	8/1/2013	Legislative Statute
Rev. Rule 2013-17	8/29/2013	IRS ***

****Significant Court Ruling Affecting Same-Sex Marriage Recognition:** 6/26/2013 the Supreme Court of the United States rules Section 3 of the Defense of Marriage Act (DOMA) is unconstitutional, *United States v. Windsor* 570 U.S. 12, 133 S. Ct. 2675 (2013). The result is that the Federal Government is required to recognize same sex marriages.

*****Significant Tax Change Affecting Same-Sex Marriage:** 8/29/2013 IRS Issues Rev. Rule 2013-17 requiring Same Sex Couples who were legally married in a jurisdiction that recognizes same sex marriage to file as married for federal tax purposes.

**Appendix A: State Recognition of Same-Sex Marriage Sorted by the Date Each State Legally
Recognized Same Sex Marriage**

State/Event	Date Legally Recognized	Source
New Jersey	10/21/2013	State Court Decision
Hawaii	12/2/2013	Legislative Statute
New Mexico	12/19/2013	State Court Decision
Oregon	5/19/2014	Federal Court Decision
Pennsylvania	5/20/2014	Federal Court Decision
Illinois	6/1/2014	Legislative Statute
Indiana	10/6/2014	Federal Court Decision
Oklahoma	10/6/2014	Federal Court Decision
Utah	10/6/2014	Federal Court Decision
Virginia	10/6/2014	Federal Court Decision
Wisconsin	10/6/2014	Federal Court Decision
Colorado	10/7/2014	State Court Decision, Federal Court Decision
Nevada	10/9/2014	Federal Court Decision
West Virginia	10/9/2014	Federal Court Decision
North Carolina	10/10/2014	Federal Court Decision
Idaho	10/15/2014	Federal Court Decision
Alaska	10/17/2014	Federal Court Decision
Arizona	10/17/2014	Federal Court Decision
Wyoming	10/21/2014	Federal Court Decision
Montana	11/19/2014	Federal Court Decision
South Carolina	11/20/2014	Federal Court Decision
Florida	1/6/2015	Federal Court Decision
Guam	6/9/2015	Federal Court Decision

Appendix A: State Recognition of Same-Sex Marriage Sorted by the Date Each State Legally Recognized Same Sex Marriage

State/Event	Date Legally Recognized	Source
Sig. Ruling	6/26/2015	Supreme Court of the United States****
Alabama	6/26/2015	Supreme Court of the United States Ruling
Arkansas	6/26/2015	Supreme Court of the United States Ruling
Georgia	6/26/2015	Supreme Court of the United States Ruling
Kansas	6/26/2015	Supreme Court of the United States Ruling
Kentucky	6/26/2015	Supreme Court of the United States Ruling
Louisiana	6/26/2015	Supreme Court of the United States Ruling
Michigan	6/26/2015	Supreme Court of the United States Ruling
Mississippi	6/26/2015	Supreme Court of the United States Ruling
Missouri	6/26/2015	Supreme Court of the United States Ruling
Nebraska	6/26/2015	Supreme Court of the United States Ruling
North Dakota	6/26/2015	Supreme Court of the United States Ruling
Ohio	6/26/2015	Supreme Court of the United States Ruling
South Dakota	6/26/2015	Supreme Court of the United States Ruling
Tennessee	6/26/2015	Supreme Court of the United States Ruling
Texas	6/26/2015	Supreme Court of the United States Ruling

******Significant Court Ruling Affecting Same-Sex Marriage Recognition:** 6/26/2015 the Supreme Court of the United States rules that state-level bans on same sex marriage are unconstitutional, *Obergefell v. Hodges* 576 U.S. ____ (2015). The result is that all states are required to legally recognize same sex marriages.

Appendix B: Variable Definitions

Variable Name	Description
<i>MARRIED</i>	Indicator variable with the value of 1 if the couple is married.
<i>INCOME</i>	CPI-adjusted total household income in thousands of U.S. dollars.
<i>1Q INCOME</i>	Indicator variable with the value of 1 if the total household income is in the first quartile of income based on the sample's CPI-adjusted total household income.
<i>2Q INCOME</i>	Indicator variable with the value of 1 if the total household income is in the second quartile of income based on the sample's CPI-adjusted total household income.
<i>3Q INCOME</i>	Indicator variable with the value of 1 if the total household income is in the third quartile of income based on the sample's CPI-adjusted total household income.
<i>4Q INCOME</i>	Indicator variable with the value of 1 if the total household income is in the fourth quartile of income based on the sample's CPI-adjusted total household income.
<i>POST</i>	Indicator variable with the value of 1 if the observation follows the passage of the 2013 law.
<i>CHILDREN</i>	Indicator variable with the value of 1 if there are minor children living in the household.
<i>LI%</i>	Lower income partne's positive annual income divided by the sum of both partner's positive annual income.
<i>SOLE EARNER</i>	Indicator variable with the value of 1 if only one of the partners has any positive income.
<i>SPLIT INCOME</i>	Indicator variable with the value of 1 if LI% is greater than 0% but less than or equal to 25%.
<i>EQUAL EARNERS</i>	Indicator variable with the value of 1 if LI% is greater than 25%.

Appendix B: Variable Definitions

Variable Name	Description
<i>WHITE</i>	Indicator variable with the value of 1 if the household describes their race as "white".
<i>BLACK</i>	Indicator variable with the value of 1 if the household describes their race as "black".
<i>HISPANIC</i>	Indicator variable with the value of 1 if the household describes their race as "hispanic".
<i>ASIAN</i>	Indicator variable with the value of 1 if the household describes their race as "asian".
<i>EDUC1</i>	Indicator variable with the value of 1 if a partner indicates highest educational attainment of "no high school degree".
<i>EDUC2</i>	Indicator variable with the value of 2 if a partner indicates highest educational attainment of "high school degree".
<i>EDUC3</i>	Indicator variable with the value of 3 if a partner indicates highest educational attainment of "some college education".
<i>EDUC4</i>	Indicator variable with the value of 4 if a partner indicates highest educational attainment of "bachelor's degree or greater".
<i>MALE EDUC</i>	Indicator variable with the value of 1, 2, 3, 4 for Opposite Sex Couple's where the male partner's highest education attainment is listed as "no high school
<i>FEMALE EDUC</i>	Indicator variable with the value of 1, 2, 3, 4 for Opposite Sex Couple's where the female partner's highest education attainment is listed as "no high school
$\mu(EDUC)$	The couple's mean education level calculated on a seven-point scale ranging from no education to a completed post-graduate degree.

