Spousal Visa Policy and Mixed-Citizenship Couples: Evidence from the End of the Defense Of Marriage Act

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Abstract

Policy can impact partner choice and match quality. Spousal visa policy permits non-residents to marry citizens, arguably an assimilation capstone. I ask how this policy affects couple rates, marriage rates, and assortative mating by citizenship and birth country. Without immigration policy variation, I identify the effect of spousal visa access by exploiting a change in the federal government's definition of spouse. When the Supreme Court ended the Defense of Marriage Act in *United States v. Windsor*, same-sex couples gained access to spousal visas for the first time. I estimate the effect of this policy change for mixed-citizenship same-sex couples, accounting for aggregate changes in other same-sex and mixed-citizenship couples, using a triple difference design. Spousal visa access causes a 36% increase in coupling rates and a 72% increase in marriage rates. Transfer benefits, health insurance, roommates, moving, fraud, or state-level heterogeneity do not explain the results. Informal calculations suggest that 1.5 million people currently have partners, directly thanks to spousal visa policy.

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Partner choice is consequential; it has significant implications on labor force participation, the allocation of leisure and household resources, income inequality, and other family-level characteristics (Becker, 1974). I study spousal visa policy and its implications for coupling and marriage, which directly affects well-being and can have downstream effects on labor supply. Well-being improves with couple formation and can depend on romantic partner choice (Stutzer and Frey, 2006; Zimmermann and Easterlin, 2006; Lee and Seshadri, 2019).

Love is not blind to policy, which can impact partner choice. For example, policy can incentivize certain couple types or prevent individuals from entering the marriage market. Spousal visa policy does both. It benefits mixed-citizenship couples, a citizen and a non-citizen, and authorizes non-residents to marry citizens. This paper studies the effect of spousal visa access on couple formation, marriage, and assortative mating by citizenship and birth country in the United States.

Spousal visa policy is a federal marriage and immigration policy that significantly benefits mixed-citizenship couples. Spousal visas permit non-permanent residents to marry citizens and prevent failed visa renewal from dissolving unions. Hence, for mixed-citizenship couples, spousal visa policy reduces barriers to formation and decreases pressure on dissolution. Therefore, spousal visa access can affect partner choice by increasing the value of mixed-citizenship couple formation and marriage. This can have downstream effects on others' partner choice because it can change the equilibrium partner allocation in the market for romantic partners. Similarly, spousal visa policy can shift the equilibrium matches by allowing non-permanent residents to marry. To understand, consider a standard result from matching theory: equilibrium allocations are efficient (Shapley and Shubik, 1971).[1] That means equilibrium pairings maximize the total utility generated by matching and are stable. Maximizing the total utility from matching improves the average utility from matching, also called match quality. Hence, policies that change the value of a couple type or determine marriage eligibility weakly reallocate equilibrium matches and affect match quality. This paper provides suggestive evidence that spousal visa access re-equilibrates the romantic partner market and improves match quality.

Thus spousal visa policy can affect partner choice by incentivizing mixed-citizenship couples and changing marriage market eligibility. I estimate how spousal visa access affects mixed-citizenship coupled and marriage rates relative to same-citizenship coupled and marriage rates, which I describe below. Changes in these relative rates indicate that spousal visa access affects partner choice.

Furthermore, it is also important to understand spousal visa access because it can im-

[1] See, for example, (Dupuy and Galichon, 2014) for a modern presentation of a matching model that unifies the assignment framing of Shapley and Shubik and the marriage context of Becker.

prove the average well-being of people (who would be) in mixed-citizenship couples. First, by providing the option value of an immigration visa or Green Card and quicker naturalization. Second, by enlarging the market for romantic partners, the average match quality increases in a standard matching model (Shapley and Shubik, 1971; Choo and Siow, 2006; Dupuy and Galichon, 2014; Adda, Pinotti and Tura, 2022). Third, marrying a citizen hastens assimilation for immigrants (Meng and Gregory, 2005) and improves their labor market outcomes (Furtado and Trejo, 2013). Fourth, (same-sex) marriage improves well-being through employment, health insurance, and homeownership (Badgett, Carpenter and Sansone, 2021).

I contribute the first study of an extensive margin change in spousal visa access in the United States. Identifying spousal visa policy's impact is challenging because it requires policy variation. A meaningful change in spousal visa policy has not occurred for decades. Earlier policy changes occurred when social norms regarding couple formation were substantively dissimilar, immigration patterns were different, and the data were sparser. I leverage a novel source of variation *United States v. Windsor*, which extended federal marriage rights to same-sex spouses.

The most similar studies leverage earlier immigration reform or international freedom of movement agreements. Jasso, Rosenzweig and Smith (2000) study the most recent comprehensive immigration reform in the United States, the Immigration Reform and Control Act (IRCA) of 1986. The IRCA included Immigration Marriage Fraud Amendments, which made spousal visa screening more stringent. This led to fewer mixed-citizenship marriages and, given other reforms, lower-skill levels amongst spousal visa holders. Adda, Pinotti and Tura (2022) study European Union (EU) expansion, which gives citizens of its member states the right to work in any member state. The expansion reduces the marriage incentive for couples with an established EU citizen and a new EU expansion citizen. Consequently, the probability that a non-citizen marries a citizen decreases, and the divorce hazard increases. These papers show that spousal visas are a benefit, and taking away that benefit reduces mixed-citizenship coupling. However, I ask a subtly distinct question. Does permitting mixed-citizenship marriage increase take-up? Does reducing visa uncertainty for mixed-citizenship couples increase their formation? Existing couples that want to remain together can marry and reduce visa uncertainty with spousal visa access. New couples can avoid these costs with spousal visa access. If love conquers all, we should not expect an effect. However, if policies affect with whom people fall in love, we should expect meaningful results.

More specifically, this paper leverages a change in the federal government's definition of a spouse instead of considering immigration reform or international agreements. Recently the federal government expanded its definition of spouse, extending access to federal marriage benefits to same-sex couples. This occurred in 2013 when the Supreme Court decision in *United States v. Windsor* ended the Defense Of Marriage Act. Passed in 1996, the Defense Of Marriage Act (DOMA) required the federal government to restrict its definition of marriage to "one man, one woman." Same-sex couples could not access spousal visas. DOMA effectively barred non-permanent residents from same-sex marriage because marrying a citizen shows an intent to remain in the United States permanently, and this violates non-permanent visas. After *United States v. Windsor*, the federal government immediately recognized same-sex marriages and granted same-sex spouses federal marriage benefits, including spousal visa access. For the first time, non-permanent residents could marry their same-sex partners. Also, mixed-citizenship same-sex couples could hedge against failed visa renewal because, unlike most visas, there is no limit on spousal visas.

This paper exploits the policy change resulting from *United States v. Windsor* to understand how spousal visa access affects coupling and marriage rates for treated couples. As one might expect, raw data show the annual mixed-citizenship same-sex marriages jumped tenfold in 2013 (Figure 1b). Likewise, the stock of mixed-citizenship same-sex couples doubled from 2012 to 2017 (Figure 1a), a larger proportional increase than same-citizenship same-sex couples and consistent with the policy change.

This paper analyzes the 2008 to 2019 rounds of the American Community Survey (ACS), repeated cross-sections that sample 1% of the United States population each year. The ACS designates a "head-of-household" and lists their relationship with every household member. Possible relationships include "spouse" and "unmarried romantic partner." Therefore, cohabiting same-sex couples are observable. However, the sexual orientation of non-coupled individuals and non-cohabiting couples is unobservable. The ACS does not document dating behavior, so I define couple formation as when couples begin cohabiting.

I use a log-linear count model to account for the unobserved same-sex attracted singles. If the single population is well behaved, then the log-linear count model represents changes in couple and marriage *rates*. I create counts at the state-by-year level for the number of individuals in four couple types: mixed-citizenship same-sex, same-citizenship same-sex, mixed-citizenship different-sex, and same-citizenship different-sex. Then I use a difference-in-differences-in-differences (DDD) design to identify the treatment-on-the-treated effect of the policy. The DDD design takes the mean post-policy count for each couple type and subtracts the mean pre-policy count. Then takes this change for mixed-citizenship same-sex couples and subtracts the change for same-citizenship same-sex couples, and subtracts the corresponding difference-in-differences for different-sex couples. Removing the changes for same-sex and mixed-citizenship couples accounts for the aggregate changes in these groups. What remains is the effect of the policy.

The policy change increases coupling rates by 36%, statistically significant at the 1% level. It also increases marriage rates by 72%, which jumps up in 2013 and persists. The policy increases disassortative mating by citizenship by definition. It also increases disassortative mating by birth country by 11%. This suggests that visa policy absent spousal visas is hostile to mixed-citizenship couples and that spousal visa policy enables mixed-citizenship couples to remain together and marry, which increases net formation.

Robustness checks show the results are not driven by: access to other federal benefits, health insurance, roommates relabeling as couples, or partners or couples moving across state lines. The results are also not explained by between-state variation in the timing of same-sex marriage legalization or population shares of non-citizens or illegally-present non-citizens. Consistent with new couples forming, the point estimates for younger couples are ampler than those for older couples; treated couples are relatively more likely to move jointly within the state.

Marriage fraud does not explain the results either. Proving *bona fide* marriage for immigration purposes is a demanding legal process. Immigration officers deny genuine couples who do not meet the normative standard of marriage for immigration purposes. Moreover, marriage fraud must be relatively more likely for same-sex couples to explain the result. A marriage fraudster would likely choose a different-sex partner given the social costs of revealing same-sex attraction, which tends to be higher abroad. I conduct additional empirical analyses to test this mechanism further and do not find supporting evidence.

This paper quantifies spousal visa policy's importance for couple formation, marriage, and assortative mating by citizenship and birth country. In doing so, it contributes new empirical evidence that a significant, understudied policy affects the rationale for and gains from marriage. Becker (1991) describes the production and consumption complementarities and credit and risk sharing afforded to couples. He highlights household production as the primary benefit of marriage. Lam (1988) and Stevenson and Wolfers (2007) emphasize the increasing importance of couples' consumption complementarities. Newer literature on marriage underscores the legal contract of marriage instead of the benefits of cohabitation. Marriage gives men legal ownership of children (Edlund, 2013). Marriage facilitates costly investment in children (Lafortune and Low, 2020). Literature also considers how policies can affect marriage incentives on the margin. Encouraging single mothers to work decreases their marriage rates in the United States (Bitler et al., 2004) and the United Kingdom (Francesconi and Klaauw, 2007). Expanding access to health insurance also lowers marriage rates (Abramowitz, 2016). This paper stresses that marriage can protect couples from risk in the immigration process, like Adda, Pinotti and Tura (2022). For non-permanent residents, this benefit is first order. Furthermore, increased couple formation due to spousal visa access implies that couples benefit from household production and consumption complementarities.

