Equally Married, Equally Benefited: Same-sex Marriage, Health Insurance, Labor Market, and Social Security

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Abstract. This paper examines the impact of federal recognition of same-sex marriage (SSM) in the United States on health insurance coverage, labor market participation, and social security benefits for same-sex couples. Utilizing detailed microdata from the American Community Survey (2008-2019), I present the first comprehensive evidence on the effects of the 2013 Supreme Court ruling in United States v. Windsor, which federally recognized SSM. Findings indicate that in states where SSM was legal, federal recognition led to a 2.6% increase in health insurance enrollment, primarily driven by a 5% rise in employer-sponsored insurance (ESI). Additionally, social security incomes increased. Surprisingly, in states where SSM was not yet legal, same-sex couples experienced a 6.6% increase in health insurance coverage and a 7% increase in ESI coverage. Labor market analyses reveal that same-sex couples also increased their labor supply, evidenced by reduced unemployment rates and increased weekly working hours. Further heterogeneity tests suggest that these gains in insurance coverage were largely due to obtaining ESI through a spouse's employment. Overall, my findings underscore that federal recognition of SSM not only boosted health insurance uptake but also had spillover effects in states without legalized SSM.

Keywords: same-sex marriage; health insurance; labor market; social security

JEL Codes: D10; I13; I18

1 Introduction

> *Marriage responds to the universal fear that a lonely person might call out only to find no one there. It offers the hope of companionship and understanding and assurance that while both still live there will be someone to care for the other.*
>
> – Justice Anthony M. Kennedy, *Majority Opinion in Obergefell v. Hodges (2015)*

Marriage has been described "the most important relation in life" and "the foundation of the family and society, without which there would be neither civilization nor progress" (Maynard v. Hill, 1888). Beyond its moral and philosophical importance, marriage in contemporary society entails a legally-recognized contract that binds spouses to specific duties and entitlements. This contractual aspect of marriage is critical for defining economic and legal obligations between spouses (Piano et al., 2024). Historically, the access of marriage has not been universal, excluding various relationships from these legal benefits. For instance, interracial marriage was not legal in the U.S. until Supreme Court's ruling in Loving v. Virginia (1967), even though the first recorded interracial marriage dates back to 1565. Unlike interracial marriage, same-sex marriages (SSM) were not initially recognized by the federal government. The SSM contract remained incomplete until a decade after Massachusetts first allowed it in 2003. This paper analyzes how the federal recognition of SSM has economically reshaped the lives of sexual minority families, extending beyond mere access to marriage to include the broader implications of marital recognition.

Research has consistently shown that sexual minority and same-sex couples (SSC) have historically faced disadvantages in accessing health insurance, healthcare, and healthcare utilization vis-à-vis opposite-sex couples (OSCs). SSCs were less likely to have insurance, have seen a doctor recently, have a usual source of healthcare, and were more likely to have unmet medical needs (Heck et al., 2006; Buchmueller & Carpenter, 2010; Blosnich et al., 2016; Clift & Kirby, 2012; Xu et al., 2023). Notably, disparities in health insurance coverage and healthcare access persist for SSCs even after legal recognition of their marriages, underscoring the ongoing challenges in achieving healthcare equity (Xu et al., 2023).

The nationwide legalization of SSM through the landmark ruling of Obergefell v. Hodges (2015) has helped narrow disparities by increasing insurance coverage and improving both physical and mental health for SSCs (Francis et al., 2012; Wight et al., 2013; Kail et al., 2015; Downing & Cha, 2020; Carpenter et al., 2021a,b; Mann et al., 2023). This progress stems partly from improved public attitudes towards minorities and reduced discrimination, particularly in the workplace (Hooghe & Meeusen, 2013; Aksoy et al., 2020; Nikolaou, 2022). Furthermore, the access to marriage has also influenced labor market behaviors, altering labor supply among SSCs (Dillender, 2015; Sansone, 2019; Hansen et al., 2020; Martell & Nash, 2020). This paper contributes to the literature by providing evidence on how federal recognition of SSM particularly enhances health insurance coverage among SSCs, and also discusses the impact in the labor market outcomes and social security benefits.

I differentiate between two distinct phases of SSM legalization: piece-meal state-level legalization and subsequent federal recognition. I particularly focus on the economic and social impacts of the pivotal Supreme Court decision—United States v. Windsor (2013), which initiated federal recognition of same-sex marriages. States that proactively legalized SSM before any federal intervention ('early-adopters') and those that legalized it following the landmark Obergefell v. Hodges in 2015 ('late-adopters') exhibit inherent differences. By examining these groups separately, my analysis elucidates the differential impacts of state and federal legislative actions on same-sex couples.

The paper starts by employing a difference-in-differences (DiD) approach to isolate the specific impact of federal recognition on SSCs in states that had already legalized SSM by 2013 (early-adopter states). This design allows for a clean estimation of the effects of the Windsor ruling, independent of the direct effects of gaining access to marriage. In these states, the federal recognition mandated by the ruling not only legitimized existing SSM but also aligned federal tax and benefit policies with state laws.

I observed a notable increase in insurance uptake; specifically, overall insurance coverage rose by 2.63%, and employer-sponsored insurance (ESI) increased by 5.01%. Additionally, SSCs saw a 13.4% increase in social security income compared to OSCs post-2013. These findings highlight the substantial economic benefits conferred on same-sex couples by federal recognition in early legalization states, particularly through

increased eligibility for various social security programs that only recognize federally-defined marriages.

To assess effects of federal recognition on SSCs in states that legalized SSM after the 2013 Windsor ruling (late-adopter states), I again employ a DiD approach, now using OSCs in late-adopter states as the control group, and SSCs in late-adopter states as the treatment group. This design allows for the examination of whether the effects of federal recognition spilled over to SSCs in states where SSM was not yet legal at the time of the ruling. This analysis isolates the effects of federal recognition across different legal contexts. In the late-adopter states, the federal recognition associated with the Windsor decision led to significant changes for SSCs.

Specifically, insurance coverage increased by 6.57%, and ESI uptake rose by 7.00%. In terms of labor market outcomes, there was a notable increase in weekly working hours by an average of 2.22 hours relative to SSCs in early-adopter states, accompanied by a reduction in the probability of unemployment by 1.21%. Additionally, these couples claimed 9.02% less Supplemental Security Income (SSI) compared to before the ruling. These findings indicate that the federal recognition of SSM had extensive effects on SSCs, even spilling over to states that had not yet legalized same-sex marriage. Heterogeneity tests based on employment status within family provide further evidence supporting the spill-over. I show that the effects are more profound in SSCs with only one partner working and become insignificant for SSCs with neither spouse employed.

The spill-over effects may manifest through three primary channels. First, the federal recognition eliminated the tax on employer health contributions for same-sex spouses, effectively reducing their overall health insurance costs and boosting enrollment in employer-sponsored insurance (ESI) plans. Second, it promoted a more inclusive workplace environment that not only increased the willingness to cover same-sex dependents under ESI but also improved employment opportunities with better benefits. Third, by incentivizing insurance companies and employers to eliminate eligibility restrictions for same-sex couples, the ruling encouraged higher ESI coverage and coincided with an increase in same-sex out-of-state marriages.

Additionally, I consider potential biases from concurrent policies by conducting robustness checks that exclude the influences from the Affordable Care Act (ACA) and its

expansion on Medicaid. After limiting the analysis to households unaffected by the ACA, the significant effects observed in the baseline results remain consistent.

My paper contributes to a growing literature focusing on marriage, marriage equality and sexual minorities. Firstly, an often-overlooked ruling (United States v. Windsor, 2013) on SSM is emphasized, and this contributes to the SSM literature by a detailed impact evaluation in health insurance, labor market outcomes and social security. Compared with the landmark ruling on marriage equality in 2015, estimation indicates that the 2013 ruling significantly affected SSCs, plausibly by even more than the most-discussed one in 2015. Prior literature on same-sex marriage legalization in the US is summarized in Table 1.

The second contribution of this paper is to extend the research design of same-sex marriage legislation in the health economics literature. Rather than assume homogeneous legalization among states, I allow for heterogeneous treatment effects. Depending on the time of state-wise legalization relative to the Supreme Court rulings (early-adopter vs. late-adopter states), the research uncovers varying responses among same-sex couples, demonstrating nuanced impacts that previous studies have overlooked.

My study enriches the understanding of economic impacts associated with same-sex marriage (SSM) legislation, focusing on how these laws influence access to benefits typically conferred by marital contracts. By examining policy variations in SSM legislation, my research highlights how shifts in marriage laws can alter the economic landscape for same-sex couples, affecting their access to health insurance and labor market outcomes. My findings suggest that similar dynamics could apply to other policies that modify the contractual benefits of marriage, positioning this work within a broader discourse on public policy and marital economics.

This paper proceeds as follows. Section 2 provides a timeline and introduction of the institutional and legislative background of SSM legalization. Data and descriptive statistics are summarized in Section 3. Section 4 presents the empirical design based on a Difference-in-Differences framework. Next, Section 5 provides the empirical results. Section 6 discusses robustness check to the baseline setting and further discussion. Section 7 concludes the paper.

2 Institutional Background

In the United States, the definition of marriage has primarily fallen under the jurisdiction of individual states. Therefore, SSM legalization tends to start inside each states, and when the argument becomes more heated, the congress and Supreme Court might step in and intervene.

2.1 State Legislation

The civil rights movement for SSM began in the 1970s, most notably with the appeal to the Minnesota Supreme Court's ruling on Baker v. Nelson in 1972, which was subsequently dismissed by the US Supreme Court "for want of a substantial federal question"[1]. It was more than thirty years later when Massachusetts became the first U.S. state to legalize SSM in 2003[2].

In 2008, the Supreme Court of California decided to legalize SSM in the state, but this was later overturned by Proposition 8, a state constitution amendment that banned SSM after less than six months of legalization, but it did not stop there. Before Obergefell v. Hodges (2015) on Jun 26th of 2015, a total of thirty-five states and the District of Colombia had legalized SSM through court rulings, legislation, and/or referendums. A detailed timeline is provided in Appendix Table A1.

2.2 The Supreme Court

As of December 31 of 2003, there were 1,138 federal statutory provisions classified to the United States Code in which marital status is a factor in determining or receiving benefits, rights, and privileges (United States General Accounting Office, 2004). To receive these federally-provided benefits, the marriage must be valid under federal law. For example, the combined income of married partners is considered when applying for Medicaid benefits, as well as for the Supplemental Security Income (SSI) program.

[1] Baker v. Nelson, 409 U.S. 810 (1972).

[2] Even though numerous attempts have been made in-between those years, for example, Jones v. Hallahan, 501 S.W.2d 588 (Ky. 1973), Frances B. v. Mark B., 78 Misc.2d 112 (1974), Singer v. Hara, 522 P.2d 1187 (Wash. Ct. App. 1974), De Santo v. Barnsley, 476 A.2d 952 (Pa. Super. Ct. 1984), Dean v. District of Columbia, 653 A.2d 307 (D.C. 1995), Storrs v. Holcomb, 645 N.Y.S.2d 286 (App. Div. 1996), Frandsen v. County of Brevard, 828 So. 2d 757 (Fla. 2001), Burns v. Burns, 560 S.E.2d 47 (Ga. Ct. App. 2002), Standhardt v. Superior Court ex rel. County of Maricopa, 77 P.3d 451 (Ariz. Ct. App. 2003) etc.

United States v. Windsor (2013)[3] repealed the Defense of Marriage Act (DOMA), which had defined the term "marriage" under federal law as a "legal union between one man and one woman". This decision required the federal government to recognize same-sex marriage performed in states where it was legal (hereafter, legal states). This marked the start of federal recognition of SSM, and many federal agencies began applying equal benefits to legally wedded same-sex couples since then.