Appendix C: Acronym Definitions

Variable Name	Description
SSM	Same-Sex Married Couple
SSC	Same-Sex Couple
OSC	Opposite-Sex Couple
DMTP	Dual-Earner Marriage Tax Penalty
ACS	American Community Survey
PUMS	Public Use Microdata Sample

Table 1: How Progressive Tax Rates and Standard Deductions contribute to the DMTP in 2015 and 2016

PANEL A: 2015

Two Single Taxpayers compared to One Married Filing Jointly (MFJ) Couple

Tax Bracket:	10%	15%	25%	28%	33%*
<u>INCOME SUBJECT TO BRACKET:</u>					
Two Working Singles	18,450	56,450	106,600	197,100	444,400
Married Filing Jointly	18,450	56,450	76,300	79,250	181,050
Bracket Difference	0	0	30,300	117,850	263,350
Marriage Tax Penalty per Bracket**	0	0	909	5,893	5,267
<u>STANDARD DEDUCTION TAX COST - difference times the marginal tax rate:</u>					
Two Singles (\$6,300*2)	12,600				
MFJ	<u>12,600</u>	0	0	0	0
Difference	-0-				

One Single & One Head of Household (HOH) Taxpayer compared to One Married Filing Jointly Couple

<u>INCOME SUBJECT TO BRACKET:</u>					
One Single & One HOH	22,375	65,275	132,700	178,800	423,850
Married Filing Jointly	18,450	56,450	76,300	79,250	181,050
Bracket Difference	3,925	8,825	56,400	99,550	242,800
Marriage Tax Penalty per Bracket**	196	883	1,692	4,978	4,856
<u>STANDARD DEDUCTION TAX COST - difference times the marginal tax rate:</u>					
One Single 6,300					
One HOH <u>9,250</u>	15,550	295	443	738	826
MFJ	<u>12,600</u>				
Difference	2,950				

* The next highest tax rate is 35%.

* The bracket difference times the next bracket's extra tax rate, e.g. 28%-25%=3% extra tax rate.

PANEL B: 2016

Two Single Taxpayers compared to One Married Filing Jointly (MFJ) Couple

Tax Bracket:	10%	15%	25%	28%	33%*
<u>INCOME SUBJECT TO BRACKET:</u>					
Two Working Singles	18,550	56,750	107,000	198,000	446,400
Married Filing Jointly	18,550	56,750	76,600	79,550	181,900
Bracket Difference	0	0	30,400	118,450	264,500
Marriage Tax Penalty per Bracket**	0	0	912	5,923	5,290
<u>STANDARD DEDUCTION TAX COST - difference times the marginal tax rate:</u>					
Two Singles (\$6,300*2)	12,600				
MFJ	<u>12,600</u>				
Difference	-0-	0	0	0	0

One Single & One Head of Household (HOH) Taxpayer compared to One Married Filing Jointly Couple

<u>INCOME SUBJECT TO BRACKET:</u>					
One Single & One HOH	22,525	65,525	133,250	179,650	425,750
Married Filing Jointly	18,550	56,750	76,600	79,550	181,900
Bracket Difference	3,975	8,775	56,650	100,100	243,850
Marriage Tax Penalty per Bracket**	199	878	1,700	5,005	4,877
<u>STANDARD DEDUCTION TAX COST - difference times the marginal tax rate:</u>					
Standard Deduction Tax Cost:					
One Singles 6,300					
One HOH <u>9,300</u>	15,600	300	450	750	840
MFJ	<u>12,600</u>				
Difference	3,000				

* The next highest tax rate is 35%.

* The bracket difference times the next bracket's extra tax rate, e.g. 28%-25%=3% extra tax rate.

Table 2: How various IRC provisions contribute to the Dual-earner Marriage Tax Penalty in 2015 & 2016

	2015		2016	
<u>STANDARD DEDUCTION</u>				
UNMARRIED: Single*	6,300		6,300	
Head of Household	<u>9,250</u>	15,550	<u>9,300</u>	15,600
MARRIED FILING JOINTLY		<u>12,600</u>		<u>12,600</u>
<u>MFJ excess income subject to tax</u>		<u>2,950</u>		<u>3,000</u>
<u>EARNED INCOME TAX CREDIT**</u> [Maximum Income to take credit]				
UNMARRIED: Single	14,820		14,880	
Single or Head of Household	<u>14,820</u>	29,640	<u>14,880</u>	29,760
MARRIED FILING JOINTLY		<u>20,330</u>		<u>20,430</u>
MFJ reduced income limitation		<u>9,310</u>		<u>9,330</u>
<u>PERSONAL EXEMPTIONS & ITEMIZED DEDUCTIONS</u> [Income level where phase-out begins]				
UNMARRIED: Single	258,250		259,400	
Single	<u>258,250</u>	516,500	<u>259,400</u>	518,800
MARRIED FILING JOINTLY		<u>309,900</u>		<u>311,300</u>
MFJ reduced income limitation		<u>206,600</u>		<u>207,500</u>
UNMARRIED: Single	258,250		259,400	
Head of Household	<u>284,050</u>	542,300	<u>285,350</u>	544,750
MARRIED FILING JOINTLY		<u>309,900</u>		<u>311,300</u>
MFJ reduced income limitation		<u>232,400</u>		<u>233,450</u>
<u>ALTERNATIVE MINIMUM TAX EXEMPTION AMOUNT</u>				
UNMARRIED: Single	53,600		53,900	
Single or Head of Household	<u>53,600</u>	107,200	<u>53,900</u>	107,800
MARRIED FILING JOINTLY		<u>83,400</u>		<u>83,800</u>
MFJ reduced exemption		<u>23,800</u>		<u>24,000</u>
<u>CAPITAL GAIN/DIVIDEND INCOME SUBJECT TO 0% SPECIAL TAX RATE</u>				
UNMARRIED: Single	37,450		37,650	
Head of Household	<u>50,200</u>	87,650	<u>50,400</u>	88,050
MARRIED FILING JOINTLY		<u>74,900</u>		<u>75,300</u>
MFJ reduced income subject to 0% tax rate		<u>12,750</u>		<u>12,750</u>
<u>CHILD TAX CREDIT</u>				
UNMARRIED: Single	75,000		75,000	
Single or Head of Household	<u>75,000</u>	150,000	<u>75,000</u>	150,000
MARRIED FILING JOINTLY		<u>110,000</u>		<u>110,000</u>
MFJ reduced income limitation		<u>40,000</u>		<u>40,000</u>
<u>SOCIAL SECURITY BENEFITS</u>				
UNMARRIED: Single	25,000		25,000	
Single or Head of Household	<u>25,000</u>	50,000	<u>25,000</u>	50,000
MARRIED FILING JOINTLY		<u>32,000</u>		<u>32,000</u>
MFJ reduced income limitation		<u>18,000</u>		<u>18,000</u>

* The standard deduction for *Single* is half of *Married Filing Jointly*, resulting in no DMTP since 2013.

** Maximum income at which the Earned Income Tax Credit is phased-out completely and, as a result, unavailable for singles or couples with no children, which is similar in the event there are some children.