This paper exposes part of immigration policy's broader impact on the market for romantic partners and contributes to the literature on marriage and immigration. Changes in immigration law affect marriage behavior (Jasso, Rosenzweig and Smith, 2000; Kelly, 2010). Changes in immigration patterns affecting immigrant sex ratios cause human capital investment and bargaining power to shift (Lafortune, 2013). Increasing human capital and low marriage returns for women lead men to import foreign brides (Kawaguchi and Lee, 2017). Non-citizens who marry a citizen have twice the naturalization hazard as those who marry non-citizens (Dziadula, 2020). The marriage patterns of immigrants are also related to their labor supply and skill level. Immigrants with spousal visas tend to be negatively selected compared to other immigrants (Jasso, Rosenzweig and Smith, 2000; Guven, Tong and Yuksel, 2020). Immigrants can be in "indentured servitude" until they gain permanent residency (Wang, 2021), which is possible through spousal visas. This article highlights that changes in marriage law can affect citizens and non-citizens through immigration law.

This paper also relates to literature that identifies determinants of assortative mating. Assortative mating depends on sex ratios (Abramitzky, Delavande and Vasconcelos, 2011), peer groups at work and school (Mansour and McKinnish, 2014), and human capital (Chiappori, Salanié and Weiss, 2017). Policy can also create a marriage market directly and impact assortative mating (Goñi, 2022). I show that spousal visa policy affects assortative mating by citizenship and birth country by changing marriage (market) eligibility.

This paper contributes to our understanding of expanding marriage rights. The Supreme Court of the United States expanded the right to marry and the rights of married couples in a few landmark rulings. *Loving v. Virginia* ended miscegenation laws, legalizing interracial marriage. *Griswold v. Connecticut* granted married couples the right to privacy. It laid the groundwork for legalizing same-sex intimacy in *Lawrence v. Texas*, federal recognition of same-sex marriage in *United States v. Windsor*, and legalizing same-sex marriage in *Obergefell v. Hodges*. These landmark Supreme Court decisions directly impact the plaintiffs and the policies they overturn. These rulings can also affect everyone through their effects on the market for romantic partners. Economists studied *Loving v. Virginia*, the expansion of same-sex marriage through state-level laws, and recently *United States v. Windsor*. Legalizing interracial marriage leads to more interracial marriages (Fryer Jr, 2007; Gevrek, 2014). Legalizing same-sex marriage is associated with greater same-sex marriages (Carpenter, 2020; Carpenter et al., 2021) and other beneficial outcomes (Badgett, Carpenter and Sansone, 2021). One paper considers *United States v. Windsor*, Friedberg and Isaac (2022) study the effect of taxes on marriage rate. Same-sex spouses automatically switched from single filers to married filers. They find that federal tax policy increases marriage rates. This paper furthers our understanding of *United States v. Windsor*, an important Supreme Court decision expanding marriage rights. This paper asks how this expansion of rights indirectly affects the broader population through the marriage market channel.

This paper contributes to a growing literature on same-sex couples and LBGTQ+ individuals (Black, Sanders and Taylor, 2007; Badgett, Carpenter and Sansone, 2021). In particular, it relates to immigrants in same-sex couples (Hoffmann and Velasco, 2021), the assortative mating of same-sex couples (Jepsen and Jepsen, 2002; Ciscato, Galichon and Goussé, 2020), the matching surplus generated by same-sex marriage (Delhommer and Hamermesh, 2021), and the impact of *United States v. Windsor* (Friedberg and Isaac, 2022).

I organize the paper as follows: Section 1 explains the institutional context and policy change. Section 2 describes the data. Section 3 explains the research design, empirical model, and estimation procedure. Section 4 reports and discusses the results. Section 5 concludes.

1 Background

1.1 Marriage and its Benefits

Marriage is a public commitment made by two partners. Laws regarding dividing assets upon divorce, alimony, child custody, and medical visitation rights form the legal *marriage contract* and are state-level laws. States determine marriage eligibility and the strength of the marriage contract.

Marital status matters for government taxes and transfers. In particular, "Single/never married" and "Married" are classifications that affect federal and state tax and transfer policies. These policies consider unmarried couples' incomes as separate individuals' incomes but consider the joint income of married couples. Therefore, couples can marry, divorce, and adjust their labor supply to optimize over tax and transfer benefits. Transfer programs include Medicaid, Supplemental Nutrition Assistance Program, the Earned Income Tax Credit, and other means-tested programs. Social Security benefits can also depend on marriage due to surviving spouse benefits. Thus, state and federal governments offer benefits that depend on marital status.

The federal government determines eligibility for immigration and citizenship. Non-citizen spouses of citizens are eligible for: temporary visas while applying for permanent residency; permanent residency visas (Green Cards), conditional upon marriage for two initial years; and United States citizenship after three years of permanent residence instead of the usual five. These benefits enable mixed-citizenship couples to stay together when they cannot obtain or renew another visa. Spousal visas do not benefit same-citizenship couples. Hence, accessing spousal visas requires mixed-citizenship couple formation, unlike other benefits.

1.2 Legality of Same-Sex Marriage

Attitudes towards and legality of same-sex marriage varied during the period of analysis. Some states offered marriage benefits, while others banned same-sex marriage, blocking access to state-level marriage benefits. In 2004, Massachusetts legalized same-sex marriage for its residents. California followed suit in 2008, including for non-residents. This spurred a rush in same-sex marriages (visible in Figure 1b). Couples traveled from around the country and world to get married in California[2]. In response, Massachusetts began offering same-sex marriage to non-residents in July 2008.

With states offering marriage to non-residents, same-sex couples all over the country could access the marriage contract. Couples residing in states without same-sex marriage would not get state-level benefits but could still access the marriage contract. For example, same-sex couples from Ohio that married in Massachusetts were not married for Ohio tax and transfer purposes. However, upon divorce, couples must divide their marital assets according to Massachusetts law (according to their marriage contracts).

In 2015, the Supreme Court ruled in *Obergefell v. Hodges* that same-sex marriage is legal in all states. This required the remaining states to immediately legalize, perform, and recognize same-sex marriages.[3]

The Defense of Marriage Act (DOMA) banned federal recognition of same-sex marriages in 1996. Despite gaining access to the marriage contract in 2008 and access to state-level marriage benefits, DOMA blocked same-sex couples from accessing federal marriage benefits. On June 26, 2013, the Supreme Court ruled in *United States v. Windsor*, striking down the section of DOMA preventing the federal government from recognizing same-sex marriages. That day, the federal government ended a nearly two-decade policy of ignoring same-sex marriages and immediately gave full federal marriage benefits to same-sex couples. This paper uses the variation in access to federal marriage benefits for same-sex couples induced by the end of DOMA.

The Supreme Court is not elected and does not grant government benefits. The policy change resulted from a close decision made after years of litigation. Hence, this policy change is exogenous to short-term political sentiment or popular opinion trends.

[2] After Proposition 8 passed in November 2008, same-sex marriage became illegal in California. However, performed marriages remained lawful. California re-legalized same-sex marriage in 2013.

[3] Table A1 provides a timeline for same-sex marriage legalization.

Lastly, this policy change occurred after same-sex couples gained access to the marriage contract in 2008. All same-sex couples gain access to spousal visas because they can access the marriage contract by traveling to a state with legal same-sex marriage.

1.3 Immigrant and Non-Immigrant Visas

Immigrant visas (Green Cards) grant holders permanent residence in the United States, whereas non-immigrant visas are issued for "temporary" visits, including work and study (United States Customs and Border Protection, 2018). Since non-immigrant visas are for temporary stays, non-immigrant visa holders must not show an intent to stay in the country. For example, if non-immigrant visa holders marry United States permanent residents or citizens, then they *show intent* to remain in the United States. Therefore, non-immigrant visa holders must switch to spousal visas to stay in the United States upon marriage.

Under DOMA, spousal visas were not available to same-sex couples. So non-immigrant visa holders marrying citizens would violate their visa terms with no option to switch to spousal visas. Hence, non-immigrant visa holders were strongly discouraged from marrying same-sex partners before 2013, effectively barring them from same-sex marriage. After *United States v. Windsor*, non-citizens could marry a same-sex partner and expect to obtain immigrant status.

Local authorities provide marriage licenses that grant classification as married for most purposes. However, proving *bona fide* marriage for immigration purposes requires an extensive application and interview process. Immigration officers may, for example, check social media, quiz partners' knowledge of each other, and inspect shared living spaces. Couples benefit from lawyers' assistance during this process (Chetrit, 2011). This process exists to prevent marriage fraud. Marriages for the sole purpose of acquiring spousal visas are fraudulent. Marriage fraud risks deportation, jail time, and denaturalization (Smith and Elmilady, 2014).

To explain the empirical results, marriage fraud must disproportionately occur for same-sex couples compared to different-sex couples. It is unlikely that fraudulent marriages drive the results for three reasons. First, proving *bona fide* marriage for immigration purposes is a long, challenging process. The Immigration Marriage Fraud Amendments in 1986 made proving marriage for immigration purposes so demanding that the number of non-citizen men married to citizen women unambiguously declined (Jasso, Rosenzweig and Smith, 2000). Secondly, it is likely more difficult for same-sex couples to meet immigration officers' criteria (Carron, 2014). For example, public relationships publicly disclose sexual orientation. However, revealing same-sex attraction is potentially incredibly socially costly, especially for immigrants. Coming out of the closet in an attempt to get a visa is avoidable by committing marriage fraud with a different-sex partner. Furthermore, for same-sex couples, filing taxes jointly was impossible in some states. This also makes proving marriage for immigration purposes relatively more challenging for same-sex couples.

2 Data

2.1 American Community Survey

I use repeated cross-sections of survey data from the 2008-2019 rounds of the US Census Bureau's American Community Survey (ACS), accessed via IPUMS (Steven Ruggles et al., 2020). Each year, the ACS surveys a new representative sample of 1% of households, collecting information on marriage, citizenship, transfer benefits, health insurance, and demographics. The ACS is the largest, most detailed data set that identifies same-sex couples in the US.