Perhaps the most significant development is the landmark ruling Obergefell v. Hodges (2015)[4], which determined that the Fourteenth Amendment's Due Process Clause protects the fundamental right to marry, applying equally to same-sex and opposite-sex couples. This ruling marked the complete legalization of SSM in the United States, making it universally legal and recognized nationwide.

2.3 Heterogeneity in Treatments

Striking down parts of DOMA, USvW requires the federal government to recognize same-sex marriages performed in states where it was legal, leading to the federal recognition of SSM - the treatment discussed later. In contrast, OvH did not greatly change how existing SSMs were recognized, but instead provided access to marriage for many SSCs in the United States. This change is subsequently referred to as marriage equality[5].

By the timing of state SSM legalization relatively to two Supreme Court rulings, states can be categorized into three types corresponding to the nature of treatment it received, explained in the Figure 1.

A early-adopter state is one that legalized SSM prior to both USvW in 2013 and OvH in 2015, such as Massachusetts (2004). Early-adopter states should receive only the treatment of federal recognition in 2013 after USvW, and no further treatment in 2015[6].

Between USvW in 2013 and OvH in 2015, those that allowed SSM are conforming states, which followed the growing national consensus on SSM legislation and eventually

[3]Hereafter, USvW.
[4]Hereafter, OvH.
[5]Despite federal recognition is explicit in OvH, given it's ruled in 2015, two years after USvW, the Supreme Court essentially granted the access to same-sex marriage and the federal recognition simultaneously.
[6]Although one could also argue that the cross-state recognition as a result of OvH in 2015 had its effects on outcomes of interest, cross-state migration can reasonably be omitted in the short window between 2013 and 2015.

implemented the legalization on their own. Conforming states were treated by both federal recognition and marriage equality when their SSM law took effect.

Lastly, like conforming states, some states legalized SSM only in compliance with the OvH ruling, called late-adopter states. The treatment they received in 2015 is theoretically the same as conforming states, but the treatment is more exogenous. The variation in timing and exposure to treatments enabled me to estimate the treatment effects using a DiD framework. Panel (a) of Figure 2 is a map showing the geographical distribution of the three types of states under this framework.

3 Data and Empirical Design

3.1 American Community Survey (ACS)

The American Community Survey (ACS) is an ongoing nationwide survey conducted by the U.S. Census Bureau. It collects detailed demographic, economic, social, and housing information from a representative sample of households across the United States and Puerto Rico. The ACS essentially serves as a more frequent version of the decennial census long-form questionnaire that was previously used to gather similar community-level data.

One of the key advantages of the ACS over the decennial census long-form is that it provides more timely data, with information being collected on an annual basis rather than once every ten years. This allows for the tracking of yearly changes and emerging trends in communities across the country.

The survey samples around 3.5 million housing unit addresses each year, making it a very large and statistically robust source of data at multiple geographic levels - including states, counties, cities, towns, and even neighborhoods. The comprehensive nature of the ACS questionnaire provides crucial information for allocating government program funding, defining legislative districts, and making decisions about community services and infrastructure investments.

3.1.1 Public use microdata

ACS provides public use micro-data files that contain anonymized records for a sample of housing units and group quarters residents. This micro-data allows researchers and data users to access the individual responses to the ACS questionnaire, enabling much more detailed and customized analyses compared to just using the pre-tabulated summary data products.

The ACS micro-data files contain the full range of responses collected through the survey, including data on demographic characteristics, housing details, employment, income, education, health insurance coverage and other topics. Crucially, the records have indicators for whether each householder is in a same-sex or opposite-sex relationship, allowing the micro-data to be used for studying outcomes related to sexual orientation.

3.1.2 Timing of legalization

Given the data in annual frequency and in order to improve power by increasing the sample size, if a state implemented legalization later than October, I only consider observations in that state from the following year as treated. For instance, the SSM law took effect in the state of Washington on December 6th, 2012. However, classifying all SSC observations from 2012 in Washington as part of the treatment group would bias the estimation. Consequently, only SSCs in Washington from 2013 onward are regarded as treated.

Adhering to this rule, the adjusted timing of legalization in each state is summarized in Table 2. All empirical results are checked using calendar years instead, no significantly changes are found (See robustness check). States that did not legalize SSM prior to OvH are listed separately (hereafter, OvH states). And a map of the variation in timing with the adjustment is shown in panel (b) of figure 2.

3.1.3 Data quality and limitation

The time horizon of the data is limited to be from year 2008 because of a data quality concern on the identification of same-sex couples. To mitigate the inaccuracy issue,

there were formatting changes to the questionnaire of ACS since 2008. The layout of the gender question was edited, making it more difficult to accidentally mark both male and female. The drop in the reported number of same-sex couples between 2007 and 2008 can be attributed to these changes, which have resulted in a more reliable estimate of same-sex couple households.

The second limitation arises from the coding practices in the ACS between 2005 and 2012. During this period, all SSCs, regardless of their legal marital status, were classified as unmarried partners—even those who were legally married in states where same-sex marriage was recognized. This classification issue prevents accurate identification of legally married SSCs during these years, leading to potential underestimation of marriage-related benefits in the data. Consequently, any estimations of the effects of same-sex marriage legalization relative to OSCs should be considered as conservative or lower-bound estimates of the actual impacts.

3.1.4 Identification of SSC

To accurately identify SSCs and OSCs, observations in Group Quarters[7] are excluded. Next, a same-sex family needs to meet the following conditions to be identified:

- Criteria 1: Households (HHs) with at least two persons whose age is between 18 and 60 [8].
- Criteria 2: Married-couple HHs or unmarried-partner HHs.
- Criteria 3: There is one member in the HH with a relationship to the reference person as "Husband/wife" or "Unmarried partner"[9].

After cleaning, I have a total sample size of 5,385,474 families, including 73,161 SSCs (1.36%). 37,793 of them are female-female families, and 35,368 male-male families.

[7]The Census Bureau classifies all people not living in housing units as living in group quarters. A group quarters is a place where people live or stay, in a group living arrangement, that is owned or managed by an entity or organization providing housing and/or services for the residents. Examples are college residence halls, residential treatment centers, skilled nursing facilities, group homes, military barracks, correctional facilities, and workers' dormitories.

[8]The age restriction helps to focus my study on the group of samples that participates the labor market the most.

[9]The reference person is the person to whom the relationship of other people in the household is recorded. The household reference person is the person listed as the householder. The subfamily reference person is either the single parent or the husband/wife in a married-couple situation. Also see https://www.census.gov/programs-surveys/cps/technical-documentation/subject-definitions.html#referenceperson.

3.1.5 Variables of interest

The primary outcome variables of interest are health insurance coverage, labor market outcomes, and social security. The selected outcome variables—health insurance coverage, labor market outcomes, and social security—are critical indicators of the economic and social impacts of same-sex marriage legalization. The dataset captures various dimensions of health insurance coverage, including general health insurance, employer-sponsored insurance (ESI), private insurance, and Medicaid[10]. I excluded Medicare since the study is confined to non-elderly adults, aligning with the target demographic most affected by changes in labor market. For each type of insurance, indicators were created to measure coverage comprehensively: a value of 1 indicates both partners are insured, 0.5 signifies one partner is insured, and 0 denotes no coverage.

In the labor market, the study evaluates labor force participation among SSCs and OSCs by examining the proportion of unemployed family members and total weekly hours worked by all family members. This provides insights into how employment dynamics differ between these groups. Additionally, data on total wage and salary income, along with information on total social security income and income from the Supplemental Security Income (SSI) program, are included. These variables offer a comprehensive view of the economic status of families, allowing for an assessment of how same-sex marriage legalization impacts financial outcomes and social benefits for SSCs.

Additionally, Figure 3 illustrates the overall insurance take-up from 2010 through 2016, segmented into early and late-adopting states for both SSCs and OSCs. Notably, there appears to be a significant shift in insurance coverage for SSCs in both early- and late-adopting states around 2014—prior to the nationwide legalization of same-sex marriage in 2015. This observation suggests a potential impact from the 2013 United States v. Windsor ruling. Given this intriguing pattern, my study concentrates on the impact of the 2013 federal recognition ruling, as it allows for a clearer attribution of changes to this specific legislative milestone, rather than conflating effects with the broader access to marriage provided by the 2015 Obergefell v. Hodges decision. This focus is particularly pertinent given the marked increase in coverage starting in 2014

[10]In ACS definition, it contains "Medicaid, Medical Assistance, or any kind of government-assistance plan for those with low incomes or a disability". For simplicity, I refer to this group of public-sponsored health insurance plans as "Medicaid".

for SSCs in states that had not yet legally recognized same-sex marriage, indicating broader implications and reach of the 2013 ruling.

Table 3 summarizes the pre- and post-USvW outcome variables of interest along with controls in early-adopter states, and table 4 gives the descriptive statistics of the sample in late-adopter states.

4 Difference-in-differences

A difference-in-difference model is used to identify the treatment effect of the Supreme Court rulings using OSCs as the control group. Therefore, the estimated treatment effect represents the change in outcomes of SSCs relatively to OSCs. It takes the form:

$$Y_{ist} = \alpha + \beta(Post13_t * SSC_i) + \tau_s + \mu_t + X'_{ist}\gamma + \epsilon_{ist} \tag{1}$$

where Y_{ist} is the outcomes of interest. $Post13_t$ is the indicator of whether the observation is surveyed after the USvW ruling, SSC_i is an indicator for same-sex couple, τ_s is state fixed effect, μ_t is year fixed effect. X_{ist} are a series of household-level characteristics, including family size, family income, average age of the couple, race, ethnicity, disabilities, and state-level characteristics (population, GDP, disposable income per capita, and unemployment rate). The standard error ϵ_{ist} is clustered at state level.

When running the estimation, I first restrict my sample to only include observations that were directly affected by the rulings. USvW in June 2013 is not expected to have direct effects on SSCs living in Texas because the legalization of SSM did not take effect until the June of 2015. As a results, for the USvW ruling, I only include SSCs and OSCs living in early-adopter states.

Additionally, I investigate a different Average Treatment on Treated (ATT) effect of the US v. Windsor ruling on same-sex couples living in late-adopter states. As Figure 3 shows, the 2013 ruling also has effects in late-adopter states, and I use this regression to estimate the spill-over effect. This approach addresses potential systematic differences between early- and late-adopter states that could bias comparisons. Here, sample is restricted to SSCs living in late-adopter states.

5 Empirical Results

5.1 Early-adopter States

The first set of DiD regressions aims to estimate the average treatment effect on the treated (ATT) of federal recognition using OSCs as the control group. Here, the sample is restricted to states that legalized SSM on or prior to 2013 (early-adopter states), and observations before legalization are excluded. Therefore, with the DiD design, the treatment group is SSCs in early-adopter states and the control group is OSCs in early-adopter states.

Regarding insurance coverage (shown in Figure 4, and Table 5), I observe higher take-up overall (2.63%), increased coverage through ESI by 5.01%, and an insignificant increase in private insurance coverage of 0.89%. Note that the large confidence interval in the pre-treatment period is mostly due to that only a few states legalized SSM in early years. Event study in Medicaid exhibits significant noisy and is therefore omitted from the main results (See Appendix for more details).

In the labor market, I do not find conclusive results, whereas my data exhibits an increase in total social security income of SSCs compared to OSCs by approximately 13.4% in Figure 5. See Table 6 for DD estimators.

To summarize, results here indicate that federal recognition of SSM indeed narrowed the health insurance gap between SSCs and OSCs, and this change happened mainly through an expanded ESI coverage.

5.2 Late-adopter States

Using the second DD regression, I investigate in SSCs living in late-adopter states, and estimate the ATT of federal recognition on late-adopter state SSCs compared to their opposite-sex counterparts. With this design, the treatment effects measure the spill-over of federal recognition in early-adopter states to late-adopter states.