Table 3: ACS Categorical Sample Descriptive Statistics

	Same Sex Couples	Opposite Sex Couples
Total households 2008-2014	4,493,979	433,311,184
Mean households per year	641,997	61,901,598
Percent of ACS sample population	1.03%	98.97%
Percentage Households Married	30.70%	92.91%
Mean total household income:		
Married households	\$108,794	\$97,167
Unmarried households	\$110,074	\$66,525

Table 4: Selection of the 2010-2014 Opposite Sex Couple Sample

Total observations 2010-2014 – Unweighted*	7,321,149
Eliminate:	
Households with less than two people or grandparent households with no parent present	(2,972,565)
Non-couple households, i.e. no spouse or unmarried partner	(998,719)
Households with same sex couples, widowed within one year, “separated” married couples, and couples with at least one spouse/unmarried partner who is under 18 years of age	(21,630)
Households where both spouses/unmarried partners report zero (\$0) income from any source or with both spouses/unmarried partners over 65 years of age	(600,133)
Final Opposite Sex Couple Sample – Unweighted Representing 52,320,230 U.S. Households Table 6 presents descriptive statistics	2,728,102

* PUMS data is a weighted data set, wherein each observation represents a larger sample of the U.S. population. While all of the analyses presented in this paper are calculated/estimated using the applicable weights, this table presents the selection of the observations using the raw, unweighted observation count.

Table 5: Selection of the 2012-2014 Sample, from which we select the 2012-2014 Same Sex Couple subsample and 2012 and 2014 OSC-SSC subsample

Total observations 2012-2014 – Unweighted*	4,438,068
Eliminate:	
Households with less than two people or grandparent households with no parent present	(1,819,949)
Non-couple households, i.e. no spouse or unmarried partner	(579,688)
Households widowed within one year, “separated” married couples, and couples with at least one spouse/unmarried partner who is under 18 years of age	(13,581)
Households where both spouses/unmarried partners report zero (\$0) income from any source or with both spouses/unmarried partners over 65 years of age	(374,979)
2012-2014 Same Sex and Opposite Sex Couple Sample – Unweighted	1,649,871
<u>SUBSETS FOR ANALYSIS AND DISCUSSION:</u>	
<u>2012, 2013 and 2014 Sample of Same Sex Couples</u>	
2012-2014 SSC and OSC Sample observations:	1,649,871
Eliminate OSC observations:	<u>(1,629,239)</u>
Unweighted SSC observations- Representing 375,092 U.S. Households	20,632
Table 7 presents descriptive statistics	
<u>2012 and 2014 Hypothesis II Sample of OSCs and SSCs</u>	
2012-2014 SSC and OSC Sample observations:	1,649,871
Eliminate observations in 2013	(553,641)
Eliminate observations of SSCs in the 11 jurisdictions that recognized SSM prior to the 2013 ruling	<u>(4,717)</u>
Unweighted - Representing 20,867,398 U.S. Households	1,091,513
162,423 SSCs and 20,704,975 OSCs	

* PUMS data is a weighted data set, wherein each observation represents a larger sample of the U.S. population. While all of the analyses presented in this paper are calculated/estimated using the applicable weights, this table presents the selection of the observations using the raw, unweighted observation count.

Table 6: Descriptive Statistics of the 2010-2014 Opposite Sex Couple Sample

PANEL A: INCOME STATISTICS	Mean	Lower Quartile	Median	Upper Quartile
All OSC Households, n = 52,320,230				
Total household income	\$98,603	\$46,700	\$77,997	\$120,092
Male's Income	62,850	24,346	44,998	74,999
Female's Income	31,289	4,999	21,092	43,058
Secondary Earner's Income Contribution	24%	5%	27%	40%
Married Households, n=46,566,024 (89%)				
Total household income	102,452	49,898	80,798	124,997
Male's Income	65,972	25,994	47,997	79,997
Female's Income	31,851	4,791	21,797	44,991
Secondary Earner's Income Contribution	24%	4%	26%	40%
Unmarried Households, n=5,754,206 (11%)				
Total household income	67,454	30,499	53,498	85,000
Male's Income	37,582	14,396	27,999	47,979
Female's Income	26,740	7,998	19,998	35,997
Secondary Earner's Income Contribution	27%	13%	31%	42%

PANEL B: ANNUAL STATISTICS	Observations	Households Represented	Married Households	Household Income
2010	557,703	10,545,863	89.4%	\$93,392
2011	541,160	10,417,000	89.4%	95,209
2012	542,543	10,479,484	89.2%	98,146
2013	546,485	10,451,963	88.6%	101,737
2014	540,211	10,425,920	88.4%	104,582

PANEL C: CHARACTERISTICS	All OSC Households	Married Households	Unmarried Households
TYPE OF HOUSEHOLD:			
INCOME CONTRIBUTION OF COUPLE:			
Single Earner Household	20%	21%	15%
Up to 75%/25% Contribution Division	28%	28%	25%
Above 75%/25% thru 50%/50% Division	52%	51%	60%
EDUCATION:			
Male	Some College	Some College	High School Diploma
Female	Some College	Some College	Some College
Minor children in household	50%	51%	44%
White household	66%	67%	57%
Observations	2,728,102	2,469,243	258,859
Households represented	52,320,230	46,566,024	5,754,206

Table 7: Descriptive Statistics of the 2012-2014 Same Sex Couple Sample

PANEL A: INCOME STATISTICS	Mean	Lower Quartile	Median	Upper Quartile
<u>All SSC Households, n=375,092</u>				
Total household income	117,384	52,878	89,700	143,887
Primary Earner's Income	80,628	33,281	57,919	94,970
Secondary Earner's Income	32,598	9,290	23,957	44,950
Secondary Earner's Income Contribution	29%	16%	32%	43%
<u>Male SSC Households, n=184,232</u>				
Male's Income	64,822	28,048	47,978	78,997
Secondary Earner's Income Contribution	28%	15%	31%	42%
<u>Female SSC Households, n=190,861</u>				
Female's Income	48,689	21,486	38,289	61,452
Secondary Earner's Income Contribution	29%	17%	34%	43%
<u>Married Households, n=119,667 (32%)</u>				
Total household income	127,025	57,168	98,806	153,972
Primary Earner's Income	88,381	35,889	62,031	100,622
Secondary Earner's Income	33,286	6,945	23,795	45,957
Secondary Earner's Income Contribution	27%	11%	30%	42%
<u>Male SSC Married Households, n=57,695 (31%)</u>				
Male's Income	68,794	29,083	50,403	82,226
Secondary Earner's Income Contribution	26%	11%	29%	41%
<u>Female SSC Married Households, n=61,973 (32%)</u>				
Female's Income	53,422	23,976	42,450	67,462
Secondary Earner's Income Contribution	27%	12%	31%	43%
<u>Unmarried Households, n=255,424 (68%)</u>				
Total household income	112,867	50,995	85,770	137,958
Primary Earner's Income	76,995	31,995	54,969	90,001
Secondary Earner's Income	32,277	9,978	23,988	44,904
Secondary Earner's Income Contribution	29%	18%	33%	43%
<u>Male SSC Unmarried Households, n=126,537 (69%)</u>				
Male's Income	63,011	27,682	46,498	77,479
Secondary Earner's Income Contribution	29%	17%	32%	42%
<u>Female SSC Unmarried Households, n=128,888 (68%)</u>				
Female's Income	46,413	20,492	36,277	58,484
Secondary Earner's Income Contribution	30%	19%	34%	44%