Each household designates one individual as the "head-of-household," typically the property owner or renter). All other household members then provide a "relationship to head"—for example, spouse, unmarried romantic partner, parent, child, tenant, roommate, etc. I restrict the sample to heads-of-household and their spouses or unmarried romantic partners.

Couples are "same-sex" if partners are both female or both male. Couples are "different-sex" if one is female and the other male. To observe couples in the survey, they must live together (cohabit), and one partner must be the head-of-household. Therefore, this study does not include non-cohabiting or non-head-of-household couples. Likewise, single individuals' sexual and romantic preferences are unobserved, so they are not in the sample.

Data on same-sex couples are unreliable before 2008 due to coding practices (Chesnut, 2008; O'Connell et al., 2010). To address data quality, I do not use surveys before 2008, and I drop individuals with imputed sex and relationship to head.

Before 2013, same-sex married couples were recoded as unmarried romantic partners. Only 2012 has a data quality flag to identify recoded couples. Therefore, to understand the stock of couples and couple formation rates, I pool married and unmarried couples and order them by survey year. To understand entry into marriage and marriage rates, I restrict to married couples from the 2012-2019 surveys only and order them by marriage year. I keep couples married between 2008 and 2019 to match the years in the principal analysis. Notice that this selects on marriage duration. Couples married before 2013 have marriage durations of 0-12 years and can appear in all eight surveys. However, couples married after 2013 have marriage durations of 0-6 years and appear in fewer surveys.

Couples are "mixed-citizenship" if one partner is a citizen and the other is a non-citizen. Couples are "same-citizenship" if they are both citizens or both non-citizens. When ordered by survey years, citizenship is determined directly from the survey response. When ordered by marriage years, citizenship reflects the status at the time of marriage. For those who naturalize after marriage, I recode them as non-citizens for the marriage analyses.

ACS respondents report being citizens at higher rates than in administrative records (Van Hook and Bachmeier, 2013; Brown et al., 2019). Van Hook and Bachmeier (2013) use survey and administrative data on annual naturalizations. They find that the number of naturalizations in survey data exceeds those in administrative data. They recommend relabeling naturalized citizens who arrived in the past five years as non-citizens. Brown et al. (2019) link individuals from the ACS to Social Security Administration data. They find misreporting citizenship is more likely for non-relatives of the head-of-household. They point out that naturalizations can take longer to appear in administrative data. To address data quality, I drop individuals with imputed citizenship. In a robustness check, I relabel naturalized citizens who arrived in the past five years as non-citizens.

Lastly, I restrict the sample to couples with at least one partner aged 18 or older and 64 or younger. I restrict age because minors typically require parents' consent to marry and because the value of partnering for older couples is more likely related to health and retirement decisions and less likely related to the labor market or fertility decisions. However, restricting both partners' ages would disproportionately drop same-sex couples because they have more considerable age differences.

2.2 Summary Statistics

Table 1 reports weighted individual-level summary statistics for mixed-citizenship same-sex couples (MSS), same-citizenship (not mixed) same-sex couples (NSS), mixed-citizen different-sex couples (MDS), and same-citizenship different-sex couples (NDS), pooled across survey years 2008-2019. The weights make the sample representative of the population for each survey year. MSS couples are more likely to be married (0.53 compared to 0.33), more likely to be male (0.66 to 0.47), and less likely to have transfer benefits (0.14 to 0.20) than NSS couples. While MSS couples are slightly less likely to have any health insurance than NSS couples (0.91 to 0.95), MSS couples are much more likely to have any health insurance than MDS couples (0.91 to 0.84). These summary statistics do not suggest that federal transfer benefits or access to health insurance are likely to explain differential mixed-citizenship or same-sex coupling patterns.[4]

[4]Tables A2, A3, and A4 provide summary statistics for additional variables and for married couples only.

2.3 Couple Counts

I employ a triple difference regression design to identify the policy's effect on changes in mixed-citizenship same-sex coupling net of other mixed-citizenship and same-sex coupling changes. This design is not defined at the individual level because individual preferences over partner sex are unobserved. Therefore, I aggregate the data from individuals up to state-years.

I create four groups of couples (MSS, NSS, MDS, NDS) and assign each (weighted) individual to one group. Then to create counts, I sum over individuals within group-state-years. The counts are representative of each group's population within a given state-year.

Figure 1a shows the number of individuals in each couple type on a logarithmic scale from the 2008 survey until the 2019 survey. Notably, the number of individuals in different-sex relationships remains stable while the number of individuals in same-sex relationships increases. For MSS couples, the number triples from 2012 to 2017.

Figure 1b shows the number of married individuals in each couple type, plotted by their year of marriage, observed in the 2019 survey. While the number of married different-sex couples remains relatively stable, the number of married same-sex couples increases substantially. The number of individuals in NSS marriages and MSS marriages increases tenfold virtually overnight in 2013 for MSS marriages. There is also a jump in NSS marriages in 2008 because California legalized same-sex marriage, and couples rushed from all over the country to marry.

Lastly, these groups are the intersections of two pairs of disjoint sets of couples: same-/different-sex and mixed-/same-citizenship. I also group couples by another couple-level binary variable for robustness checks—for example, an indicator for receipt of a federal transfer benefit, health insurance type, or moving within the past year.

3 Method

Ideal data to estimate the effect of spousal visa access on coupling and marriage rates would include respondents' sexual orientation. The coupling rate for a given couple type is the number of individuals y_{gst} in couple type g, in state s, and year y divided by the relevant subpopulation pop_{gst}. The relevant subpopulation for same-sex couple types (MSS, NSS) is the population of same-sex attracted individuals ($y_{MSS,st} + y_{NSS,st} +$ same-sex attracted singles). Similarly, for different-sex couples. So $\ln(\frac{y_{gst}}{pop_{gst}})$ is the ideal outcome variable.

I employ a difference-in-differences-in-differences design to identify the policy's average treatment-on-the-treated (ATT) effect. The DDD design removes selection bias from aggregate same-sex coupling patterns and aggregate mixed-citizenship coupling patterns. NSS and MDS coupling rates create a counterfactual MSS coupling rate, which the design removes. This leaves variation specific to MSS couples alone. The design uses indicator variables for post-treatment $post_t$, mixed-citizenship M_g, same-sex SS_g, and group-state fixed effects σ_{gs} and year fixed effects τ_t.

Start with the ideal regression model. Notice that fixed-effects σ_{gs} and τ_t absorb the subpopulations pop_{gst} when they have common growth rates:

$$\ln(\frac{y_{gst}}{pop_{gst}}) = \beta_0 M_g \times post_t + \beta_1 SS_g \times post_t + \beta_2 M_g \times SS_g \times post_t + \sigma_{gs} + \tau_t + \epsilon_{gst}, \tag{1}$$

$$\ln(y_{gst}) = \beta_0 M_g \times post_t + \beta_1 SS_g \times post_t + \beta_2 M_g \times SS_g \times post_t + \tilde{\sigma}_{gs} + \tilde{\tau}_t + \epsilon_{gst}. \tag{2}$$

Where ϵ_{gst} are standard errors clustered at the group-state level. σ_{gs} and τ_t subsume the intercept and indicator variables post_t, M_g, SS_g, and $\mathrm{M}_g \times \mathrm{SS}_g$. $\tilde{\sigma}_{gs}$ and $\tilde{\tau}_t$ additionally subsume $pop_{gst} = pop_{gs} growth\_rate_t$.

I cannot estimate Equation (1) because the sexual orientation of singles is unobserved. Likewise, I cannot estimate Equation (2) and maintain a balanced panel because $\ln(y_{gst})$ is not defined when $y_{gst} = 0$, which is frequent for MSS couples in small states. To handle this, I consider the log conditional mean function $\ln E[y_{gst}|x_{gst}]$ instead of the conditional mean of the log: $E[\ln y_{gst}|x_{gst}]$, as in Equation (2). (x_{gst} are the right-hand side variables.) Bringing the logarithm operator outside the expectation is a Poisson model, which is not mathematically equivalent. However, Poisson is conceptually similar and better suited to count data than OLS (Wooldridge, 2001). The Poisson model has two advantages. First, it avoids transformations, like $\ln(y + 1)$, that are not readily interpretable (Wooldridge, 2001) and can yield incorrect estimates (Cohn, Liu and Wardlaw, 2022). Second, it maintains a balanced panel and representativeness for all states. This avoids restricting the sample to large states or complicating interpretation. Both unbalanced panels and covariates can complicate interpretation (Borusyak, Jaravel and Spiess, 2022).

I estimate a Conditional Fixed Effects Poisson regression model of Hausman, Hall and Griliches (1984) by Quasi-Maximum Likelihood to identify the effect of access to spousal visas on coupling and marriage rates, as follows:

$$\ln(E[y_{gst}|\mathbf{x}_{gst}]) = \beta_0 M_g \times post_t + \beta_1 SS_g \times post_t + \beta_2 M_g \times SS_g \times post_t + \sigma_{gs} + \tau_t. \tag{3}$$

Equation (3) is this paper's primary regression model. β_2 is the coefficient of interest. It is the DDD estimator for the ATT. $\exp(\beta_2)$ is the incidence rate ratio (IRR) of the increase in the MSS-coupled rate relative to the increase in the NSS-coupled rate, net of the same ratio for different-sex-coupled rates.

The Conditional Fixed Effects Poisson model partials out the dimension of fixed effects that grow arbitrarily large. So σ_{gs} are not estimated. τ_t are finitely many fixed effects, not partialled out. The estimation procedure requires post_t in the model to maintain convexity. I include post_t in the model and some τ_t with $t \geq 2013$ automatically drops out. It does not matter which post-period year fixed effect τ_t drops out; the results are identical.

I estimate the model using quasi-maximum likelihood. Therefore, estimates are consistent, assuming the mean of the dependent variable is correctly specified (Gourieroux, Monfort and Trognon, 1984; Wooldridge, 1999). That is, Quasi-Maximum Likelihood Estimation (QMLE) for Poisson regression does not assume the mean and variance are equal[5]. Instead, Quasi-MLE computes the variance/covariance matrix using the outer product of the gradient vector—the Hessian. These QMLE robust standard errors do not assume a Poisson distribution, are robust to arbitrary patterns of serial correlation (Wooldridge, 1999), and are, therefore, not subject to the issues explained by Bertrand, Duflo and Mullainathan (2004) concerning difference-in-differences inference. I cluster the standard errors at the group-state level in all specifications.