DD regression in Figure 6 shows a persistent increase in both overall insurance as well coverage through employment, 6.57% and 7.00% respectively. See Table 7 for details. There was no significant change in the private coverage, which includes coverage

through ACA marketplace that started in October 1st of 2013[11]. This offers additional evidence to the spill-over effect against the potential threat from Medicaid Expansion that was implemented at the same time.

In the labor market, Figure 7 shows a significant decrease in unemployment by 1.21%, and an increase in weekly working hours by 2.2237 hours. On the other hand, I observe a decreased SSI income (by approximately 9.02%) as in Figure 8. See Table 8 and Table 9 for details.

My findings here show that although the 2013 ruling did not directly lift the legal restriction of SSM in the late-adopter states, it had a spill-over effect on health insurance coverage to SSCs in not-yet-legal states. Potential channels and discussion on the spill-over is discussed in Section 6.

6 Robustness Check and Discussion

6.1 State Classification Adjustment

I further examine the validity of my findings by testing the sensitivity of the results to the timing of same-sex marriage (SSM) legalization at the state level. Although my primary analysis adjusts the treatment onset to the following year for states legalizing SSM after October, I also conducted parallel analyses using the actual calendar years as the cutoff for determining treatment status. This approach allowed me to include all same-sex couples (SSCs) in the treatment group from the year SSM was legalized, regardless of the specific legalization date within that year.

The rationale for the initial adjustment was based on maximizing the accuracy of treatment exposure, particularly given the close proximity of some legalization dates to the end of the calendar year, which might delay the practical effects of legalization on SSCs. By reanalyzing the data without this adjustment—thus treating the year of legalization as the immediate onset of treatment effects—we aim to test the robustness of my results against any potential classification bias.

[11] Although a big fraction of the states did not expanded the eligibility of Medicaid as mandated in the ACA bill, the opening of health insurance exchanges is required by law.

The results from this alternative approach, detailed in the Figure 9, show that the main findings remain consistent, indicating no significant differences when the year of legalization is used directly. This stability suggests that our findings are robust to variations in the classification of treatment onset.

6.2 Concurrent Healthcare Reform: ACA

One potential threat to the spill-over estimation above is the concurrent healthcare system reform that happened on 2010, the Affordable Care Act (ACA). ACA could potentially be the reason of the early response in outcomes. Implemented in 2014, ACA establishes private insurance marketplace in each state, and expands the eligibility of Medicaid coverage to able-bodied childless low-income individuals [12]. Outlined below, two sets of robustness check isolate the interference of ACA, re-estimate the ATT, and have found same conclusions.

6.2.1 ACA Expansion and Health Insurance Take-up

The first major policy change from ACA is the expanded Medicaid eligibility to able-bodied childless individual with low income. After the passing of ACA back in 2010, Supreme Court's decision on National Federation of Independent Business v. Sebelius in 2012 allows states to decide whether the eligibility shall be expanded. Therefore, this allows me to run the same estimation on a sub-sample of households in ACA non-expansion and late-adopter states[13]. I look at households that are completely not affect by the policy reform in Medicaid.

Figure 10 and Table 10 demonstrates the event studies of insurance coverage status for same-sex couples. We could notice that the significant increase of 6.95% and 7.14% in overall coverage and ESI persist absence of ACA expansion. These results indicate that my spill-over estimation is robust to Medicaid reform.

[12]ACA also established a small business exchange (Small Business Health Options Program, SHOP) for employers to gain better access to the insurance market for their employees. However, the launch and participation of SHOP face challenges from the beginning, so SHOP is not expected to have significant bias to my findings. See https://chirblog.org/winding-small-business-marketplaces-feds-acknowledge-failure-launch/.

[13]Similar strategy cannot be applied to early-adopter states since majority of them expanded Medicaid eligibility. Therefore restricting my sample to ACA non-expansion early-adopter states will result in insufficient sample size and statistical power. However, my event study of Medicaid coverage in early-adopter states shows no increasing trend post-2014 (see appendix graph on Medicaid), ruling out the potential bias from Medicaid.

6.2.2 Income and Medicaid Eligibility

The second major change in ACA is the establishment of health insurance marketplace. The marketplace is a federal/state regulated exchange that allows households to purchase different levels of health insurance plans to fit their needs. In ACS micro-data, the coverage through this channel is considered private insurance. I further restricted my sample to households with annual income above 400% FPL[14]. This threshold excludes all household that might be affected by ACA through income and access to the insurance marketplace.

Figure 11 shows a similar positive spill-over of federal recognition on late-adopter state SSCs, with a 2.86% increase in overall coverage and 3.48% increase in ESI (see Table 10).

6.3 Heterogeneity in Employment Status

As section 5 has shown, the increase in insurance coverage from the USvW ruling is mainly through more coverage from employment. In this case, I should expect the treatment effect to be larger for households with exactly one spouse employed and the other unemployed. For households with both spouses employed, there still could be an increase in coverage of ESI, since no all job provides health insurance, especially part-time positions. Lastly, there should not be changed in ESI for households with neither spouses employed.

To validate these predictions, and to provide supporting evidence on the spill-over, I test the heterogeneity of treatment effects in the employment status within households in late-adopter state. Table 11 shows the heterogeneity test estimators, which are consistent with my predictions.

6.4 Discussion: the Spill-over

The surprising results in the spill-over effects of United States v. Windsor (2013) on same-sex couples can happen through several channels. First of all, Crandall-Hollick et al. (2013) explains that the Supreme Court decision may lower the effective

[14]Although Medicaid expansion lower the Medicaid income eligibility to below 138% of FPL, 400% of FPL is the threshold to qualify for premium tax credit that subsidizes an insurance marketplace plan. See https://www.healthcare.gov/glossary/federal-poverty-level-fpl/ for details.

health insurance premiums paid by married same-sex couples on employer-sponsored insurance (ESI) plans. Previously, the employer's contribution towards the premium for a same-sex spouse was taxable income for the employee, unlike for opposite-sex spouses. Post-decision, with same-sex marriages recognized for federal tax purposes, these contributions are no longer taxable, thereby reducing the tax liability for same-sex couples and encouraging higher enrollment in employer-provided family health plans.

Secondly, 2013 ruling even though did not specifically target same-sex households in late-adopter states, it improved workplace anti-discrimination, which was empirically validated and mentioned as a potential channel in literature (Sansone, 2019). Friendlier work environment could incentivize higher willingness to include same-sex dependent in ESI, as well as improve sexual minority's access to better employment with more ESI coverage.

Lastly, the ruling in 2013 provides incentives for insurance companies and employers to avoid setting eligibility restrictions on same-sex couples. This is supported by the significant increases in ESI across all specifications. Thirdly, Badgett & Mallory (2014) provides descriptive evidence from administrative data that more same-sex couples get married following the ruling, both in-state and out-of state. They see nearly twice as many couples married in New England states in 2013 than in 2012, with larger increase in out-of-state travels for marriage.

7 Conclusion

This study utilized a difference-in-differences approach to investigate the impacts of the pivotal Supreme Court decision regarding same-sex marriage in the United States - the 2013 United States v. Windsor ruling. The findings highlight substantial benefits in terms of improved health insurance coverage accrued by same-sex couples following the federal recognition of their unions.

By acknowledging the incremental layers of reform inherent in the legalization of same-sex marriage, I estimate the treatment effect of the federal recognition followed by extended federal benefits and consider early- and late-adopter states, building upon the existing literature on the same-sex marriage. Despite a smaller effect size, I discovered that federal recognition in both SSM-legal states and SSM not-yet-legal

states, reduced the disparities in health insurance coverage of SSCs compared to opposite-sex counterparts. This enhancement primarily manifested through broader employment-based coverage, benefiting same-sex partners both as employees and as dependents. Also in late-adopter states, SSCs also increased their labor supply and reduced their demand for social security benefits like SSI after the federal recognition.

In assessing the impact of federal recognition on same-sex couples, it was crucial to account for potential confounding factors like the Affordable Care Act (ACA), which was implemented in 2014 and significantly altered healthcare eligibility and insurance market structures. To isolate the effects of legal changes from ACA impacts, robustness checks were conducted on sub-samples from states that did not expand Medicaid and households earning above 400% of the Federal Poverty Level, ensuring they were unaffected by ACA's subsidy criteria. These checks confirmed that increases in health insurance coverage and employment benefits observed among same-sex couples were attributable to federal recognition rather than ACA interventions. This distinction is critical in understanding the specific economic benefits that federal recognition has conferred on same-sex couples, highlighting its unique role independent of broader healthcare reforms.

This study contributes to the growing body of literature on the economic and social impacts of same-sex marriage legalization, as well as how public policy could help narrow the economic gap between heterosexual families and sexual & gender minorities. The findings highlight the potential for policy interventions to reshape the landscape for marginalized communities and foster greater inclusivity within societal institutions.

While the legislative process and institutional context were specific to the United States, the lessons learned from this research can inform policymakers globally as more countries legalize same-sex marriage and provide equal legal treatment towards LGBTQ+ community. Furthermore, the broader implications extend beyond same-sex unions, as similar logic can be applied to any policies that modify the supply and benefits associated with the marital contract.

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8 Tables

Table 1: Summary of SSM Literature

Outcome	**Literature**	**USvW**	**OvH**	**Data**
Health	Carpenter, Eppink, et al. (2021)	✗	✓	BRFSS
	Kail, Acosta and Wright (2015)	✗	✓	CPS
	Wight, LeBlanc and Badgett (2013)	✗	✓	CHIS[a]
	Francis, Mialon and Peng (2012)[b]	✗	✓	State-level data
Insurance	Mann et al. (2023)	✗	✗	ACS
	Carpenter, Gonzales, et al. (2021)	✗	✗	ACS, NHIS
	Carpenter, Eppink, et al. (2021)	✗	✓	BRFSS
	Downing and Cha (2020)	✗	✓	ACS
	Tumin and Kroeger (2020)	✗	✓	NHIS
Healthcare Use	Carpenter, Eppink, et al. (2021)	✗	✗	BRFSS
Labor Market	Martell and Nash (2020)	✗	✓	ACS, NHIS
	Hansen et al. (2020)	✗	✓	ACS, CPS, ATUS
	Sansone (2019)	✗	✓	ACS
	Dillender (2015)	✗	✓	CPS
Miscellaneous	Piano, Behr and West (2024)	✗	✓	State-level data
	Isaac (2023)	✓	✗	ACS
	Cheng et al. (2021)	✓	✗	ACS

This table summarizes the existing literature on the same-sex marriage in the context of the United States of America. The same-sex marriage legalization is divided into two layers in my study, recognition by the federal government of the existing same-sex marriage, and the access to same-sex marriage in the first place. The Supreme Court ruling on United States v. Windsor (USvW) decided that the federal government must give the same benefits and treatment to same-sex marriages performed in legal state, and the ruling on Obergefell v. Hodges (OvH) on the other hand decided that all states must allow same-sex marriage. The miscellaneous outcome is primarily on taxation.

[a] California Health Interview Survey
[b] Instead of SSM legalization, this study is on the ban on SSM.

Table 2: States Group by SSM Legalization Year (Adjusted)

Year	State
2004	Massachusetts
2009	Connecticut*, Iowa, Vermont
2010	New Hampshire, District of Columbia
2011	New York
2013	California, Washington*, Maryland, Maine*, New Mexico, Rhode Island, Delaware, Minnesota
2014	New Jersey*, Hawaii*, Illinois, Oregon, Pennsylvania
2015	Utah*, Virginia*, Indiana*, Wisconsin*, Oklahoma*, Colorado*, West Virginia*, North Carolina*, Wyoming*, South Carolina*, Idaho*, Nevada*, Alaska*, Arizona*, Montana*, Florida
OvH States	Alabama, Arkansas, Georgia, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Tennessee, Texas

In this table, states in the U.S. are grouped based on the different timing of same-sex marriage legalization within the states. Given the data used in annual basis, if a state implemented the legalization later than October in that year, the treatment year will be set as the following year. States in the table marked by * are these approximated states. Note that states that did not legalize the same-sex marriage prior to Obergefell v. Hodges (2015) are listed separately.