PANEL B: ANNUAL STATISTICS	Observations	Households Represented	Married Households	Household Income
2012	5,982	111,475	23.9%	112,824
2013	7,156	126,341	31.0%	116,484
2014	7,494	137,276	39.2%	121,914

PANEL C: CHARACTERISTICS	All SSC Households	Married Households	Unmarried Households
TYPE OF HOUSEHOLD:			
INCOME CONTRIBUTION OF COUPLE:			
Single Earner Household	10%	14%	9%
Up to 75%/25% Contribution Division	28%	29%	27%
Above 75%/25% thru 50%/50% Division	62%	58%	64%
EDUCATION:			
Male	Some College	Some College	Some College
Female	Some College	Some College	Some College
Minor children in household	21%	31%	16%
White household	66%	66%	66%
Observations	20,632	6,879	13,753
Households represented	375,092	119,667	255,425

Table 8: Results estimating Equations (1) – (4) to examine the income-marriage relation for opposite sex couples

<u>Dependent Variable: MARRIED</u>				
EQUATION	EQUATION (1)	EQUATION (2)	EQUATION (3)	EQUATION (4)
<i>INTERCEPT</i>	1.189 *** (<.0001)	1.440 *** (<.0001)	1.391 *** (<.0001)	1.587 *** (<.0001)
<i>INCOME</i>	0.009 *** (<.0001)	0.010 *** (<.0001)	0.009 *** (<.0001)	
Household Income Quartiles:				
<i>2Q INCOME</i>				0.627 *** (<.0001)
<i>3Q INCOME</i>				1.043 *** (<.0001)
<i>4Q INCOME</i>				1.422 *** (<.0001)
<i>CHILDREN</i>	0.297 *** (<.0001)	0.295 *** (<.0001)	0.307 *** (<.0001)	0.305 *** (<.0001)
<i>SPLIT INCOME</i>		-0.488 *** (<.0001)	-0.474 *** (<.0001)	-0.505 *** (<.0001)
<i>EQUAL EARNERS</i>		-0.753 *** (<.0001)	-0.721 *** (<.0001)	-0.798 *** (<.0001)
<i>WHITE</i>		0.374 *** (<.0001)	0.359 *** (<.0001)	0.344 *** (<.0001)
Males's Education:				
<i>HIGH SCHOOL</i>			0.054 *** (<.0001)	0.013 (0.204)
<i>SOME COLLEGE</i>			0.092 *** (<.0001)	0.039 *** (<.0001)
<i>COLLEGE GRADUATE</i>			0.411 *** (<.0001)	0.395 *** (<.0001)
Female's Education:				
<i>HIGH SCHOOL</i>			0.071 *** (<.0001)	0.043 *** (0.001)
<i>SOME COLLEGE</i>			-0.120 *** (<.0001)	-0.165 *** (<.0001)
<i>COLLEGE GRADUATE</i>			0.014 (0.231)	-0.033 *** (0.006)
R-square	0.4100	0.5095	0.5320	0.5625

n=2,728,102

Sum of weights read=52,320,230, i.e. 52,320,230 opposite sex couple households represented

Years: 2010 through 2014

Logistic regressions, with Jackknife estimation of variance

p values in parentheses

***, **, and * indicate that statistical significance is demonstrated at the .01, .05, and .10 levels, respectively

Table 9: Results estimating Equation (3) to examine the income-marriage relation for opposite sex couples by income quartile class

<u>Dependent Variable: MARRIED</u>					
INCOME QUARTILE:	<u>LOWER</u>	<u>SECOND</u>	<u>THIRD</u>	<u>UPPER</u>	
Percentage of Quartile Married	81%	88%	92%	95%	
<i>INTERCEPT</i>	1.170 *** ($<.0001$)	1.610 *** ($<.0001$)	1.783 *** ($<.0001$)	2.787 *** ($<.0001$)	
<i>INCOME</i>	0.024 *** ($<.0001$)	0.015 *** ($<.0001$)	0.011 *** ($<.0001$)	0.001 *** ($<.0001$)	
<i>CHILDREN</i>	-0.018 (0.047)	0.276 *** ($<.0001$)	0.606 *** ($<.0001$)	0.920 *** ($<.0001$)	
<i>SPLIT INCOME</i>	-0.555 *** ($<.0001$)	-0.743 *** ($<.0001$)	-0.886 *** ($<.0001$)	-1.105 *** ($<.0001$)	
<i>EQUAL EARNERS</i>	-0.765 *** ($<.0001$)	-1.130 *** ($<.0001$)	-1.318 *** ($<.0001$)	-1.368 *** ($<.0001$)	
<i>WHITE</i>	0.242 *** ($<.0001$)	0.339 *** ($<.0001$)	0.440 *** ($<.0001$)	0.373 *** ($<.0001$)	
Male's Education:					
<i>HIGH SCHOOL</i>	-0.022 (0.076)	-0.057 *** (0.003)	0.000 (0.988)	0.063 (0.193)	
<i>SOME COLLEGE</i>	-0.063 *** ($<.0001$)	-0.023 (0.241)	0.071 *** (0.005)	0.181 *** ($<.0001$)	
<i>COLLEGE GRADUATE</i>	0.485 *** ($<.0001$)	0.250 *** ($<.0001$)	0.261 *** ($<.0001$)	0.430 *** ($<.0001$)	
Female's Education:					
<i>HIGH SCHOOL</i>	-0.035 (0.012)	0.074 *** (0.007)	0.107 *** (0.006)	0.224 *** (0.008)	
<i>SOME COLLEGE</i>	-0.266 *** ($<.0001$)	-0.177 *** ($<.0001$)	-0.049 (0.149)	0.157 *** ($<.0001$)	
<i>COLLEGE GRADUATE</i>	-0.003 (0.865)	-0.128 *** ($<.0001$)	-0.023 (0.522)	0.222 *** ($<.0001$)	
R-square	0.4539	0.3489	0.3311	0.2957	
n	656,616	687,008	688,727	695,751	
Households represented	13,077,652	13,054,748	13,064,737	13,123,093	

Years: 2010 through 2014

Logistic regressions, with Jackknife estimation of variance

p values in parentheses

***, **, and * indicate that statistical significance is demonstrated at the .01, .05, and .10 levels, respectively

Table 10: Results estimating Equations (5) – (6) for SSC and OSC separately to examine and compare the income-marriage relation and how the relation changed following 2013