I test if the model correctly specifies the mean of the dependent variable with a RESET test (Ramsey, 1969; Wooldridge, 2001). This test adds the square and cube of the fitted values from Equation (3) into the regression. Specifically, I estimate:

$$\begin{aligned}\ln E[y_{gst}|\mathbf{x}_{gst}] =& \beta_0 M_g \times post_t + \beta_1 SS_g \times post_t + \beta_2 M_g \times SS_g \times post_t + \sigma_{gs} + \tau_t \\ &+ \psi_1 \ln^2(\hat{y}_{gst}) + \psi_2 \ln^3(\hat{y}_{gst}).\end{aligned} \tag{4}$$

Then test that $\psi_1 = \psi_2 = 0$. I report these χ^2-statistics and their p-values.

The DDD design assumes the groups have parallel pre-trends.[6] Conceptually, Ghanem, Sant'Anna and Wüthrich (2022) show that non-separable models' pre-trends are parallel when the conditional means of the demeaned untreated potential outcome are stable across time. Formally, $E[Y_{gs,t=pre}(0) - E[Y_{gs,t=pre}(0)]|\sigma_{gs}] = E[Y_{gs,t=post}(0) - E[Y_{gs,t=post}(0)]|\sigma_{gs}]$, for a fixed $g \in \{\text{MSS}, \text{NSS}, \text{MDS}, \text{NDS}\}$. Hence, I assume the unobserved components of potential coupling or marriage rates are equal in conditional expectation in each period.

I estimate a DDD event study specification to test the parallel pre-trends assumption. The DDD event study also provides insight into how the effects evolve over time. Specifically,

[5]The Poisson probability distribution has the property of equal mean and variance and the generic MLE Poisson regression assumes this.

[6]Specifically, I assume parallel pre-trends holds in log counts. Parallel pre-trends are unlikely to hold under any arbitrary monotonic transformation (Roth and Sant'Anna, 2022). The Poisson model is ideal for count data, and the RESET test fails to reject that the model is correctly specified.

I estimate the following:

$$\ln E[y_{gst}|\mathbf{x}_{gst}] = \sum_{k=2008}^{2019} \delta_k M_g \times 1\{t=k\}_t + \sum_{k=2008}^{2019} \gamma_k SS_g \times 1\{t=k\}_t \qquad (5)$$
$$+ \sum_{k=2008}^{2019} \beta_k M_g \times SS_g \times 1\{t=k\}_t + \sigma_{gs} + \tau_t,$$

where β_{2012}, γ_{2012}, δ_{2012}, τ_{2012} are omitted, then test that

$$\beta_{2008} = \beta_{2009} = \beta_{2010} = \beta_{2011} = 0. \qquad (6)$$

For Poisson regression, the pre-trends test yields a χ^2-statistic. I report the test statistics and their p-values.

3.1 Marriage Specification

I estimate Equation 3 for couples married between 2008 and 2019 and surveyed between 2012 and 2019. As mentioned above, Census recoding practices prevent observing same-sex couples' marriage years before 2012. So this sample selects on marriage duration. Instead of Survey Year, t represents Marriage Year.

Ordering couples by their marriage year (omitting unmarried couples) instead of the survey year is valuable for two reasons. First, the marriage year estimates identify the effect of spousal visa policy on marriage rates. Second, they represent a *flow* into marriage. Whereas the survey year estimates capture changes in the *stock* of couples. The DDD event study estimates from the marriage specification, therefore, inform whether the relative flow into mixed-citizen same-sex couples is temporary or persistent, which is crucial for understanding the policy.

3.2 Robustness

I include covariates in both the main specification, described by Equation (3), and the DDD event study, described by Equation (5). Including covariates provides suggestive evidence about the channels through which the policy can operate. I choose covariates that can plausibly mediate the effect of federal marriage benefits. Specifically, group-state-year population shares for couples: with transfer benefits (food stamps, welfare, Social Security, and Supplemental Security Income), with health insurance (employer, private, public, purchased, other), that recently jointly moved (from abroad, between states, within state), where one partner recently moved (from abroad, between states, within state), and where a partner is a recent arrival or born in China, India, Mexico, or the Philippines. I also choose state-year demographic covariates that are plausible confounders: individual population shares for male, white, Hispanic, black, non-citizen, naturalized, student, active-duty military, welfare or foodstamp receipt, and age categories (18-24, 25-34, 35-44, 45-54, 55-64, $\geq$65); and the proportion of unmarried different-sex cohabiting couples.

Covariates, however, complicate and change the interpretation. Without covariates, β_2 is the total effect of access to federal marriage benefits. With covariates, β_2 is the effect of access to federal marriage benefits conditional on the covariates. If the covariates are mediators, this is the effect that does not operate through the channel represented by the covariates. However, these covariates could be the outcome of the policy and, therefore, induce selection bias. Even without selection bias, the covariates also restrict the interpretation of β_2. β_2 is the ATT for the subgroups that do not experience changes in the covariates (Ghanem, Sant'Anna and Wüthrich, 2022). Given the restricted interpretation and possible selection bias, the model without covariates is the primary specification of interest.

I also directly test that federal marriage benefits affect coupling through channels other than spousal visa policy. Instead of using a mixed-citizen indicator variable M_g, I change the specification to measure relative increases in same-sex couples with a different attribute A_g. If the policy change causes couples to form to access a specific benefit, then this specification measures that directly:

$$\ln(E[y_{gst}|\mathbf{x}_{gst}]) = \beta_0 A_g \times post_t + \beta_1 SS_g \times post_t + \beta_2 A_g \times SS_g \times post_t + \sigma_{gs} + \tau_t. \quad (7)$$

For heterogeneity analyses, I split the sample and run separate regressions. For state-level heterogeneity, I leave years unchanged. However, I split the individual-level data within state-years for birth country, age, and gender heterogeneity. This increases the number of zeros and decreases precision. To increase precision, I combine years for these individual-level splits. 2008 and 2019 are unchanged; however, I combine these pairs into one: 2009/2010, 2011/2012, 2013/2014, 2015/2016, and 2017/2018.

For heterogeneity by birth country, it is not interesting to consider same-citizenship couples because they are virtually all born in the United States. Therefore, I estimate Equation (7) but restrict the sample to individuals in mixed-citizenship couples only. In this case, A_g indicates a characteristic of the non-citizen's birth country.

4 Results & Discussion

4.1 Main Results

Table 2 reports the estimated model described by Equation (3). The triple interaction is the coefficient of interest and exponentiating it gives the Relative IRR reported at the bottom of the table. The Relative IRR estimates the average treatment effect of spousal visa policy for mixed-citizenship same-sex coupled rate. The table also reports statistics and p-values for a RESET misspecification test and a parallel pre-trend test, described by Equations (5) and (4). Each column corresponds to a different set of covariates. The first column has none, and subsequent columns contain a set of covariates indicated by an X. As discussed above, the primary specification of interest includes no covariates because covariates can induce bias and restrict the interpretation of the ATT to a subset of the treated sample. Figure 2 plots the DDD event study estimates, described by Equation (5).

The rate at which same-sex attracted individuals are in mixed-citizenship couples increases 0.304 log points. The relative IRR is 1.355 with a standard error of 0.072. This represents a 35.5% increase in the mixed-citizenship same-sex coupled rate for same-sex attracted individuals, statistically significant at the 1% level. The χ^2-statistic for the RESET test, described by Equation (4), is 2.764, which fails to reject the assumption of a correctly specified mean. The χ^2-statistic for the pre-trends test, described by Equation (6), is 3.174, which fails to reject the assumption of parallel pre-trends.

Pre-period estimates appear stable, and post-period estimates trend upwards in Figure 2a. The steady increase in MSS coupling indicates higher net couple formation. Higher net couple formation results from decreased dissolution or increased formation. Hence, this result suggests fewer marginal dissolutions resulting from immigration policy and greater marginal formations resulting from the higher value of MSS coupling. The higher formation is consistent with the slow increase in couples because deciding to move in together is a long process. Conversely, marriage fraudsters seeking visas rather than companionship would move in immediately. That would appear as a jump in the coupled rate, contrary to the results in Figure 2a.

Table 3 reports the estimated model described by Equation (3), where year represents the year of marrying. Access to spousal visa policy causes the annual mixed-citizenship same-sex marriage rate to increase by 0.540 log points. The relative IRR is 1.716 with a standard error of 0.307. This represents a 71.6% increase in mixed-citizenship same-sex marriages, statistically significant at the 5% level. The χ^2 statistic for the RESET test is 3.167, which fails to reject the assumption of a correctly specified mean. The χ^2 statistic for the pre-trends test is 0.457, which fails to reject the assumption of parallel pre-trends.

Figure 2b plots the DDD event study estimates. The 2008 estimate is off-trend because a disproportionate number of same-citizenship same-sex marriages occurred when California legalized same-sex marriage that summer. In 2013, the estimates jump to a permanently higher level. This is consistent with non-permanent residents gaining the right to marry a same-sex partner without visa penalties.

For both Tables 2 and 3, the first column is the primary specification of interest. Subsequent columns include covariates. These estimates provide suggestive evidence regarding channels other than spousal visa access. Since the main estimates do not become insignificant, these alternative channels likely do not explain the results. I further test and discuss alternative channels below.

A caveat to consider while interpreting the results is double counting. Suppose every citizen partner of a new MSS couple would have had a citizen partner who is now partnerless. Then the number of NSS couples decreases by precisely the number of MSS couples. The converse is also possible. Suppose each citizen partner of a new MSS couple would have been single, and citizens who previously would have a non-citizen partner must find a citizen partner. Then the number of NSS couples increases by precisely the number of MSS couples. A back-of-the-envelope calculation[7] suggests that these extreme cases of reallocation in the market for romantic partners could over- or under-estimate the actual effect by 7%. For the couple rate, double counting could inflate it from 33% or deflate it from 38%. I also test for possible double counting by estimating a difference-in-differences specification with mixed-citizenship couples only because switching between same-sex and different-sex partners is unlikely. This yields an estimate of 95.5% (Table A25), likely due to contemporaneous increases in same-sex coupling. I also re-estimate the main specification restricting to non-citizens only. Since a similar number of MSS- and NSS-coupled individuals are non-citizens, if double counting occurs, the estimated effect should be substantially larger in this restricted sample. However, the estimate is quite similar at 37.4% (Table A25).