Table 3: Descriptive Statistics: Early-adopter States

Variable	Pre-2013				Post-2013			
	SSC		OSC		SSC		OSC	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Overall Coverage	0.9396	0.1922	0.9320	0.2246	0.9327	0.2074	0.9194	0.2425
ESI	0.7866	0.3534	0.7906	0.3797	0.7461	0.3786	0.7296	0.4102
Private Insurance	0.1000	0.2546	0.0907	0.2600	0.1104	0.2668	0.1039	0.2749
Medicaid	0.0859	0.2368	0.0888	0.2664	0.0949	0.2490	0.1056	0.2848
Unemployment	0.0401	0.1963	0.0412	0.1988	0.0314	0.1743	0.0265	0.1607
Weekly Hours Worked	74.373	24.293	70.551	23.737	73.642	25.308	69.677	24.327
Log Total Wage	10.8977	2.4473	10.7524	2.4344	10.9344	2.5220	10.7818	2.5229
Log Total Social Security	0.3648	1.8149	0.3092	1.6652	0.3922	1.8774	0.2696	1.5625
Log Total SSI	0.2611	1.5179	0.1784	1.2643	0.2501	1.4885	0.1733	1.2467
Family Size	2.8341	1.0595	3.4323	1.2987	2.7777	1.2025	3.4415	1.3943
Log Total Income	11.4698	0.9465	11.3169	0.9921	11.4739	1.1995	11.3441	1.1037
Disability	0.1221	0.3275	0.0984	0.2978	0.1425	0.3495	0.1077	0.3099
Average Age	42.6811	9.3769	43.5937	9.5969	41.9821	9.9867	43.0899	9.8398
Hispanic	0.1165	0.3209	0.0915	0.2883	0.2280	0.4196	0.2082	0.4060
Asian	0.0155	0.1237	0.0113	0.1058	0.0349	0.1835	0.0242	0.1536
Black	0.0768	0.2664	0.0623	0.2416	0.0977	0.2970	0.0678	0.2514
Log Population	16.362	1.1729	16.338	1.1028	16.408	1.1588	16.386	1.1087
Log GDP	13.538	1.1398	13.485	1.1260	13.674	1.1741	13.629	1.1628
Log Disposable Income	10.621	0.1058	10.611	0.0995	10.790	0.1183	10.779	0.1150
Unemployment rate	8.7338	2.1896	8.5256	2.2350	5.2985	1.5425	5.2611	1.5480
Observations	2,317		155,629		16,741		909,035	

This sample is used to estimate the average treatment effect on the treated (ATT) of the 2013 Supreme Court ruling on United States v. Windsor in early-adopter states, that invalidate part of the Defense of Marriage Act (DOMA). The decision marked the federal recognition of the same-sex marriage in the united state. Sample here is restricted to early-adopter states, those who legalized the same-sex marriage in their states prior to the ruling, and observations from before SSM was legal in those states are excluded. Column two to fifth contain the descriptive statistics of the pre-treatment outcomes and characteristics of the treatment and control households. And column sixth to ninth, on the other hand, includes the mean and standard deviation of the post-treatment treatment and control groups.

Table 4: Descriptive Statistics: Late-adopter States

Variable	Pre-2013				Post-2013			
	SSC		OSC		SSC		OSC	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Overall Coverage	0.8222	0.3164	0.8480	0.3254	0.9016	0.2482	0.8995	0.2684
ESI	0.6665	0.3976	0.7038	0.4235	0.7096	0.3920	0.7171	0.4135
Private Insurance	0.1095	0.2547	0.1015	0.2732	0.1158	0.2707	0.1113	0.2831
Medicaid	0.0592	0.1874	0.0542	0.2069	0.0835	0.2325	0.0791	0.2471
Unemployment	0.0520	0.1656	0.0449	0.1523	0.0311	0.1290	0.0249	0.1136
Weekly Hours Worked	72.297	26.041	68.869	25.218	73.422	24.992	70.123	24.788
Log Total Wage	10.490	2.5873	10.401	2.6257	10.749	2.4305	10.666	2.5350
Log Total Social Security	0.5131	2.1160	0.3899	1.8599	0.4207	1.9296	0.3428	1.7540
Log Total SSI	0.3128	1.6476	0.1805	1.2626	0.2774	1.5619	0.1953	1.3203
Family Size	2.8892	1.1521	3.3705	1.3263	2.7949	1.1808	3.2893	1.3349
Log Total Income	11.090	1.1567	11.051	1.0595	11.253	1.1785	11.237	1.0911
Disability	0.1692	0.3750	0.1359	0.3427	0.1692	0.3749	0.1298	0.3361
Average Age	41.473	9.7452	42.641	10.090	40.951	10.412	42.680	10.137
Hispanic	0.1538	0.3608	0.1341	0.3408	0.2050	0.4037	0.1598	0.3664
Asian	0.0305	0.1721	0.0260	0.1590	0.0354	0.1847	0.0264	0.1602
Black	0.1007	0.3009	0.0897	0.2858	0.1172	0.3216	0.0846	0.2782
Log Population	15.998	0.7426	15.879	0.7938	16.026	0.7890	15.946	0.8107
Log GDP	12.907	0.7696	12.789	0.8242	13.002	0.8360	12.919	0.8584
Log Disposable Income	10.460	0.0894	10.454	0.0943	10.629	0.0980	10.620	0.0999
Unemployment rate	8.1221	1.9273	7.9880	2.0265	4.4950	1.0531	4.5582	1.0696
Observations	15,353		1,548,017		22,738		1,480,010	

This sample is used to estimate the average treatment effect on the treated (ATT) of the 2013 Supreme Court ruling on United States v. Windsor in late-adopter states, that invalidate part of the Defense of Marriage Act (DOMA). The decision marked the federal recognition of the same-sex marriage in the united state. Sample here is restricted to late-adopter states, those who legalized the same-sex marriage in their states in 2015 following Obergefell v. Hodges. Column two to fifth contain the descriptive statistics of the pre-treatment outcomes and characteristics of the treatment and control households. And column sixth to ninth, on the other hand, includes the mean and standard deviation of the post-treatment treatment and control groups.

Table 5: Effect of United States v. Windsor (2013) on Insurance
Early-adopter States

VARIABLES	Overall Coverage (1)	ESI (2)	Private Insurance (3)
DD Estimator	0.0263***	0.0501***	0.0089*
	(0.0067)	(0.0072)	(0.0051)
Year Fixed Effect	✓	✓	✓
State Fixed Effect	✓	✓	✓
Controls	✓	✓	✓
Baseline	0.9396	0.7866	0.1000
N	920,474	920,474	920,474

Dependent variables: probability couple insured, probability couple has employer-sponsored insurance, and probability couple has privately-purchased insurance (excluding purchases through a government program). Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01.

Table 6: Effect of United States v. Windsor (2013) on Social Security
Early-adopter States

VARIABLES	Log Total Social Security (1)	Log Total SSI (2)
DD Estimator	0.1340***	-0.0546
	(0.0290)	(0.0893)
Year Fixed Effect	✓	✓
State Fixed Effect	✓	✓
Controls	✓	✓
Baseline	0.3648	0.2611
N	920,474	920,474

Dependent variables: log of combine social security benefits, and log of combined Supplemental Security Income benefits. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01.

Table 7: Effect of United States v. Windsor (2013) on Insurance
Late-adopter States

VARIABLES	Overall Coverage (1)	ESI (2)	Private Insurance (3)
DD Estimator	0.0657***	0.0700***	0.0077
	(0.0063)	(0.0058)	(0.0053)
Year Fixed Effect	✓	✓	✓
State Fixed Effect	✓	✓	✓
Controls	✓	✓	✓
Baseline	0.8222	0.6665	0.1095
N	2,692,598	2,692,598	2,692,598

Dependent variables: probability couple insured, probability couple has employer-sponsored insurance, and probability couple has privately-purchased insurance (excluding purchases through a government program). Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01.

Table 8: Effect of United States v. Windsor (2013) on Labor Market
Late-adopter States

VARIABLES	Unemployment (1)	Weekly Hours Worked (2)	Log Total Wage (3)
DD Estimator	-0.0121**	2.2237***	0.0497
	(0.0028)	(0.3430)	(0.0348)
Year Fixed Effect	✓	✓	✓
State Fixed Effect	✓	✓	✓
Controls	✓	✓	✓
Baseline	0.0520	72.297	10.490
N	2,692,598	2,692,598	2,692,598

Dependent variables: probability couple unemployed, combined weekly working hours, and log of combine wage and salary income. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01.

Table 9: Effect of United States v. Windsor (2013) on Social Security
Late-adopter States

VARIABLES	Log Total Social Security (1)	Log Total SSI (2)
DD Estimator	0.0105	-0.0902***
	(0.0280)	(0.0321)
Year Fixed Effect	✓	✓
State Fixed Effect	✓	✓
Controls	✓	✓
Baseline	0.5131	0.3128
N	2,692,598	2,692,598

Dependent variables: log of combine social security benefits, and log of combined Supplemental Security Income benefits. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01.

Table 10: Effect of United States v. Windsor (2013) on Insurance
ACA and Late-adopter States

VARIABLES	Overall Coverage (1)	ESI (2)	Overall Coverage (3)	ESI (4)
DD Estimator	0.0695***	0.0714***	0.0286***	0.0348***
	(0.0089)	(0.0054)	(0.0067)	(0.0087)
Year Fixed Effect	✓	✓	✓	✓
State Fixed Effect	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Baseline	0.8159	0.6618	0.8557	0.7135
N	1,669,489	1,669,489	1,275,685	1,275,685

Dependent variables: probability couple insured, and probability couple has employer-sponsored insurance. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01. Samples in column (1) and (2) are restricted to ACA non-expansion late-adopter states, whereas samples in column (3) and (4) are restricted to households in late-adopter states with an annual income higher than 400% of the Federal Poverty Line (FPL).

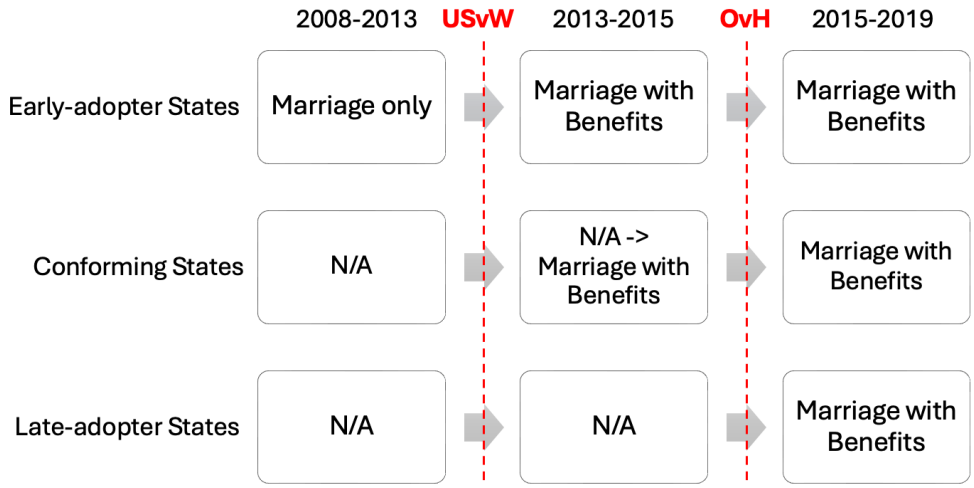
Table 11: Effect of United States v. Windsor (2013) on Insurance
Late-adopter States

VARIABLES	Overall Coverage (1)	ESI (2)	Overall Coverage (3)	ESI (4)	Overall Coverage (5)	ESI (6)
DD Estimator	0.0559***	0.0598***	0.0910***	0.1048***	0.0530	0.0326
	(0.0054)	(0.0065)	(0.0244)	(0.0292)	(0.0774)	(0.0542)
Year Fixed Effect	✓	✓	✓	✓	✓	✓
State Fixed Effect	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓
Baseline	0.8487	0.6997	0.6077	0.4064	0.3407	0.0752
N	2,372,844	2,372,844	158,469	158,469	9,871	9,871

Dependent variables: probability couple insured, and probability couple has employer-sponsored insurance. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01. Samples in column (1) and (2) are restricted to households with neither spouses unemployed in late-adopter states, samples in column (3) and (4) are restricted to households with only one spouse unemployed in late-adopter states, and samples in column (5) an (6) are restricted to households with both spouses unemployed in late-adopter states.