<u>Dependent Variable: MARRIED</u>				
<u>EQUATION:</u>	<u>EQUATION (5):</u>		<u>EQUATION (6):</u>	
<u>HOUSEHOLD COUPLE:</u>	Same Sex	Opposite Sex	Same Sex	Opposite Sex
<i>INTERCEPT</i>	-1.008 *** (<.0001)	1.180 *** (<.0001)	-0.895 *** (<.0001)	1.354 *** (<.0001)
<i>INCOME</i>	0.000 ** (0.628)	0.009 *** (<.0001)		
Household Income Quartiles:				
<i>2Q INCOME</i>			0.251 * (0.063)	0.641 *** (<.0001)
<i>3Q INCOME</i>			-0.081 (0.516)	1.027 *** (<.0001)
<i>4Q INCOME</i>			0.230 * (0.079)	1.446 *** (<.0001)
<i>POST</i>	0.560 *** (<.0001)	-0.051 *** (0.003)	0.450 *** (<.0001)	-0.060 *** (<.0001)
<i>INCOME*POST</i>	0.002 ** (0.001)	-0.001 *** (0.003)		
<i>2Q INCOME*POST</i>			-0.010 (0.957)	-0.081 *** (<.0001)
<i>3Q INCOME*POST</i>			0.817 *** (<.0001)	-0.036 (0.122)
<i>4Q INCOME*POST</i>			0.575 *** (0.0004)	-0.036 (0.155)
<i>CHILDREN</i>	0.857 *** (<.0001)	0.282 *** (<.0001)	0.858 *** (<.0001)	0.282 *** (<.0001)
<i>SPLIT INCOME</i>	-0.393 *** (<.0001)	-0.519 *** (<.0001)	-0.429 *** (<.0001)	-0.555 *** (<.0001)
<i>EQUAL EARNERS</i>	-0.625 *** (<.0001)	-0.789 *** (<.0001)	-0.701 *** (<.0001)	-0.873 *** (<.0001)
<i>WHITE</i>	0.078 (0.209)	0.326 *** (<.0001)	0.703 (0.236)	0.303 *** (<.0001)
$\mu(EDUC)$	-0.053 * (0.057)	0.104 *** (<.0001)	-0.082 *** (0.005)	0.095 *** (<.0001)
R-square	0.7069	0.5217	0.7366	0.5510
n	8,759	1,082,754	8,759	1,082,754
Households Represented	162,423	20,704,975	162,423	20,704,975

Years: 2012, prior to the change, and 2014, post the change

Logistic regressions, with Jackknife estimation of variance

p values in parentheses

***, **, and * indicate that statistical significance is demonstrated at the .01, .05, and .10 levels, respectively

Table 11: Results estimating Equations (7) – (8) for SSC and OSC together to examine and compare the income-marriage relation and how the relation changed following 2013

Dependent Variable: <i>MARRIED</i>	EQUATION (7)	EQUATION (8)
<i>INTERCEPT</i>	1.186 *** (<.0001)	1.360 *** (<.0001)
<i>SSC</i>	-2.679 *** (<.0001)	-2.767 *** (<.0001)
<i>POST</i>	-0.050 *** (0.003)	-0.060 *** (<.0001)
<i>SSC*POST</i>	0.592 *** (<.0001)	0.478 *** (<.0001)
<i>INCOME</i>	0.009 *** (<.0001)	
<i>2Q INCOME</i>		0.642 *** (<.0001)
<i>3Q INCOME</i>		1.030 *** (<.0001)
<i>4Q INCOME</i>		1.451 *** (<.0001)
<i>INCOME*POST</i>	-0.001 *** (0.003)	
<i>2Q INCOME*POST</i>		-0.081 *** (<.0001)
<i>3Q INCOME*POST</i>		-0.036 (0.120)
<i>4Q INCOME*POST</i>		-0.036 (0.151)
<i>SSC*INCOME</i>	-0.010 *** (<.0001)	
<i>SSC*2Q INCOME</i>		-0.509 *** (0.0001)
<i>SSC*3Q INCOME</i>		-1.384 *** (<.0001)
<i>SSC*4Q INCOME</i>		-1.634 *** (<.0001)
<i>SSC*POST*INCOME</i>	0.003 *** (<.0001)	
<i>SSC*POST*2Q INCOME</i>		0.077 (0.664)
<i>SSC*POST*3Q INCOME</i>		0.905 *** (<.0001)

<i>SSC*POST*4Q INCOME</i>		0.653 *** (<.0001)
<i>CHILDREN</i>	0.289 *** (<.0001)	0.287 *** (<.0001)
<i>SPLIT INCOME</i>	-0.517 *** (<.0001)	-0.553 *** (<.0001)
<i>EQUAL EARNERS</i>	-0.787 *** (<.0001)	-0.870 *** (<.0001)
<i>WHITE</i>	0.323 *** (<.0001)	0.301 *** (<.0001)
$\mu(EDUC)$	0.101 *** (<.0001)	0.092 *** (<.0001)
R-square	0.6474	0.6691

n=1,091,513

Households represented = 20,086,398

Years: 2012, prior to the change, and 2014, post the change

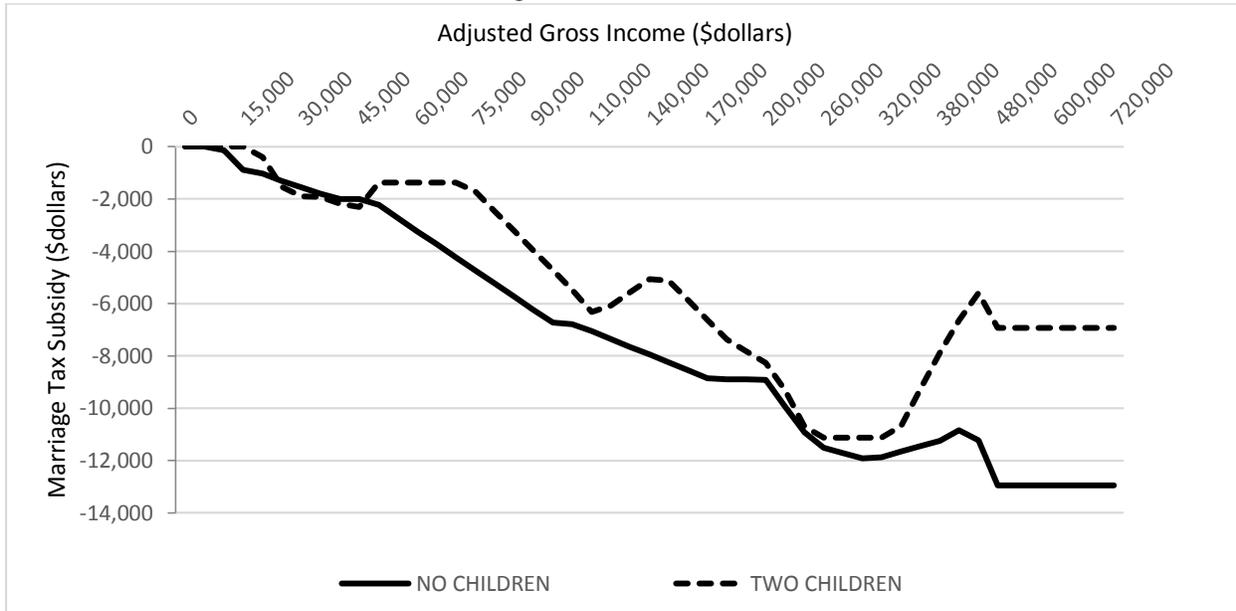
Logistic regressions, with Jackknife estimation of variance