[7]If the groups have equal size, then double-counting could double or halve the estimates. However, the groups have different sizes. In Table 1, there are $9,034$ MSS-coupled individuals and $149,138$ NSS-coupled individuals. If there are 35.5% more MSS-coupled individuals (Table 2) in the post-period than the pre-period, then there could be $1.355/(1 + 1.355) \times 9,034 = 5,197$ fewer NSS-coupled individuals. That corresponds to approximately $5,197/(149,138/2) = 6.97\%$ fewer NSS-coupled individuals in the post-period. Accounting for this would yield an estimate of 33.0%. Conversely, if the market reallocates partners oppositely, the estimate would become 37.97%.

4.2 Alternative Explanations

The DDD design accounts for aggregate changes in both same-sex couples and mixed-citizenship couples. A credible explanation for the results must explain why mixed-citizenship same-sex couples are differentially affected. For example, same-sex couples gain access to spousal visas, but spousal visas matter to mixed-citizenship couples only, so mixed-citizenship same-sex couples are differentially affected. I explore a variety of alternatives. However, few other explanations offer a credible justification for the differential treatment effect of MSS couples, and I find no evidence to support them.

I test the credibility of alternative channels in several ways, primarily by including covariates in the main specification and by estimating the policy's effect on different types of couples, as described by Equation (7). Table 4 reports these estimates.[8] Because the covariates represent couples' characteristics in the survey year, the marriage year specification conditions on possible outcomes. Hence, Columns 2 to 5 in Table 3 are solely suggestive. These estimates with covariates are significantly larger in magnitude, which does not indicate that these alternative channels are important. If anything, transfer benefits, insurance, and moving are downstream outcomes of spousal visa access.

Transfer Benefits and Health Insurance

Other federal transfer benefits and health insurance incentivize couples to form and marry. However, including the share of couples with transfer benefits (Column 2) or health insurance (Column 3) in Table 2 does not statistically significantly change the coefficients of interest. These incentives likely matter less for MSS couples because they are positively selected, as shown in Table 1. This is not unexpected because same-sex couples, in general, are positively selected, especially on education (Black, Sanders and Taylor, 2007; Badgett, Carpenter and Sansone, 2021). Table 4 shows there is no differential same-sex coupling by transfer receipt or health insurance.

Moving Across State Lines

Same-sex couples or same-sex attracted individuals might move between states to access state-level marriage benefits. I include the share of coupled individuals who moved within the past year as covariates in the main regression specification. Moves are within a state, between states, and from abroad. Column 4 in Table 2 shows that including these covariates

[8]The appendix contains additional disaggregated estimates for transfer benefits (Table A9), health insurance (Table A10), both partners moving (Table A11), one partner moving (Table A12), and heterogeneity by non-citizens' birth countries (Table A13).

do not statistically significantly change the coefficient of interest. Table 4 indicates there is no differential same-sex coupling by joint or one-partner moves across state lines within the past year.

Same-Sex Marriage Legalization

Same-sex marriage legalization increases the number of same-sex marriages (Dillender, 2014; Carpenter, 2020; Carpenter et al., 2021). Despite differencing out changes that happen for same-citizenship same-sex couples, does variation in the timing of same-sex marriage legalization differentially affect mixed-citizenship couples? Many states legalized same-sex marriage in 2013, including California's re-legalization. Omitting California does not change the results (Table A14). Likewise, results for early ($\leq$2012) and late (2015) legalization states are statistically similar to each other and the main effect (Table A15).

Deferred Action for Childhood Arrivals

Contemporaneous changes to immigration policy, including the Deferred Action for Childhood Arrivals (DACA), made it easier for illegally present immigrants to adjust their immigration status. For non-residents, marrying a citizen requires an immigration status adjustment. However, there is little state-level heterogeneity by the non-citizen population share or by the illegally-present-immigrant non-citizen share (Table A15). (Estimates for illegally-present immigrant numbers are from Van Hook et al. (2014).) Thus illegally present immigrants do not account for the results.

Stigma

One limitation is the unobserved stigma against same-sex couples, which fell during the study period. Stigma could lead to closeted cohabiting couples differentially responding as "roommates" in earlier years. However, the absolute change in unmarried same-sex two-roommate households cannot account for the main effect (Figure A1). Estimating Equation (3) on unmarried individuals in two-roommate households shows a slight upward trend in MSS roommates (Table A16)—the opposite of what could account for the main effect. Similarly, same-sex couples with additional adults in the household are not more likely to form after the policy change (Table A17). Lastly, if genuine couples previously misreported themselves as roommates, then later truthfully reported themselves as romantic partners, moving (within-state) should not increase. However, consistent with couple formation, same-sex couples are more likely to move within-state after the policy change (Tables A11 and A12).

4.3 Mechanism

When non-permanent residents gain access to marriage, they marry their citizen partners. In response, the MSS marriage rate immediately jumps in Figure 2b. After the policy change, visa status does not prevent marriages, and marriage offers visa benefits. MSS couples are relatively more attractive and less likely to dissolve under immigration pressure. Individuals date and eventually move in together; this shows up as the slow increase in the coupled rate in Figure 2a. If immigration pressures dissolve numerous MSS couples per year, then removing that pressure could lead to a jump in the coupled rate, although that does not appear to happen. This increase in MSS couples then sustains the higher MSS marriage rate. If the marriage rate were purely due to pre-existing couples marrying, that relative rate would fall back to zero.

Additional empirical evidence is consistent with the increase in MSS couple formation. Same-sex couples are more likely to move within-state after the policy change (Tables A11 and A12), presumably to be together or start a family. Likewise, the effects for younger individuals are double those for older individuals (Table A18), likely because younger people are more actively seeking a relationship.

When I restrict the sample of non-citizens to those who arrived before the policy change, I find a bigger increase in marriage rates, consistent with pre-existing couples gaining access to marriage (Table A19). The coupled rate increase is more modest, consistent with non-citizens having a partner already or facing higher search costs forgoing a partner.

Fraud

Net MSS couple forming increased because the relative net benefits of MSS pairings increased. Did the policy change create more MSS couples that form long, loving relationships, or are these couples cohabiting and marrying merely to access spousal visas? Marrying merely for visas constitutes visa fraud, as described in section 1.3. When the policy changes, both spousal visas and same-sex marriage legalization are salient. For example, there are TV shows and movies about spousal visas; and same-sex marriage is a hot political topic. *United States v. Windsor* makes headlines, and marriage fraudsters have a new option. Couples who merely want spousal visas move in together to convince immigration officers that marriages are *bona fide*, creating a jump in the MSS coupled rate. However, there is no jump in the coupled rate, suggesting couples are not merely forming to access spousal visas.

I consider additional empirical evidence to probe for marriage fraud. First, I consider heterogeneity by non-citizens' birth countries. Specifically, I test four country characteristics that could make marriage fraud relatively attractive: illegal same-sex marriage, illegal same-sex attraction, low income, and constraining visa caps that delay immigration. These first three attributes incentivize people to leave, while the last creates an incentive to find a new pathway to immigrate. I estimate Equation (7) with mixed-citizenship couples only, where A represents one of the four country attributes. None of the estimates are statistically significant at the 5% level (Table A13). The magnitudes suggest new MSS-coupled non-citizens are 19% more likely from a country facing visa caps but 39% more likely from a country with legal homosexuality. Visa caps bind when immigration is frequent, this is the case for China, India, Mexico, and the Philippines. However, non-citizen same-sex spouses are disproportionately unlikely to be born in one of these countries, apart from the Philippines (Table A5). Controlling for the share of non-citizen partners born in these birth countries does not change the outcome in the primary specification (Table 2). The general increase in MSS-coupled individuals dwarfs the gain from these four countries. Moreover, the growth does not come from citizens facing persecution for their sexual orientation. These results are not consistent with a story of marriage fraud.

Second, I re-estimate the main specification, Equation 3, restricting non-citizens to those who arrived before 2013 (Table A19). They did not move to the United States seeking a spousal visa with a same-sex spouse because it was not possible. Nevertheless, the MSS marriage rate for pre-2013 arrivals jumped by 86.5%, higher than the overall estimate. This is consistent with pre-existing couples marrying once they can. I also re-estimate the main specification restriction to non-citizens who arrived in the past three years (Table A20). These non-citizens are less likely to have permanent residency and, therefore, be more likely to benefit from a spousal visa. The MSS marriage rate for non-citizens who arrived in the past three years increases by 61% but is not statistically significant. This smaller effect size suggests that the non-citizens who had more time to date and form couples are driving the increase in marriages.

The MSS-coupled rate for pre-2013 arrivals increased by 13.8%, lower than the primary estimate (Table A19). This is consistent with newer arrivals forming a larger share of the recently formed couples, which is compatible with both mechanisms of loving relationships and marriage fraud. However, the MSS-coupled rate for recent arrivals is suspiciously large at 147% (Table A20), and parallel pre-trends do not hold. This suggests that recently-arrived non-citizens are increasingly open to same-sex coupling. If fraud drives these coupling increases, they should carry through to the marriage results. However, since the marriage estimates are smaller for post-2013 and recent arrivals, these results are inconsistent with marriage fraud driving the results.

Third, non-citizens without any visas may seek spousal visas to gain legal status. I re-estimate the main specification, Equation 3, splitting states by their share of non-citizens that are illegally present. I do not find evidence of heterogeneity (Table A15). This is inconsistent with marriage fraud among undocumented non-citizens.

Mail-Order Spouses

Instead of meeting non-citizens through conventional means, are citizens importing spouses? If so, the relative number of non-citizen partners who lived abroad in the past year should increase. However, it does not (Table A12). This suggests that "mail order" spouses are not a meaningful channel for spousal visas to increase couple formation and marriage.

Couples Living in Exile

The Netherlands, Belgium, and Canada were the first countries to legalize same-sex marriage, more than ten years before *United States v. Windsor*. Several other European and Latin American countries also legalized same-sex marriage before 2013. Did MSS-coupled United States citizens who lived abroad repatriate after the policy change? If so, there should be an increase in MSS couples who jointly lived abroad in the past year. However, this is not the case (Table A11), which suggests that couples living in exile do not drive the results.