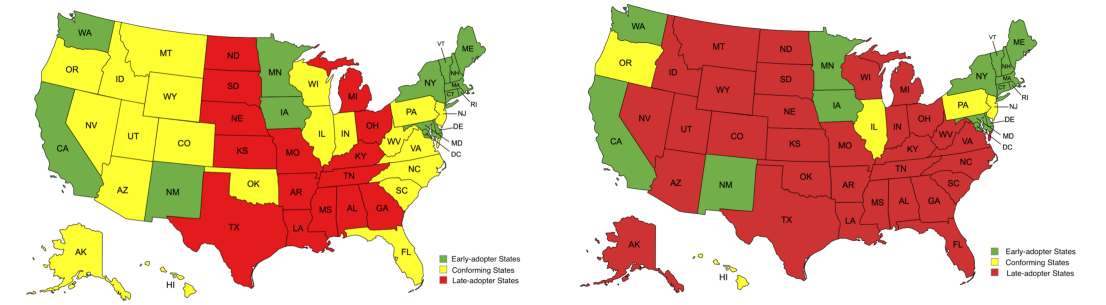
9 Figures

Figure 1: Timeline of Same-sex Marriage Legalization



This figure shows the heterogeneous treatments from two Supreme Court rulings on same-sex marriage by type of state a same-sex couple lives in. SSCs in early-adopter state have access to marriage before both rulings, therefore USvW in 2013 only granted their existing marriage federal recognition and benefits. SSCs in conforming states gained federally-recognized marriage between two rulings, whereas those in late-adopter states got it on 2015 in compliance with OvH.

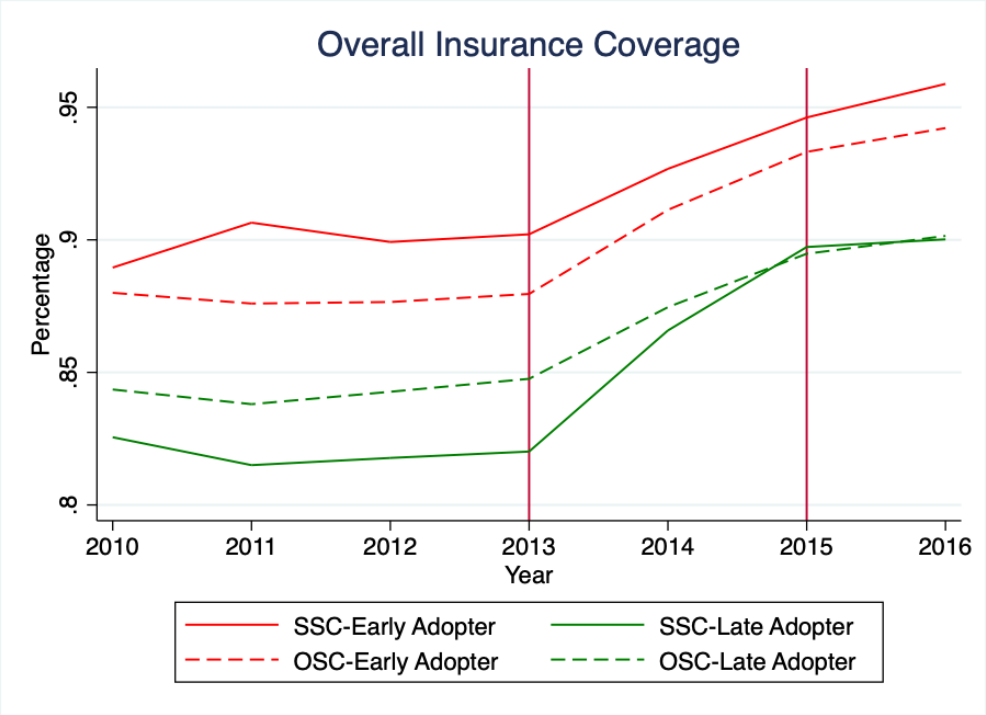
Figure 2: Classification of States



(a) Original Classification (b) Adjusted Classification

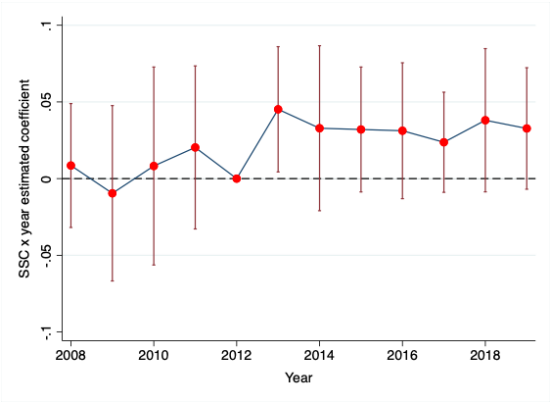
Panel (a) marks the states with their type based on the effective year of same-sex marriage. In panel (b), some conforming states are adjusted into late-adopter states, if within-state legalization happened in 2015 but before OvH ruling, or later than October of 2014.

Figure 3: Trend in Overall Insurance by State and Group

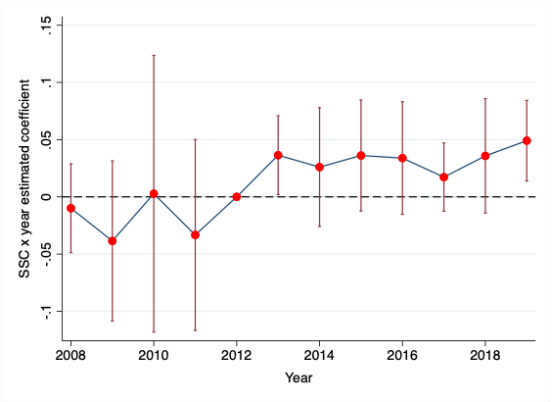


This figure displays the trend in overall insurance coverage from 2010 to 2016, categorized by couple type and state adoption timing. Vertical lines mark the years of major Supreme Court rulings related to same-sex marriage: United States v. Windsor in 2013 and Obergefell v. Hodges in 2015.

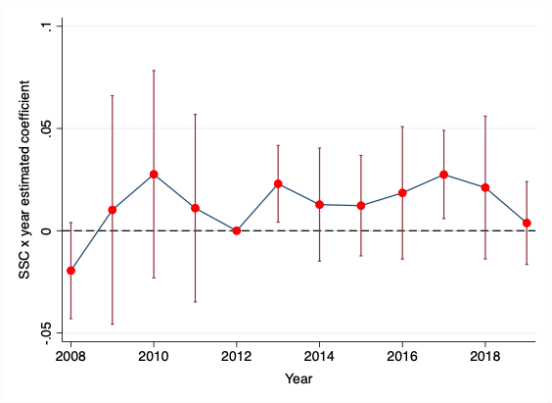
Figure 4: Trends in Insurance Coverage for United States v. Windsor (2013)
Early-adopter States



(a) Overall Insurance



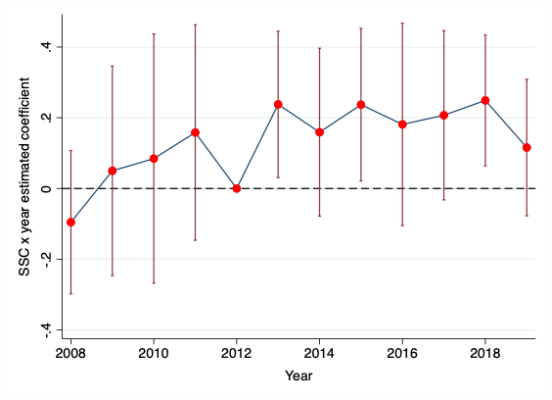
(b) ESI



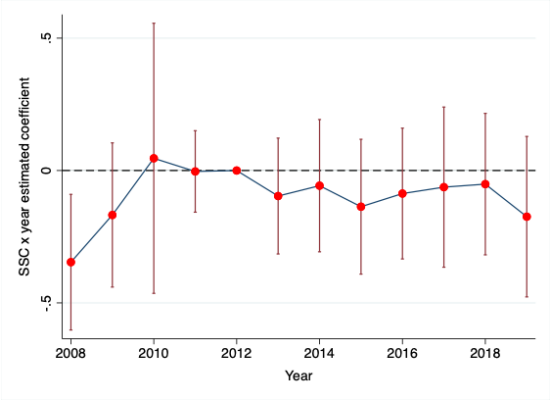
(c) Private Coverage

Effect of USvW ruling (federal recognition) on SSCs' insurance take-up relative to OSCs. Sample is restricted to households in early-adopter states and excludes pre-legalization observations.

Figure 5: Trends in Social Security for United States v. Windsor (2013)
Early-adopter States



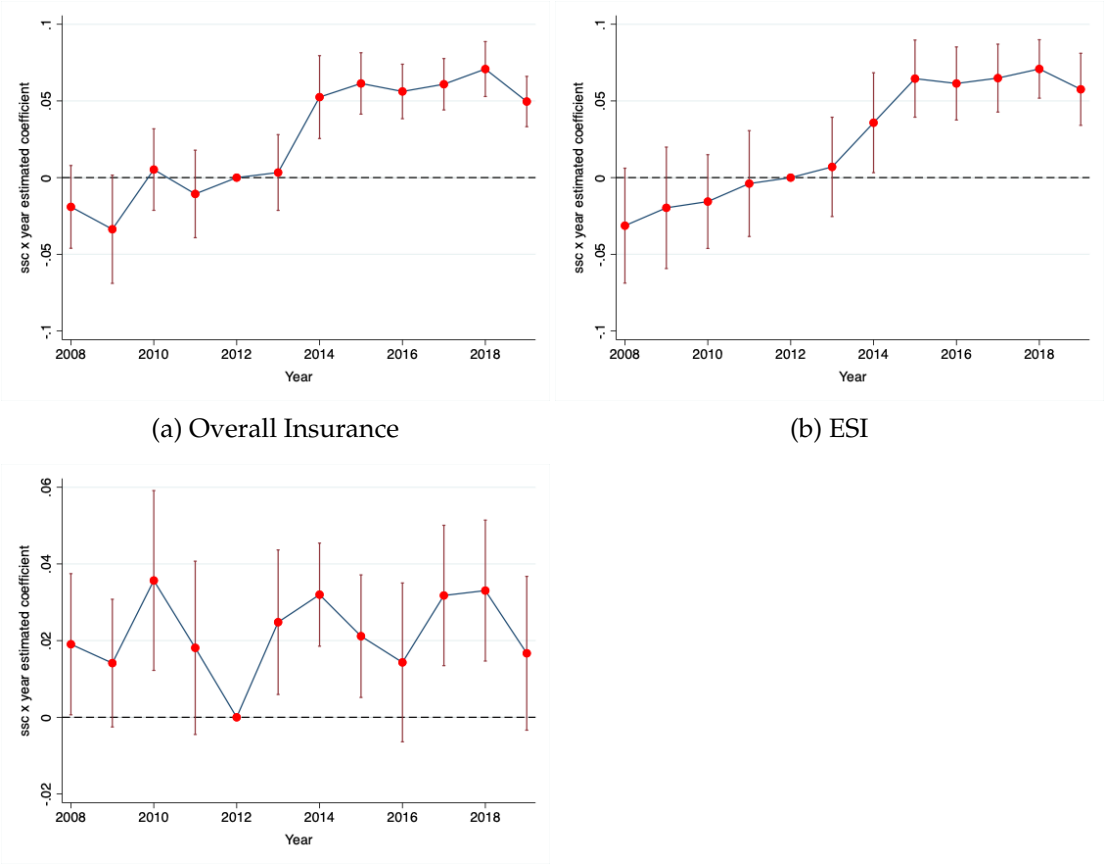
(a) Social Security Benefits



(b) SSI Income

Effect of USvW ruling (federal recognition) on SSCs' social security receipt relative to OSCs. Sample is restricted to households in early-adopter states and excludes pre-legalization observations.