p values in parentheses

***, **, and * indicate that statistical significance is demonstrated at the .01, .05, and .10 levels, respectively

Figure 1

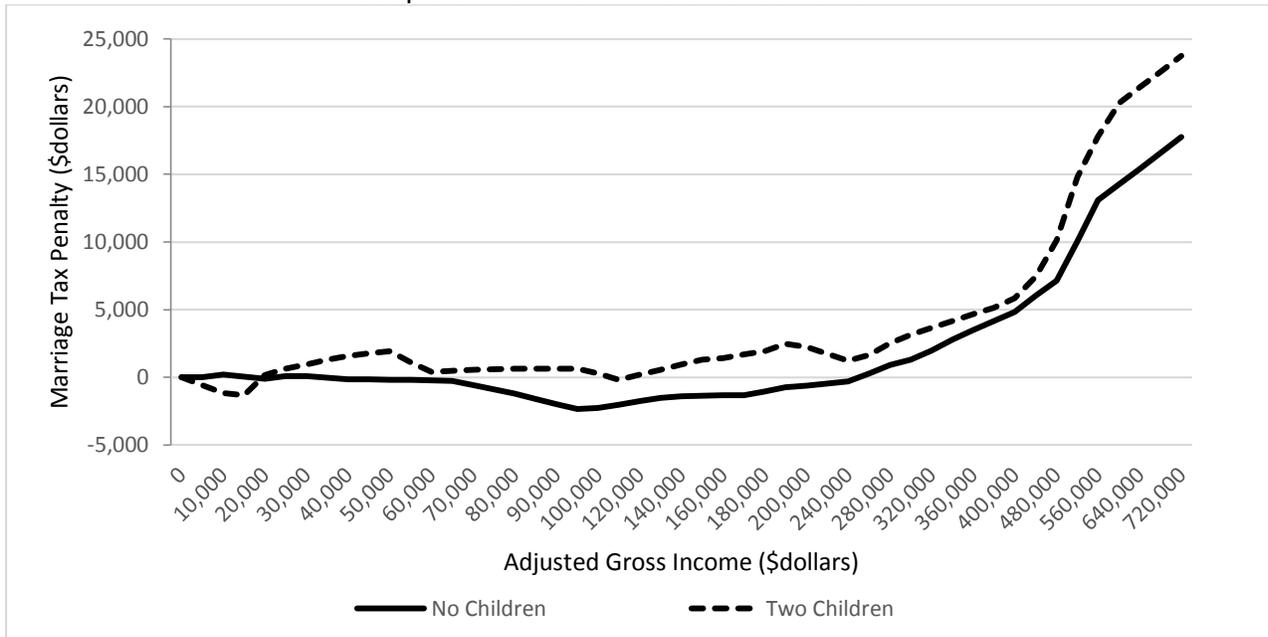
2015 Marriage Subsidy: Calculated when one partner earns 100% of the couple's income, claiming the standard deduction



We define a marriage subsidy as the reduction in the couple's federal income tax burden, because they are married, in comparison to their tax liability if unmarried. The greater the absolute value of the negative subsidy, the greater the benefit from filing MFJ. In our calculation of the marriage subsidy, we assume that the married couple files MFJ, the unmarried wage earner files as *Head of Household* and claims the children as dependents.

Figure 2

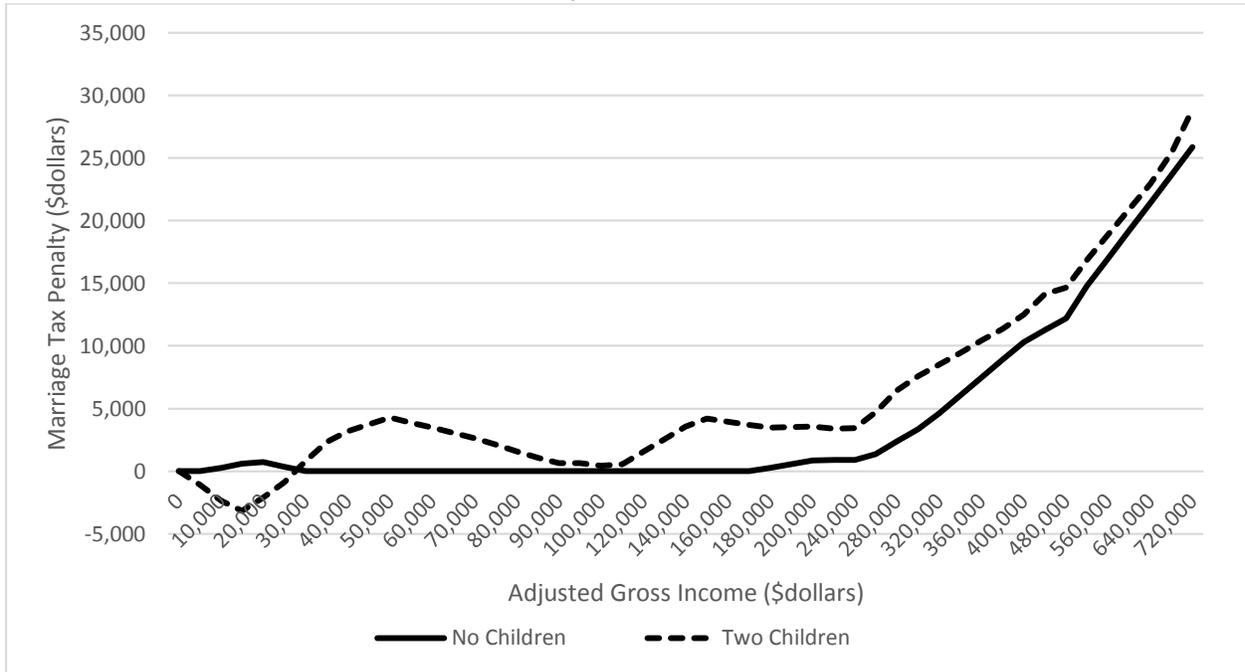
2015 Marriage Penalty (Subsidy if Negative): Calculated when one partner earns 75% of the couple's income and the other earns 25%



We define a marriage penalty (subsidy) as the increase (reduction) in the couple's federal income tax burden, because they are married, in comparison to their tax liability if unmarried. The greater the absolute value of the positive (negative) value, the greater the penalty (benefit) from filing MFJ. In our calculation of the marriage subsidy, we assume that the married couple files MFJ, the unmarried 75% wage earner files as *Head of Household* and claims the children as dependents.