Couples Living Apart

Partners meet and date before moving in together. So moving in could reflect an increased relative incidence of MSS dating or MSS couples that "live apart" deciding to live together. I do not observe when couples meet or how long they have dated. Therefore, I cannot distinguish between these two channels. However, couples previously living apart likely do not account for the full result for two reasons. First, Carpenter and Gates (2008) estimate that $10 - 11\%$ of gay men and lesbian women have a same-sex partner but do not live together. If this proportion is similar for both MSS and NSS couples and only MSS couples living apart moved in together, that accounts for a third of the increase. Second, suppose MSS couples decide living apart is no longer worth it (maybe because a spousal visa gives them the flexibility to move or because living together is an implicit condition for a spousal visa). In that case, they should move in relatively quickly. However, the relative incidence of MSS couples does not jump in 2013. Instead, it slowly increases (Figure 2a).

4.4 Downstream Outcomes

Spousal visa access increases the mixed-citizenship coupled and marriage rates for same-sex attracted individuals. This can affect downstream outcomes in three ways: demographic accounting, the market for romantic partners, and specific benefits of spousal visas. More specifically, with more MSS couples, same-sex couples will more closely resemble MSS couples by accounting for the demographic change. With more entrants and new benefits to marriage, the romantic partner market reallocation can change the characteristics of same-sex couples. Lastly, the benefits of spousal visas may affect the attributes of same-sex couples directly—for example, increased marriage and naturalization.

Assortative Mating

The increase in MSS-coupled individuals naturally increases the proportion of same-sex couples with characteristics common to MSS couples. MSS couples are more disassortatively matched than NSS couples by citizenship, by definition, and by birth country, race, education, and age (Table A2). I estimate Equation (7) where the attribute A represents discordant birth countries (domestic, abroad), discordant race (non-Hispanic white, Hispanic white, black, other), an education gap of three or more years, or an age gap of five or more years. Table 5 presents the results. Spousal visa access leads to downstream increases in disassortative mating by birth country by (10.6% and race by (7.0%), although the latter is insignificant. However, the coefficients point to greater assortative mating by education by 4.6% and age by 7.3%. The education estimate is not statistically significant. The age estimate is significant at the 1% level; however, the parallel pre-trends test rejects the assumption at the 10% level.

Increases in MSS couples can mechanically explain the increased disassortativeness by birth country and race. However, that cannot explain increased assortative mating by education and age. This suggests that same-sex couples match more closely on education and age. If we think of couples as maximizing (market and home) income or creating household goods, then closer matching on education can indicate higher total production (Becker, 1974) or higher investment in household goods (like children) (Lafortune and Low, 2020). Thus these pairings are of higher quality. Closer matches on education and age can also reflect a thicker market at work or school (Mansour and McKinnish, 2014), perhaps resulting from decreased stigma. Since spousal visa access enables greater marriage market participation, this assortative mating increase could be a downstream effect of *United States v. Windsor*.

Immigrants' Characteristics

Non-citizens that gain a citizen partner also hold Green Cards, which bestow the right to work, study, or do neither and enjoy leisure. Do non-citizens enter or leave the workforce? Wang (2021) finds non-permanent residents may be in indentured servitude, although marrying a citizen does not increase job switching. More broadly, spousal visa holders are negatively selected because they typically cannot acquire a work visa Jasso, Rosenzweig and Smith (2000); Guven, Tong and Yuksel (2020). Hence, spousal visa access could increase or decrease non-citizens' labor supply.

To probe this, I estimate Equation (7) and split couples by an attribute A indicating exactly one partner employed, in the labor force, or school, or that both partners speak English very well. Table 6 presents these results. Overall, there are no changes in the share of same-sex couples with precisely one partner employed or in the labor force. This result suggests that MSS couple formation does not affect overall labor supply decisions for same-sex couples on the extensive margin. Likewise, the share of same-sex couples with one partner in school is unchanged. The labor supply and school results suggest that non-citizens switching from work or study visas does not lead to changes in the share of couples with one working or studying partner. Finally, there is no change in the proportion of same-sex couples who both speak English very well. This result is not self-evident because greater MSS coupling could plausibly lead to more couples where one partner faces a linguistic disadvantage in the labor market. However, this does not appear to be the case.

Naturalization

Non-citizens married to citizens have a higher naturalization rate than other non-citizens (Dziadula, 2020). Does that mean spousal visa access causes more naturalizations? A definitive answer requires observing the grounds for naturalization. However, I do not observe visa types or an individual's naturalization process. Therefore, I cannot distinguish if naturalizations among same-sex couples increase due to their greater numbers or spousal visa access. More same-sex married couples can deterministically lead to more naturalizations for same-sex spouses. On the other hand, spousal visas make naturalization possible after three years instead of five. The number of new citizens married to same-sex citizens for at least three years increases absolutely (Figure A8). Hence there are more same-sex married naturalized citizens. New citizens married to same-sex citizens also increases relative to other same-sex couples (Figure A9a). This is consistent with a general increase in same-sex marriage among those who will naturalize. It is also consistent with increased naturalization among those who marry a same-sex partner due to spousal visa policy.

4.5 Heterogeneity

As mentioned above, I check for treatment effect heterogeneity by the state of residence and non-citizens' birth countries. The results are not noteworthy. Heterogeneity by birth country or state of residence is statistically insignificant (Tables A13 and A15). I also check for heterogeneity by two fundamental demographic characteristics: age and sex. I find the effect of spousal visa access is larger in magnitude for younger people than older people, but the difference is statistically insignificant (Table A18).

Similarly, I find the point estimates for men are larger than those for women (Table A21). However, they are statistically different for coupling but not marriage, which are less precise. These results indicate that spousal visa access affects same-sex attracted men more than same-sex attracted women.

It is unclear why this pattern emerges. I speculate three possible explanations. First, same-sex coupled men generally match more disassortatively than same-sex coupled women, notably by race (Jepsen and Jepsen, 2002; Ciscato, Galichon and Goussé, 2020). I also observe this in my data (Table A6). Men's greater general propensity to match disassortatively could explain their larger increase in MSS coupling. Understanding this broad difference in homogamy requires further research.[9]

Second, differential stigma and opportunity: same-sex attracted men may face more stigma and higher opportunity costs of remaining abroad or in an immigrant community relative to same-sex attracted women. Likewise, men may have an easier time leaving their community behind than women. Hence, same-sex attracted men may differentially immigrate or leave their immigrant communities. Marrying a citizen can facilitate that or be an outcome of that. Probing the costs and benefits of leaving immigrant communities and the role of sexual orientation is beyond the scope of this paper.

Third, geographic sorting: same-sex attracted men may live in areas with more non-citizens relative to same-sex attracted women. There is some empirical evidence for geographic sorting. 93% of MSS-coupled men live in metropolitan areas compared to 90% of women, and 87% of NSS-coupled men live in metropolitan areas compared to 82% of women (Table A7). Likewise, a quarter of non-citizens live in California, and NSS-coupled men are 35% more likely to live in California than women (Table A8). I re-estimate Equation (3) splitting the sample by metropolitan status (Table A22). For urban couples, the effects are similar to the primary estimates. For non-urban couples, the coupling estimate is larger but insignificant and less precise, and the marriage estimate is virtually zero.

[9] Men face higher costs of having children together, which is the canonical household public good. Therefore, men may differentially substitute children for other household public goods that could be contingent upon an age gap or other differences.

5 Conclusion

Congress passed the Defense of Marriage Act as a symbolic stand against the extension of marital benefits to same-sex couples. However, the Defense of Marriage Act was not merely symbolic. Instead, it lowered the mixed-citizenship coupled rate for same-sex attracted individuals. It tore mixed-citizenship same-sex couples apart by preventing their marriages and barring access to spousal visas. Simple calculations[10] suggest that DOMA separated 80,000 people from their same-sex partners and prevented nearly 50,000 people from marrying between 2008 and 2012. Thus, through immigration policy, DOMA caused some LGB individuals to suffer irreversible loss and prevented them from saying “I will always love you” by reallocating people to new partners or no partner.

The Supreme Court ruling in *United States v. Windsor* struck down DOMA, giving federal marriage benefits to same-sex spouses. In this case, the plaintiffs argued that same-sex spouses should receive the same preferential treatment in the federal tax code as different-sex spouses. However, the consequences of *United States v. Windsor* go far beyond taxes. The resultant spousal visa access caused the mixed-citizenship coupled rate for same-sex attracted individuals to increase by 36%, and their marriage rate increased by 72%. Extrapolating these effects to the broader population suggests approximately 1.5 million people have their current partners directly thanks to spousal visas, according to back-of-the-envelope calculations[11]. Spousal visas can improve average match quality indirectly by making the romantic partner market thicker.

This paper shows that immigration policy can be marriage policy, using novel variation to estimate the impact of spousal visa access on coupling and marriage. Our understanding of immigration laws’ effects on household formation and decision-making requires further research, especially in light of the prominent effects in this paper. As policymakers and the general public debate immigration law and its reform, they should consider its implications for families, citizens, and their well-being.

[10] An estimated $65,825$ people marry a mixed-citizenship same-sex partner from 2008 to 2012, based on the 2012-2019 ACSs. After DOMA, there are 1.716 times more marriages. So $65,825 \times 0.716 = 47,131$ people are prevented from marrying. Similarly, there are $233,489$ mixed-citizenship same-sex coupled individuals sampled from 2008 to 2012 in the ACS. After DOMA, there are 1.355 times more couples. So $233,489 \times 0.355 = 82,889$ people were prevented from forming a couple.

[11] Take the estimate in Table 2 as the true population effect. Then the proportion of mixed-citizenship couples benefiting from a spousal visa is $0.355/1.355 = 0.26$. There are $5,729,983$ mixed-citizenship coupled individuals estimated from the 2019 ACS. So $5,729,983 \times 0.26 = 1,489,796$ people benefit from a spousal visa.