Figure 6: Trends in Insurance Coverage for United States v. Windsor (2013)
Late-adopter States



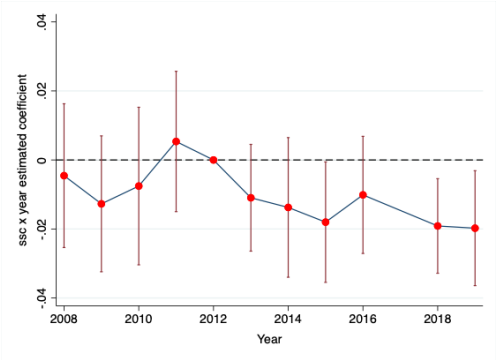
(a) Overall Insurance

(b) ESI

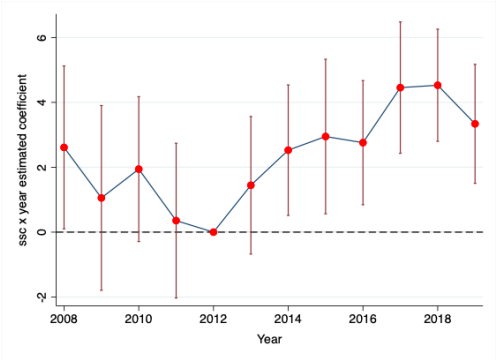
(c) Private Coverage

Effect of USvW ruling (federal recognition) on SSCs' health insurance coverage relative to OSCs. Sample is restricted to households in late-adopter states.

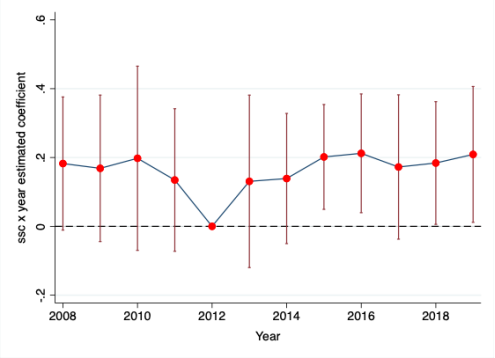
Figure 7: Trends in Labor Market Outcomes for United States v. Windsor (2013)
Late-adopter States



(a) Unemployment



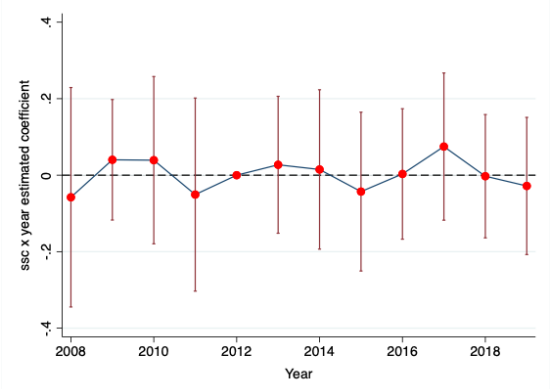
(b) Hours



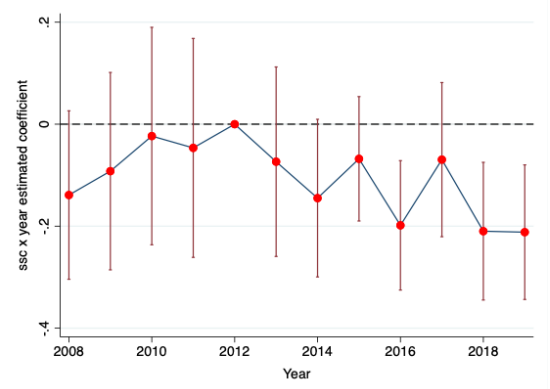
(c) Wage

Effect of USvW ruling (federal recognition) on SSCs' labor market outcomes relative to OSCs. Sample is restricted to households in late-adopter states.

Figure 8: Trends in Social Security for United States v. Windsor (2013)
Late-adopter States



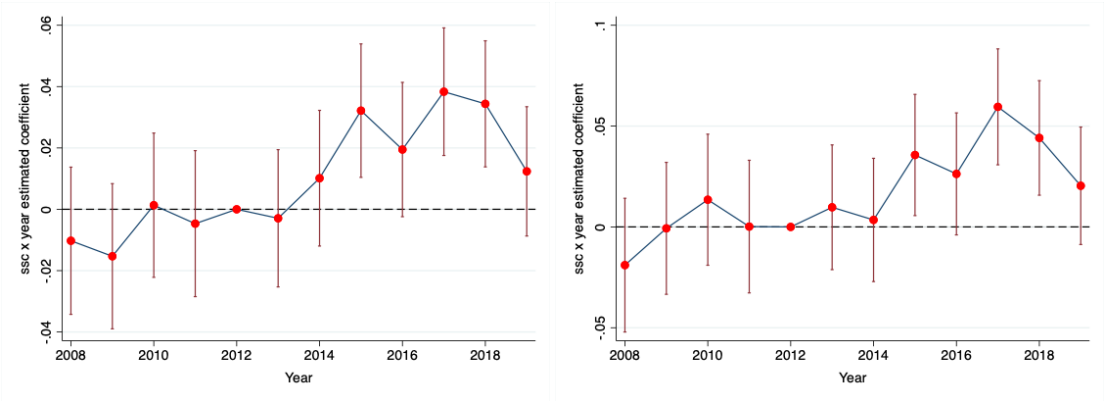
(a) Social Security Benefits



(b) SSI Income

Effect of USvW ruling (federal recognition) on SSCs' social security receipt relative to OSCs. Sample is restricted to households in late-adopter states.

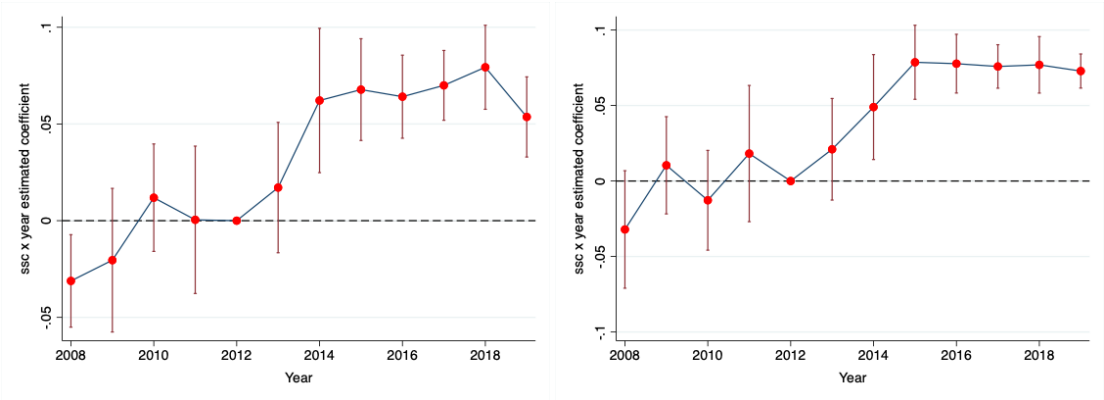
Figure 9: Effect of United States v. Windsor (2013) on Insurance
Late-adopter States (Calendar year as cutoff)



(a) Overall Insurance (b) ESI

Effect of USvW ruling (federal recognition) on late-adopter state SSCs' insurance take-up relative to OSCs. Sample is restricted to late-adopter states. State classification is based on calendar year only with no adjustments.

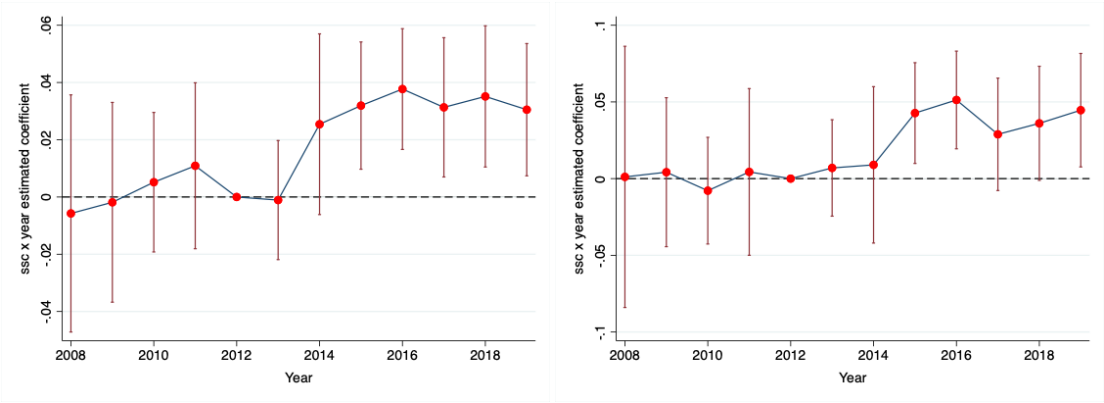
Figure 10: Trends in Insurance Coverage for United States v. Windsor (2013)
Late-adopter states without Medicaid expansion



(a) Overall Insurance (b) ESI

Effect of USvW ruling (federal recognition) on late-adopter state SSCs' insurance take-up relative to OSCs. Sample is restricted to late-adopter states without expansion on Medicaid eligibility.

Figure 11: Trends in Insurance Coverage for United States v. Windsor (2013)
Late-adopter states (Above 400% FPL)



(a) Overall Insurance (b) ESI

Effect of USvW ruling (federal recognition) on late-adopter state SSCs' insurance take-up relative to OSCs. Sample is restricted to households in late-adopter states with annual income above 400% of FPL.

10 Appendix

10.1 Appendix A: Marriage Equality and Obergefell v. Hodges (2015)

This section aims to estimate the average treatment effect on the treated (ATT) of marriage equality. Here, sample is restricted to states that did not legalized SSM until 2015 (late-adopter states). Therefore, the SSCs in this sub-sample did not have access to marriage before OvH, and the ruling in 2015 granted them both marriage equality and federal recognition. In this case, the control group is OSCs in late-adopter states, and the treatment group is SSCs in late-adopter states. The OvH ruling in 2015 should not directly change the Medicaid enrollment status of a same-sex couple living in a early-adopter state, where they had been enjoying the right to marry prior to 2015 and federal recognition since 2013. When estimating the treatment effect of 2015 ruling, I only include SSCs and OSCs living in late-adopter states, and descriptive statistics can be found in Appendix Table A2.

The DiD regression becomes:

$$Y_{ist} = \alpha + \beta(Post15_t * SSC_i) + \tau_s + \mu_t + X'_{ist}\gamma + \epsilon_{ist} \tag{2}$$

where Y_{ist} is the outcomes of interest. Unlike results in the federal recognition of the same-sex marriage, pre-trends are found in both overall insurance coverage and ESI. As in Figure B3, the treatment effects happened prior to the 2015 ruling that ensured marriage equality, which are consistent with the spill-over found in the previous section. A significant decrease of 1.99% in Medicaid coverage is shown in panel (d) and Table A4. This can be explained by the fact that combined income of both spouses may disqualify them for Medicaid, the eligibility of which depends on the federal poverty line (FPL)[15]. Lastly, no significant effects can be seen in the labor market outcomes and social security (See Appendix B and C for DD estimates and event study).