Figure 3

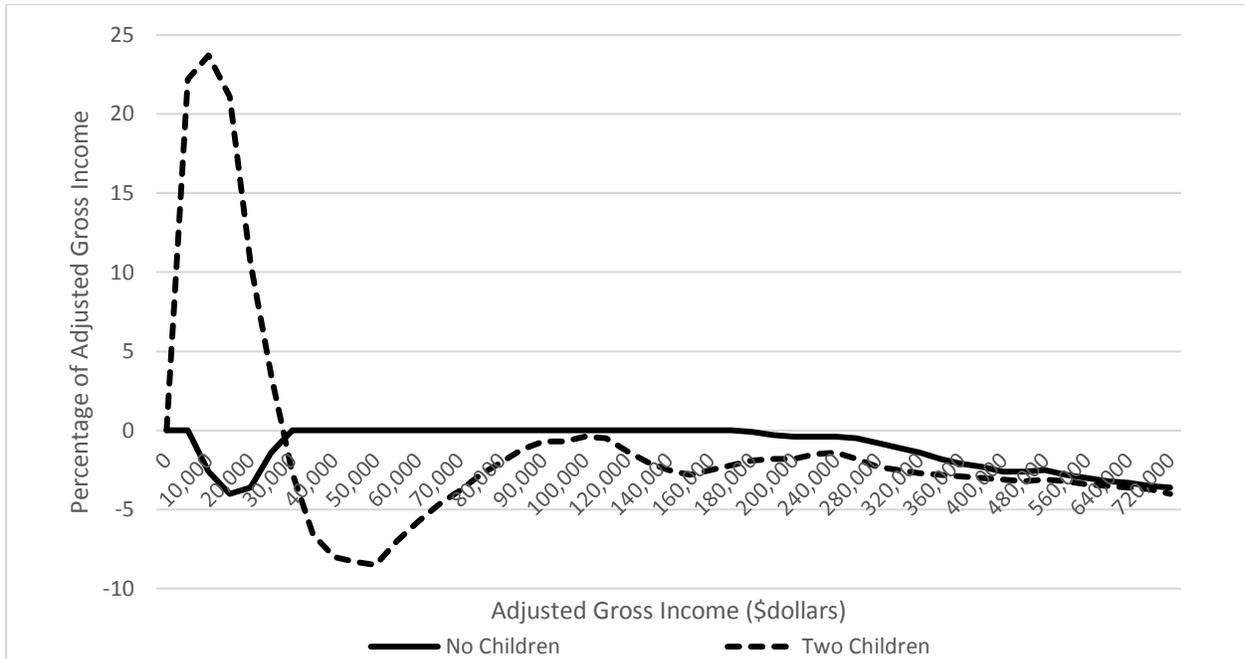
2015 Marriage Penalty (Subsidy if Negative): Calculated when each partner earns 50% of the couple's income



We define a marriage penalty (subsidy) as the increase (reduction) in the couple's federal income tax burden, because they are married, in comparison to their tax liability if unmarried. The greater the absolute value of the positive (negative) value, the greater the penalty (benefit) from filing MFJ. In our calculation of the marriage subsidy, we assume that the married couple files MFJ, and that one of the unmarried files as *Head of Household* and claims the children as dependents.

Figure 4

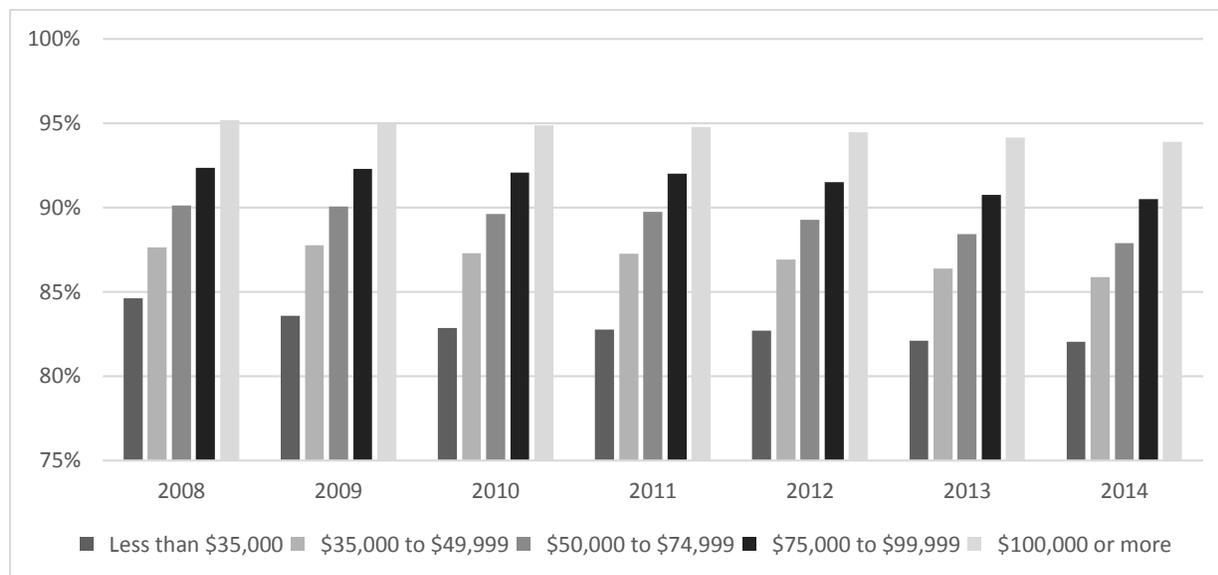
The 2015 marriage tax penalty, if negative, and subsidy, if positive, as a percentage of the couple's Adjusted Gross Income for households with each worker contributing equally to total household income.



We define a marriage penalty (subsidy) as the increase (reduction) in the couple's federal income tax burden because they are married, in comparison to their tax liability if unmarried. The greater the absolute value, the greater the penalty or benefit from filing MFJ. In our calculation of the marriage subsidy, we assume that the married couple files MFJ, and that one of the unmarried files as *Head of Household* and claims the children as dependents.