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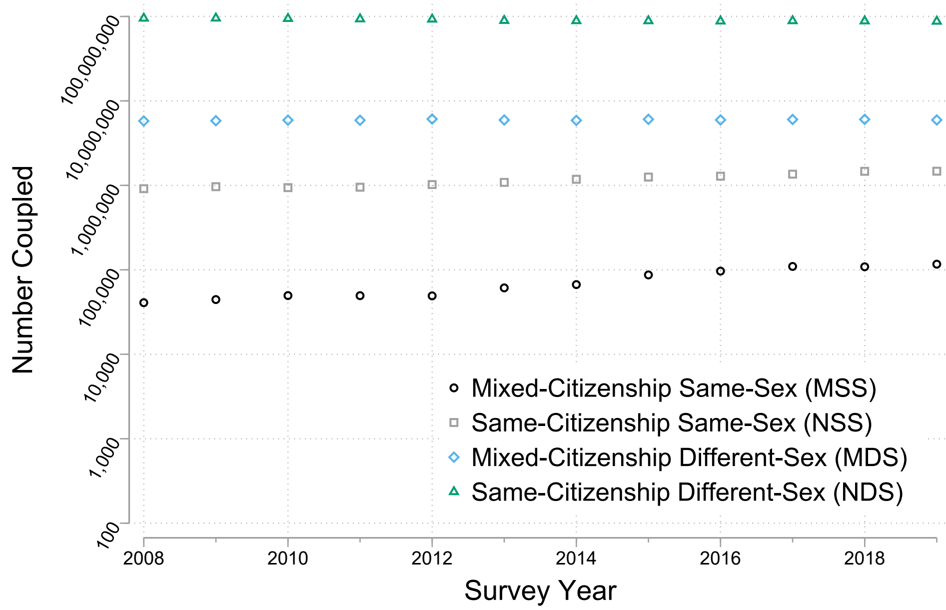
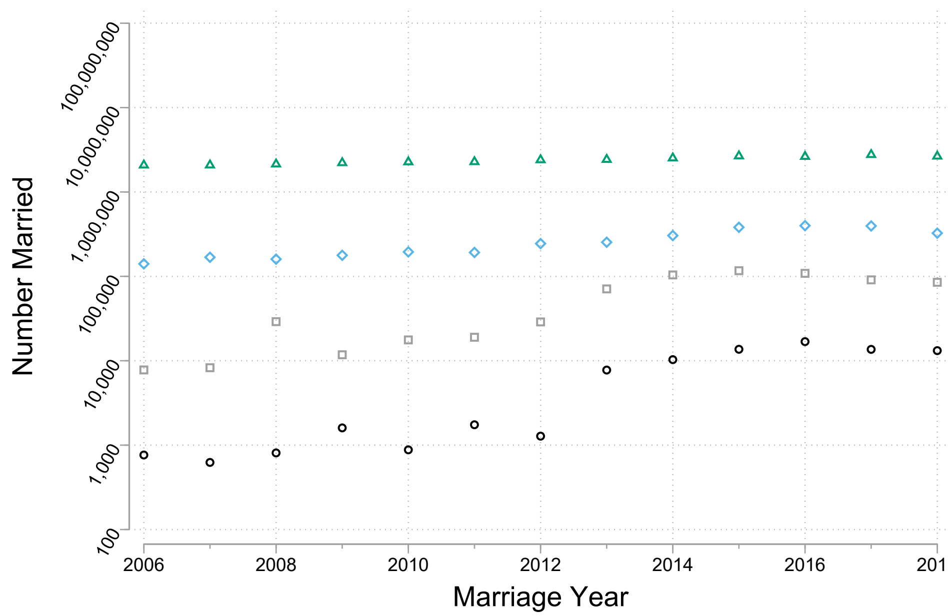
Table 1: Individual-Level Summary Statistics

	MSS	NSS	MDS	NDS
Age	40.62	43.06	41.39	44.79
	(10.62)	(11.70)	(10.72)	(11.53)
Male	0.66	0.47	0.50	0.49
	(0.47)	(0.50)	(0.50)	(0.50)
Years of Education	14.43	14.77	12.76	13.95
	(3.53)	(2.56)	(3.95)	(2.82)
Non-Citizen	0.51	0.02	0.51	0.07
	(0.50)	(0.14)	(0.50)	(0.25)
Married	0.53	0.33	0.90	0.88
	(0.50)	(0.47)	(0.29)	(0.33)
Any Transfer	0.14	0.20	0.18	0.18
	(0.34)	(0.40)	(0.38)	(0.39)
Any Insurance	0.91	0.95	0.84	0.92
	(0.28)	(0.21)	(0.37)	(0.26)
Couple Moved to New State	0.03	0.03	0.02	0.02
	(0.16)	(0.16)	(0.15)	(0.14)
Partner Moved to New State	0.03	0.02	0.02	0.01
	(0.17)	(0.14)	(0.15)	(0.09)
One Partner Born Abroad	0.74	0.08	0.52	0.06
	(0.44)	(0.27)	(0.50)	(0.24)
Interracial Couple	0.41	0.21	0.20	0.10
	(0.49)	(0.41)	(0.40)	(0.30)
Educ Gap $\geq$ 3 Years	0.32	0.22	0.32	0.20
	(0.47)	(0.42)	(0.47)	(0.40)
Age Gap $\geq$ 5 Years	0.57	0.46	0.43	0.29
	(0.50)	(0.50)	(0.50)	(0.45)
One Partner Employed	0.31	0.25	0.42	0.33
	(0.46)	(0.43)	(0.49)	(0.47)
One Partner in LF	0.25	0.20	0.36	0.29
	(0.43)	(0.40)	(0.48)	(0.46)
One Partner In School	0.16	0.12	0.10	0.08
	(0.37)	(0.33)	(0.30)	(0.27)
Both Speak English Very Well	0.70	0.96	0.49	0.90
	(0.46)	(0.19)	(0.50)	(0.30)
Observations	9,034	149,138	639,427	11,429,990

This table reports means and standard deviations (in parentheses) for individuals in four couple types. The intersection of same- or different-sex and same- or mixed-citizenship determines the four couple types: mixed-citizenship same-sex (MSS), same-citizenship same-sex (NSS), mixed-citizenship different-sex (MDS), same-citizenship different-sex (NDS). The data are from the 2008-2019 rounds of the ACS.



(a) by Survey Year



(b) by Marriage Year

Figure 1: Number of Individuals by Couple Type

Each point is the population estimate for the number of individuals in a given couple type and year. The vertical axes depict the number of individuals on a logarithmic scale. The horizontal axes depict years. The intersection of same- or different-sex and same- or mixed-citizenship determines the four couple types. For survey years, each point is a population estimate, representing the United States population in a given survey year. For marriage years, each point represents the population married in a given year conditional on the marriages surviving until 2019; and is representative of the 2019 population.

Table 2: DDD Estimates For Coupled Rate

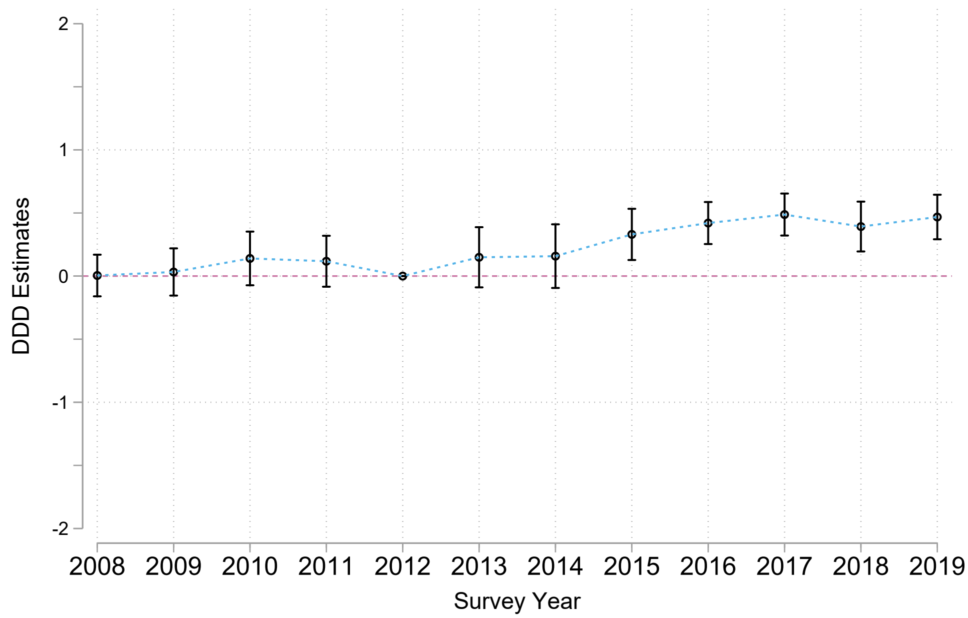
	Coupled Rate Per Adult					
post × M × SS	0.304	0.312	0.356	0.307	0.359	0.306
	(0.053)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
post × SS	0.367	0.357	0.313	0.363	0.310	0.366
	(0.018)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
post × M	0.074	0.065	0.024	0.071	0.021	0.069
	(0.015)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Transfer Benefits		X				
Health Insurance			X			
Moving				X		
Recent Arrival					X	
State Demographics						X
Observations	2,448	2,448	2,448	2,448	2,448	2,448
Log Likelihood	-666,781	-647,866	-534,274	-655,085	-552,346	-526,704
Relative IRR	1.355	1.367	1.428	1.359	1.432	1.358
SE	0.072	0.073	0.075	0.072	0.076	0.066
p-value	0.000	0.000	0.000	0.000	0.000	0.000
χ^2 RESET Test	2.764	2.189	3.557	3.040	1.385	0.411
p-value	0.251	0.335	0.169	0.219	0.500	0.814
χ^2 Pre-Trend Test	3.174	3.590	5.692	3.254	4.112	3.306
p-value	0.529	0.464	0.223	0.516	0.391	0.508

This table reports the Quasi-Maximum Likelihood estimates of the Poisson Conditional Fixed Effects model described by Equation (3). SS refers to same-sex coupled individuals, M refers to mixed-citizenship coupled individuals, and *post* refers to 2013 or later. The coefficient of interest is $post \times SS \times M$, and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 RESET Test line reports the statistics from the misspecification test described by Equation (4). The χ^2 Pre-Trend Test line reports the test statistic for the parallel pre-trends test described by Equation (6). Standard errors are in parentheses, clustered at the group-state level.