[15]To be eligible for Medicaid, the household needs to have an income equal to 400% of the FPL at most, which is the threshold for getting partially subsidized insurance plans.

10.2 Appendix B: Additional Tables

Table A1: Date and Form of SSM Legalization

State	Date of Decision	Date of Effect	Form
Massachusetts	Nov 18th, 2003	May 17th, 2004	Court decision
California	May 15th, 2008	Jun 16th, 2008	Court decision
	(Overturned)		
	Aug 4th, 2010	Jun 26th, 2013	Court decision
Connecticut	Oct 10th, 2008	Nov 12th, 2008	Court decision
Iowa	Apr 3rd, 2009	Apr 27th, 2009	Court decision
Vermont	Apr 7th, 2009	Sep 1st, 2009	State legislation
New Hampshire	Jun 3rd, 2009	Jan 1st, 2010	State legislation
District of Columbia	Dec 18th, 2009	March 3rd, 2010	State legislation
New York	Jun 24th, 2011	July 24th, 2011	State legislation
Washington	Feb 13th, 2012	Dec 6th, 2012	State legislation[16]
Maryland	Mar 1st, 2012	Jan 1st, 2013	Referendum
Maine	Nov 6th, 2012	Dec 29th, 2012	Referendum
New Jersey	Sep 27th, 2013	Oct 21st, 2013	Court decision
New Mexico	Dec 19th, 2013	Aug 21st, 2013	Court decision, county clerk[17]
Rhode Island	May 2nd, 2013	Aug 1st, 2013	State legislation
Delaware	May 7th, 2013	Jul 1st, 2013	State legislation
Minnesota	May 14th, 2013	Aug 1st, 2013	State legislation
Hawaii	Nov 13th, 2013	Dec 2nd, 2013	State legislation
Illinois	Nov 20th, 2013	Feb 26th, 2014	State legislation, court decision[18]
Utah	Dec 20th, 2013	Dec 20th, 2013	Court decision
	(Court Stay[19])		
	Oct 6th, 2014	Oct 6th, 2014	Court Decision
Oregon	May 19th, 2014	May 19th, 2014	Court decision
Pennsylvania	May 20th, 2014	May 20th, 2014	Court decision
Virginia	Oct 6th, 2014	Oct 6th, 2014	Court decision
Indiana	Jun 25th, 2014	Oct 6th, 2014	Court decision

Continued on next page

[16] Affirmed by a referendum

[17] The New Mexico Supreme Court ruled that the same-sex marriage is permitted on Dec 19th of 2013, even though eight county clerks had already been issuing marriage license to same-sex couples since Aug of 2013.

[18] The legislation was set to be effective from Jun 1st of 2014, but a U.S. District Judge ruled on Feb 21st of 2014, that the marriage is available immediately.

[19] Stay is an action taken by a court to stop a legal proceeding or the actions of a party.

Table A1 – *Continued from previous page*

State	**Date of Decision**	**Date of Effect**	**Form**
Wisconsin	Sep 4th, 2014	Oct 6th, 2014	Court decision
Oklahoma	Jul 18th, 2014	Oct 6th, 2014	Court decision
Colorado	Jul 9th, 2014	Oct 7th, 2014	Court decision
West Virginia	Jul 28th, 2014	Oct 9th, 2014	Court decision
North Carolina	Oct 10th, 2014	Oct 10th, 2014	Court decision
Wyoming	Oct 17th, 2014	Oct 21st, 2014	Court decision
South Carolina	Nov 12th, 2014	Nov 20th, 2014	Court decision
Idaho	May 13th, 2014	Oct 15th, 2014	Court decision
Nevada	Oct 7th, 2014	Oct 9th, 2014	Court decision
Alaska	Oct 12th, 2014	Oct 12th, 2014	Court decision
Arizona	Oct 17th, 2014	Oct 17th, 2014	Court decision
Montana	Nov 19th, 2014	Nov 19th, 2014	Court decision
Florida	Aug 21st, 2014	Jan 6th, 2015	Court decision

Table A2: Descriptive Statistics: Late-adopter States

Variable	Pre-2015				Post-2015			
	SSC		OSC		SSC		OSC	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Overall Coverage	0.8296	0.3113	0.8517	0.3218	0.9074	0.2417	0.9045	0.2621
ESI	0.6669	0.3976	0.7031	0.4233	0.7163	0.3906	0.7207	0.4116
Private Insurance	0.1122	0.2580	0.1027	0.2746	0.1143	0.2702	0.1115	0.2831
Medicaid	0.0621	0.1936	0.0560	0.2102	0.0847	0.2343	0.0815	0.2504
Unemployment	0.0433	0.2036	0.0403	0.1967	0.0235	0.1515	0.0208	0.1429
Weekly Hours Worked	72.243	25.988	68.911	25.236	73.654	24.863	70.311	24.671
Log Total Wage	10.500	2.5775	10.413	2.6234	10.781	2.4127	10.699	2.5188
Log Total Social Security	0.5051	2.1028	0.3906	1.8624	0.4132	1.9114	0.3323	1.7280
Log Total SSI	0.3099	1.6403	0.1848	1.2780	0.2744	1.5549	0.1921	1.3100
Family Size	2.8784	1.1753	3.3731	1.3275	2.7886	1.1753	3.2657	1.3336
Log Total Income	11.092	1.1607	11.059	1.0645	11.277	1.1767	11.263	1.0888
Disability	0.1708	0.3763	0.1364	0.3432	0.1677	0.3736	0.1279	0.3340
Average Age	41.480	9.8093	42.655	10.103	40.860	10.456	42.668	10.127
Hispanic	0.1593	0.3660	0.1357	0.3424	0.2081	0.4060	0.1627	0.3691
Asian	0.0318	0.1755	0.0262	0.1597	0.0349	0.1837	0.0261	0.1595
Black	0.1035	0.3046	0.0898	0.2859	0.1172	0.3217	0.0834	0.2765
Log Population	16.006	0.7465	15.884	0.7953	16.022	0.7929	15.952	0.8119
Log GDP	12.921	0.7764	12.798	0.8274	13.004	0.8409	12.931	0.8606
Log Disposable Income	10.475	0.0947	10.467	0.0990	10.642	0.0934	10.635	0.0950
Unemployment rate	7.7600	1.9606	7.7037	2.0436	4.2500	0.8573	4.2880	0.8679
Observations	18,521		1,793,944		19,567		1,234,083	

This sample is used to estimate the average treatment effect on the treated (ATT) of the 2015 Supreme Court ruling on Obergefell v. Hodges, that legalize the same-sex marriage across the United States. The decision ensured an equal access of the same-sex marriage in the whole country. Sample here is restricted to late-adopter states, those who did legalized the same-sex marriage in their states prior to the ruling (with adjustment). Column two to fifth contain the descriptive statistics of the pre-treatment outcomes and characteristics of the treatment and control households. And column sixth to ninth, on the other hand, includes the mean and standard deviation of the post-treatment treatment and control groups.

Table A3: Effect of United States v. Windsor (2013) on Labor Market
Early-adopter States

VARIABLES SSC vs OSC	Unemployment (1)	Weekly Hours Worked (2)	Log Total Wage (3)
DD Estimator	0.0073	4.0760***	0.0565
	(0.0060)	(0.8710)	(0.0605)
Year Fixed Effect	✓	✓	✓
State Fixed Effect	✓	✓	✓
Baseline	0.0401	74.373	10.898
N	920,474	920,474	920,474

Dependent variables: probability couple unemployed, combined weekly working hours, and log of combine wage and salary income. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01.

Table A4: Effect of Obergefell v. Hodges (2015) on Insurance
Late-adopter States

VARIABLES SSC vs OSC	Overall Coverage (1)	ESI (2)	Private Insurance (3)	Medicaid (4)
DD Estimator	0.0528***	0.0616***	0.0017	-0.0199***
	(0.0056)	(0.0058)	(0.0049)	(0.0027)
Year Fixed Effect	✓	✓	✓	✓
State Fixed Effect	✓	✓	✓	✓
Baseline	0.8296	0.6669	0.1122	0.0621
N	2,692,598	2,692,598	2,692,598	2,692,598

Dependent variables: probability couple insured, probability couple has employer-sponsored insurance, probability couple has privately-purchased insurance (excluding purchases through a government program), and probability couple has Medicaid or other government-sponsored health insurance. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01.

Table A5: Effect of Obergefell v. Hodges (2015) on Labor Market
Late-adopter States

VARIABLES SSC vs OSC	Unemployment (1)	Weekly Hours Worked (2)	Log Total Wage (3)
DD Estimator	-0.0062*	2.1390***	0.0602*
	(0.0035)	(0.2740)	(0.0315)
Year Fixed Effect	✓	✓	✓
State Fixed Effect	✓	✓	✓
Baseline	0.0433	72.243	10.501
N	2,692,598	2,692,598	2,692,598

Dependent variables: probability couple unemployed, combined weekly working hours, and log of combine wage and salary income. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01.

Table A6: Effect of Obergefell v. Hodges (2015) on Social Security
Late-adopter States

VARIABLES SSC vs OSC	Log Total Social Security (1)	Log Total SSI (2)
DD Estimator	-0.0034	-0.0737***
	(0.0262)	(0.0266)
Year Fixed Effect	✓	✓
State Fixed Effect	✓	✓
Baseline	0.5051	0.3099
N	2,692,598	2,692,598

Dependent variables: log of combine social security benefits, and log of combined Supplemental Security Income benefits. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01.

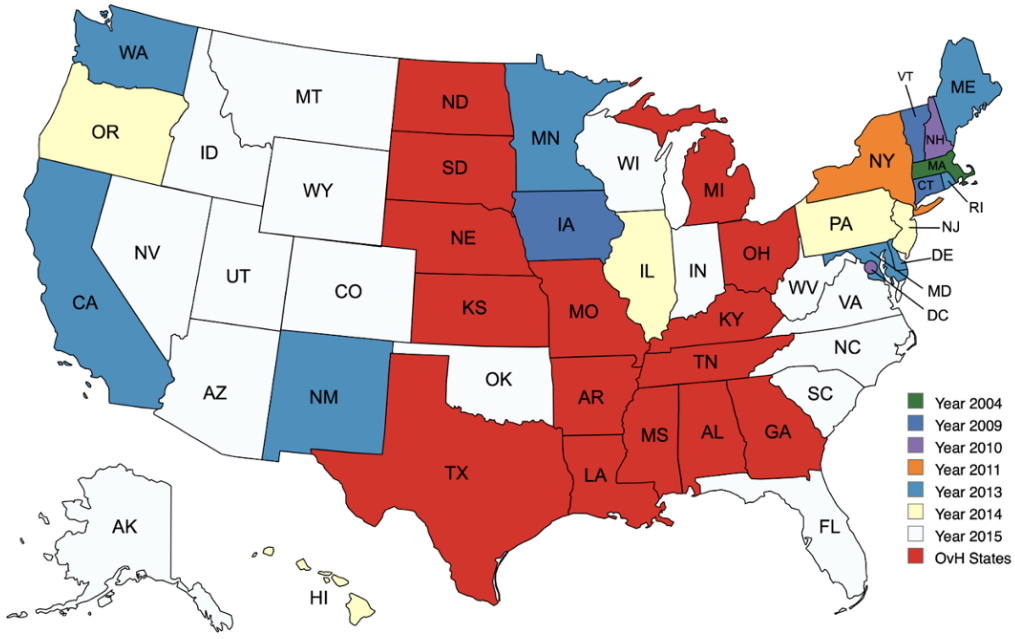
Table A7: Effect of United States v. Windsor (2013) on Medicaid Coverage

VARIABLES	Medicaid (1)	Medicaid (2)
DD Estimator	-0.0378***	-0.0196***
	(0.0090)	(0.0036)
Year Fixed Effect	✓	✓
State Fixed Effect	✓	✓
Controls	✓	✓
Baseline	0.0859	0.0592
N	920,474	2,692,598

Dependent variables: probability couple has Medicaid or other government-sponsored health insurance. Standard errors in parenthesis clustered at the state level (51 clusters: 50 states plus the District of Colombia). All specifications include year and state fixed effect, individual and state-level controls. Individual controls: family size, family income, average age of the couple, race, ethnicity, and disabilities. State-level controls: population, GDP, disposable income per capita, and unemployment rate. *p<0.10, **p<0.05, ***p<0.01. Column (1) represents the DiD results in early-adopter states, and column (2) presents the results in late-adopter states.