Figure 5

The percentage of opposite sex couples married, by household income from 2008 through 2014

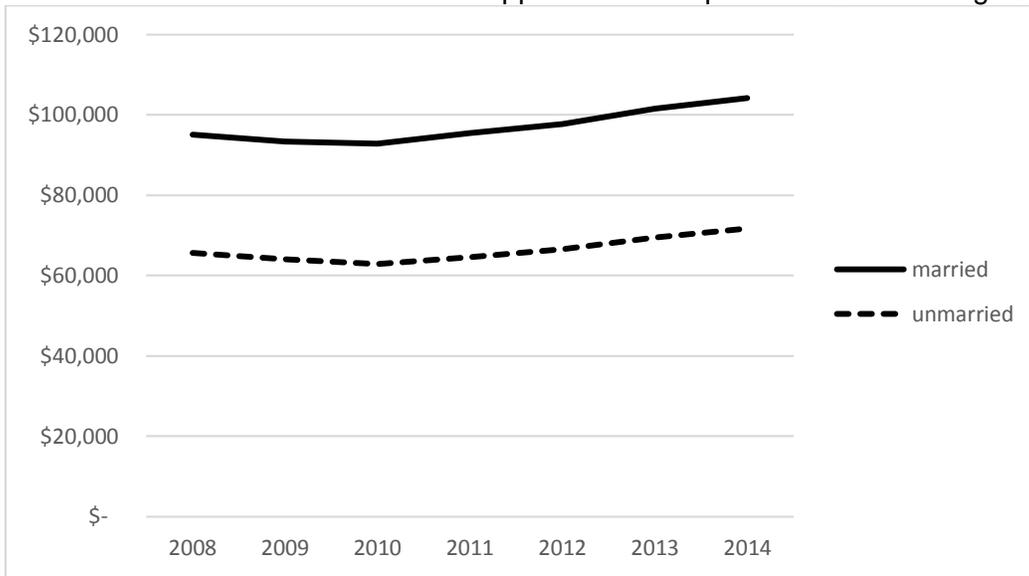


Data Source: The U.S. Census Bureau American Community Survey Data

<http://www.census.gov/hhes/samesex/data/>

Figure 6

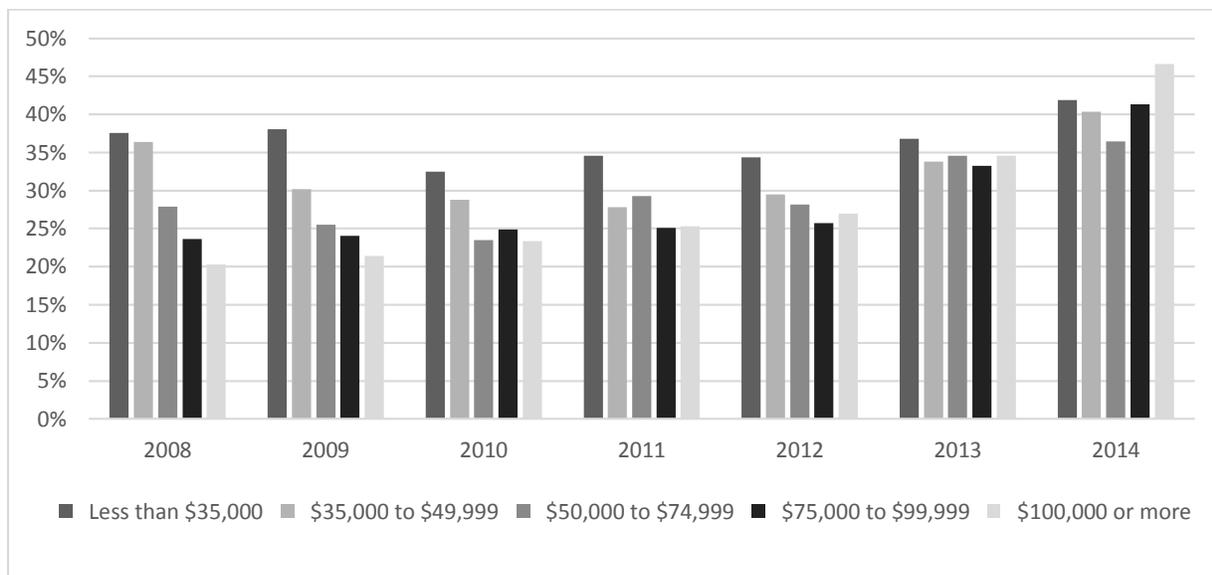
Mean total annual household income of opposite sex couples from 2008 through 2014



Data Source: The U.S. Census Bureau American Community Survey Data
<http://www.census.gov/hhes/samesex/data/>

Figure 7

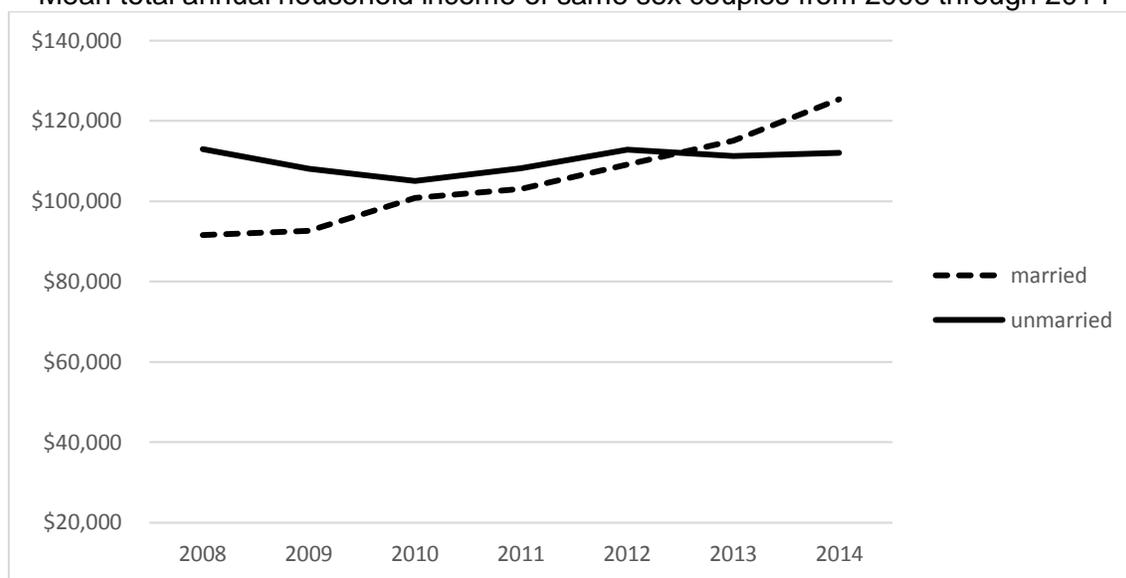
The percentage of same sex couples married, by household income from 2008 through 2014



Data Source: The U.S. Census Bureau American Community Survey Data
<http://www.census.gov/hhes/samesex/data/>

Figure 8

Mean total annual household income of same sex couples from 2008 through 2014



Data Source: The U.S. Census Bureau American Community Survey Data
<http://www.census.gov/hhes/samesex/data/>