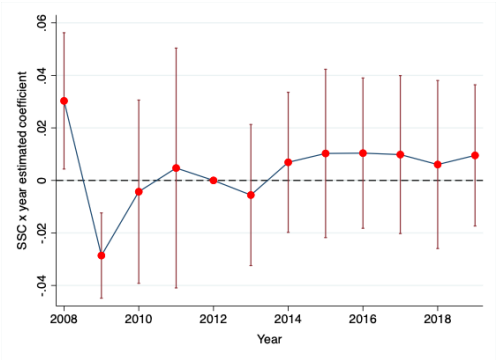
10.3 Appendix C: Additional Figures

Figure B1: States by SSM Legalization Year

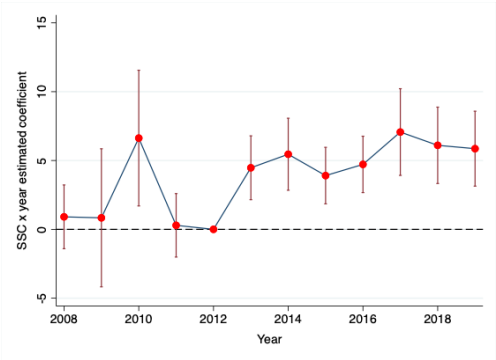


This map shows the variation in same-sex marriage legalization year. Note that states legalized SSM by OvH ruling are listed separately.

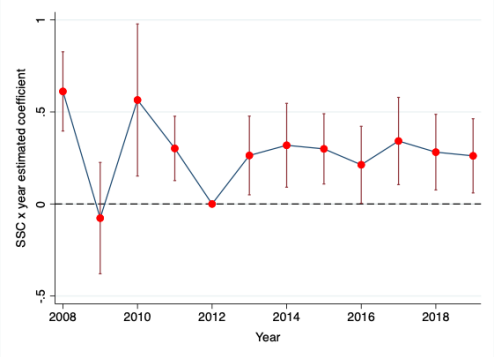
Figure B2: Trends in Labor Market Outcomes for United States v. Windsor (2013)
Same-sex couples vs. Opposite-sex couples



(a) Unemployment



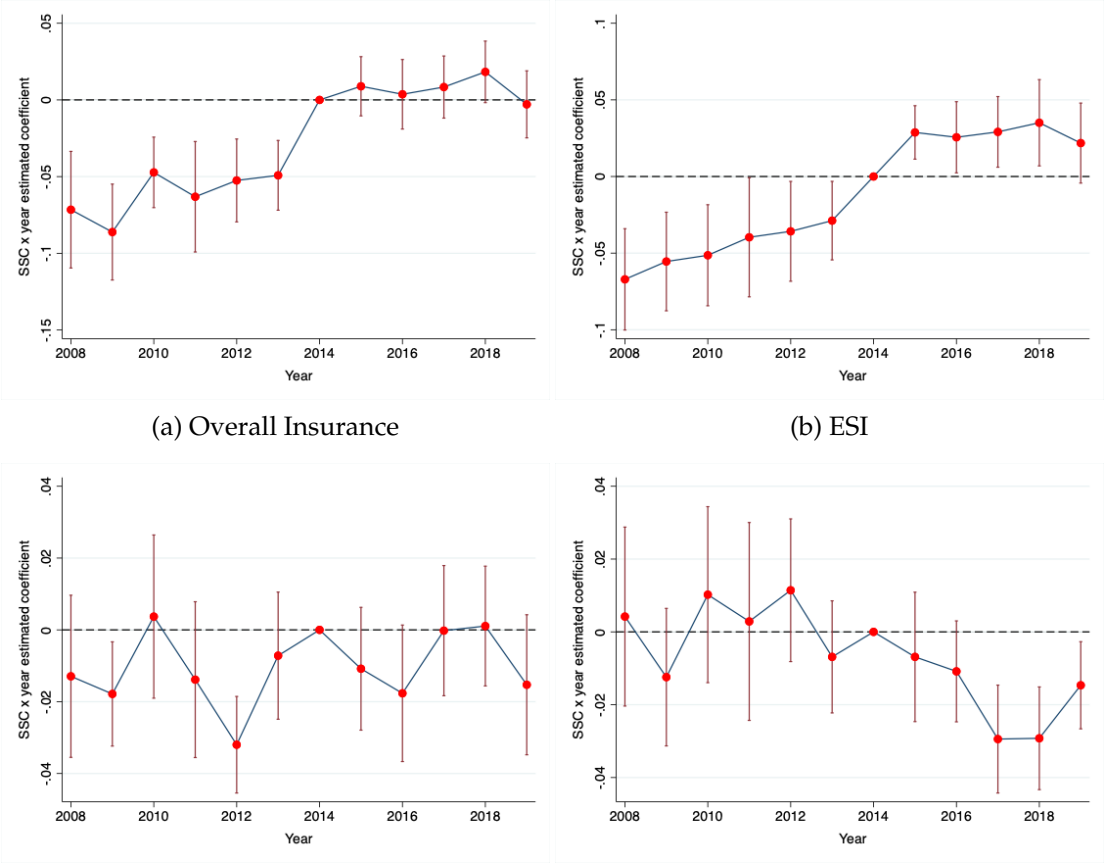
(b) Hours



(c) Wage

Effect of USvW ruling (federal recognition) on SSCs' labor market outcomes relative to OSCs. Sample is restricted to households in early-adopter states and excludes pre-legalization observations.

Figure B3: Trends in Insurance Coverage for Obergefell v. Hodges (2015)
Same-sex couples vs. Opposite-sex couples



(a) Overall Insurance

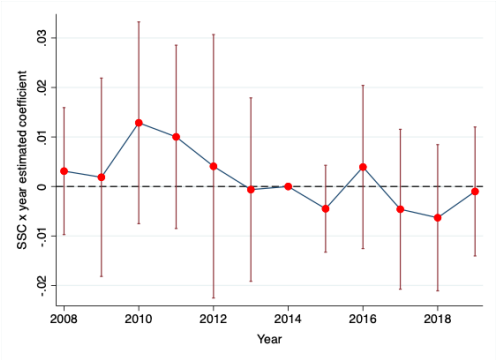
(b) ESI

(c) Private Coverage

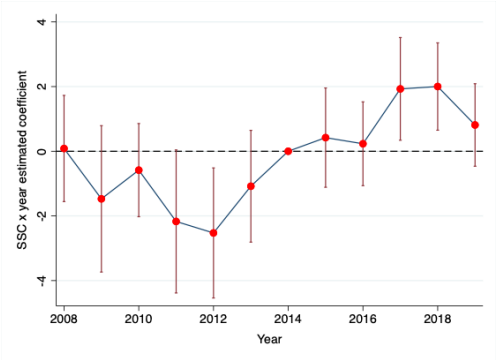
(d) Medicaid

Effect of OvH ruling (marriage equality) on SSCs' insurance take-up relative to OSCs. Sample is restricted to households in late-adopter states.

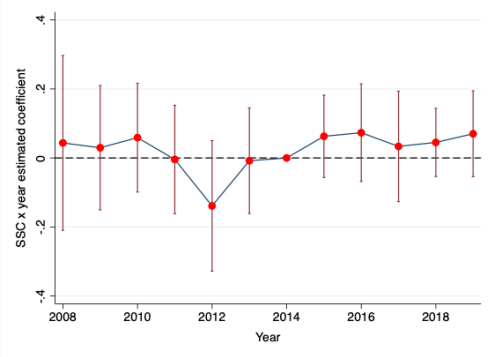
Figure B4: Trends in Labor Market Outcomes for Obergefell v. Hodges (2015)
Same-sex couples vs. Opposite-sex couples



(a) Unemployment



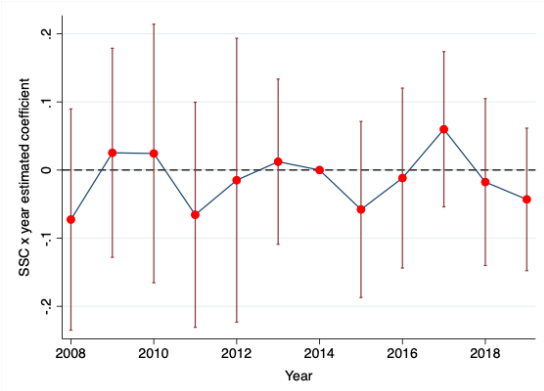
(b) Hours



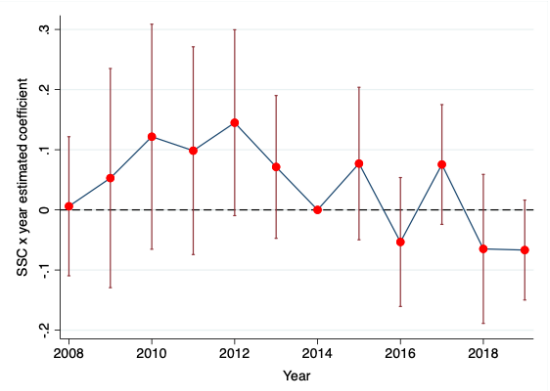
(c) Wage

Effect of OvH ruling (marriage equality) on SSCs' labor market outcomes relative to OSCs. Sample is restricted to households in late-adopter states.

Figure B5: Trends in Social Security for Obergefell v. Hodges (2015)
Same-sex couples vs. Opposite-sex couples



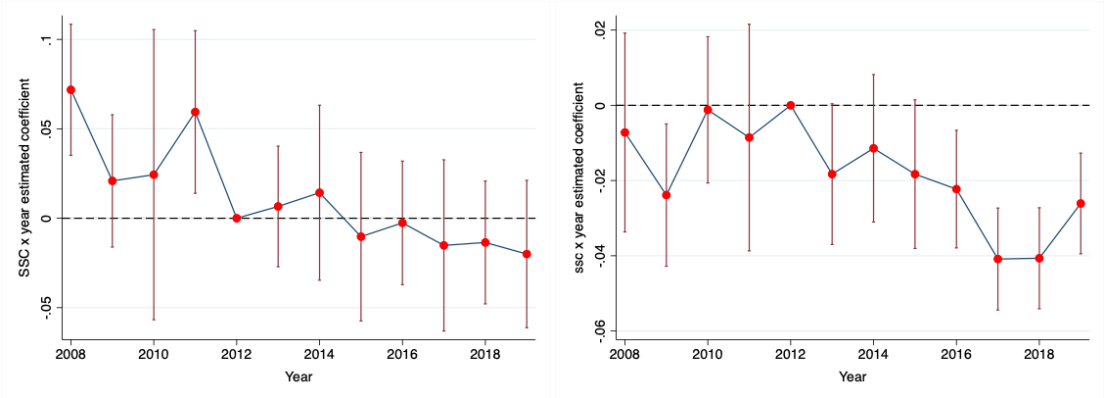
(a) Social Security Benefits



(b) SSI Income

Effect of OvH ruling (marriage equality) on SSCs' social security receipt relative to OSCs. Sample is restricted to households in late-adopter states.

Figure B6: Trends in Medicaid Coverage for United States v. Windsor (2013)



(a) Early-adopter State (b) Late-adopter State

Effect of USvW ruling (Federal Recognition) on SSCs' Medicaid coverage relative to OSCs. Sample is restricted to households of early-adopter states in panel (a) and of late-adopter states in panel (b).