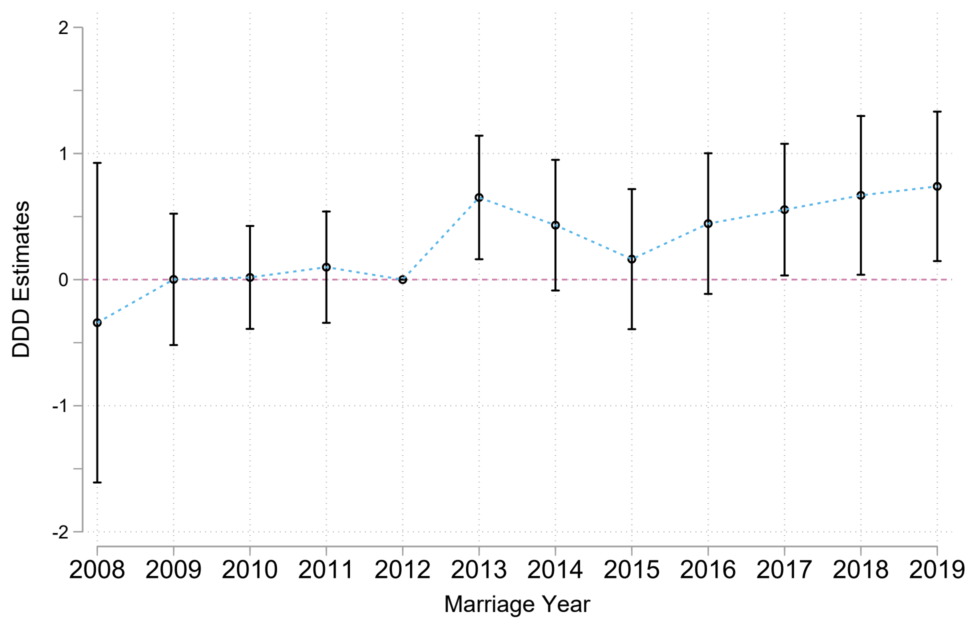
Table 3: DDD Estimates For Marriage Rate

	Marriage Rate Per Adult Per Year					
post $\times$ M $\times$ SS	0.540	1.238	1.400	0.997	1.351	0.531
	(0.179)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
post $\times$ SS	1.383	0.542	0.344	0.868	0.321	1.401
	(0.153)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
post $\times$ M	-0.008	-0.696	-0.854	-0.458	-0.807	0.005
	(0.015)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
Transfer Benefits		X				
Health Insurance			X			
Moving				X		
Recent Arrival					X	
State Demographics						X
Observations	2,436	2,448	2,448	2,448	2,448	2,448
Log Likelihood	-14,930,592	-7,369,073	-4,178,118	-7,004,612	-3,971,369	-3,264,687
Relative IRR	1.716	3.450	4.054	2.710	3.862	1.700
SE	0.307	0.624	0.709	0.486	0.702	0.319
p-value	0.020	0.000	0.000	0.000	0.000	0.028
χ^2 RESET Test	3.167	2.628	12.038	3.909	12.964	3.640
p-value	0.205	0.269	0.002	0.142	0.002	0.162
χ^2 Pre-Trend Test	0.457	0.451	0.372	0.529	0.392	0.459
p-value	0.978	0.978	0.985	0.971	0.983	0.977

This table reports the Quasi-Maximum Likelihood estimates of the Poisson Conditional Fixed Effects model described by Equation (3). SS refers to same-sex coupled individuals, M refers to mixed-citizenship coupled individuals, and *post* refers to 2013 or later. The coefficient of interest is $post \times SS \times M$, and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 RESET Test line reports the statistics from the misspecification test described by Equation (4). The χ^2 Pre-Trend Test line reports the test statistic for the parallel pre-trends test described by Equation (6). Standard errors are in parentheses, clustered at the group-state level.



(a) Coupled Individuals by Survey Year



(b) Married Individuals by Marriage Year

Figure 2: Dynamic DDD Estimates

This figure plots the Quasi-Maximum Likelihood estimates of the Poisson Conditional Fixed Effects model described by Equation (5), where time is either Survey Year or Marriage Year. I cluster standard errors at the group-state level.

Table 4: DDD Estimates For Coupled Rate - Alternative Channels

	Coupled Rate Per Adult			
	Any Transfer	Any Insurance	Joint Move	Partner Move
post $\times$ A $\times$ SS	-0.029	0.148	-0.000	0.025
	(0.033)	(0.098)	(0.050)	(0.062)
post $\times$ SS	0.389	0.232	0.383	0.383
	(0.021)	(0.096)	(0.018)	(0.019)
post $\times$ A	0.026	0.427	0.114	-0.006
	(0.014)	(0.051)	(0.017)	(0.015)
Observations	2,448	2,436	2,436	2,436
Log Likelihood	-1,993,173	-2,435,592	-671,942	-624,212
Relative IRR	0.971	1.160	1.000	1.025
SE	0.032	0.114	0.050	0.063
p-value	0.367	0.160	0.997	0.692
χ^2 Pre-Trend Test	0.574	2.546	1.100	4.469
p-value	0.966	0.636	0.894	0.346

This table reports the Quasi-Maximum Likelihood estimates of the Poisson Conditional Fixed Effects model described by Equation (7). SS refers to same-sex coupled individuals, A refers to individuals in couples with an attribute described by the column headers, and *post* refers to 2013 or later. The coefficient of interest is $post \times SS \times A$, and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 Pre-Trend Test line reports the test statistic for the parallel pre-trends test described by Equation (6). Standard errors are in parentheses, clustered at the group-state level.

Table 5: DDD Estimates for Disassortative Attributes

	Coupled Rate Per Adult			
	Birthplace	Race	Education	Age
post × A × SS	0.101	0.068	-0.047	-0.076
	(0.046)	(0.046)	(0.031)	(0.029)
post × SS	0.369	0.350	0.394	0.424
	(0.017)	(0.017)	(0.021)	(0.021)
post × A	0.114	0.181	0.026	-0.027
	(0.010)	(0.016)	(0.009)	(0.010)
Observations	2,448	2,448	2,448	2,448
Log Likelihood	-668,806	-850,751	-626,325	-639,834
Relative IRR	1.106	1.070	0.954	0.927
SE	0.051	0.049	0.030	0.027
p-value	0.038	0.155	0.119	0.006
χ^2 Pre-Trend Test	4.809	2.231	1.299	7.855
p-value	0.307	0.693	0.862	0.097

This table reports the Quasi-Maximum Likelihood estimates of the Poisson Conditional Fixed Effects model described by Equation (7). SS refers to same-sex coupled individuals, A refers to individuals in couples with an attribute described by the column headers, and *post* refers to 2013 or later. Specifically, A represents: one partner born abroad and the other domestically (Birthplace), different races (Race), an education gap of five or more years (Education), or an age gap of three or more years (Age). The coefficient of interest is $post \times SS \times A$, and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 Pre-Trend Test line reports the test statistic for the parallel pre-trends test described by Equation (6). Standard errors are in parentheses, clustered at the group-state level.

Table 6: DDD Estimates Where for Labor Supply Attributes

	Coupled Rate Per Adult			
	One Employed	One in LF	One in School	Both Speak English
post × A × SS	-0.001	0.017	-0.026	-0.008
	(0.033)	(0.031)	(0.038)	(0.051)
post × SS	0.377	0.382	0.393	0.395
	(0.016)	(0.018)	(0.018)	(0.048)
post × A	-0.075	0.018	-0.134	-0.054
	(0.012)	(0.011)	(0.013)	(0.019)
Observations	2,448	2,448	2,448	2,448
Log Likelihood	-1,049,799	-733,689	-738,266	-743,443
Relative IRR	0.999	1.017	0.974	0.992
SE	0.033	0.032	0.037	0.051
p-value	0.974	0.591	0.485	0.870
χ^2 Pre-Trend Test	16.566	6.956	5.010	10.831
p-value	0.002	0.138	0.286	0.029

This table reports the Quasi-Maximum Likelihood estimates of the Poisson Conditional Fixed Effects model described by Equation (7). SS refers to same-sex coupled individuals, A refers to individuals in couples with an attribute described by the column headers, and *post* refers to 2013 or later. Specifically, A represents: one partner employed (One Employed), one partner in the labor force (One in LF), one partner in school (One in School), or both partners speak English very well (Both Speak English). The coefficient of interest is $post \times SS \times A$, and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 Pre-Trend Test line reports the test statistic for the parallel pre-trends test described by Equation (6). Standard errors are in parentheses, clustered at the group-state level.

A Appendix

A.1 Timing of State-Level Same-Sex Marriage Laws

Table A1 lists states by their timing of same-sex marriage legalization, noting the method and existing alternatives to marriage.

Table A1: Timing of Same-Sex Marriage Legalization

State	Effective	Granting Body	Alternatives
Massachusetts	May 17, 2004	State Court	
Connecticut	Nov 12, 2008	State Court	Civil Unions, 2005
Iowa	May 25, 2009	State Court	
Vermont	Sep 1, 2009	Legislature	Civil Unions, 2000
New Hampshire	Jan 1, 2010	Legislature	Civil Unions, 2008
Dist of Col	Mar 3, 2010	Legislature	Domestic Partnership, 2002
			Recognition of Marriages, 2009
New York	Jul 24, 2011	Legislature	Recognition of Marriages, 2010
Washington	Dec 9, 2012	Voters & Leg	Domestic Partnerships, 2007
Maine	Dec 29, 2012	Voters	Domestic Partnerships, 2004
Maryland	Jan 1, 2013	Voters & Leg	Domestic Partnerships, 2008
California	Jun 28, 2013	Federal Court	Domestic Partnerships, 2000/2005
		State Court	Legal from June 16-Nov 4, 2008
Delaware	Jul 1, 2013	Legislature	Civil Unions, 2012
Minnesota	Aug 1, 2013	Legislature	
Rhode Island	Aug 1, 2013	Legislature	Civil Unions, 2011
New Jersey	Oct 21, 2013	State Court	Civil Unions, 2007
Hawai'i	Dec 2, 2013	Legislature	Civil Unions, 2012
			Reciprocal Beneficiaries, 1997
New Mexico	Dec 19, 2013	State Court	
Oregon	May 19, 2014	Federal Court	Domestic Partnerships, 2008
Pennsylvania	May 20, 2014	Federal Court	
Illinois	Jun 1, 2014	Legislature	Civil Unions, 2011

Oklahoma	Oct 6, 2014	Federal Court	
Utah	Oct 6, 2014	Federal Court	
		Federal Court	Legal from Dec 20, 2013-Jan 6, 2014
Virginia	Oct 6, 2014	Federal Court	
Colorado	Oct 7, 2014	Federal Court	Designated Beneficiary, 2009
			Civil Unions, 2013
Indiana	Oct 7, 2014	Federal Court	
Wisconsin	Oct 7, 2014	Federal Court	Domestic Partnerships, 2009
		Federal Court	Legal from June 6-13, 2014
Nevada	Oct 9, 2014	Federal Court	Domestic Partnerships, 2009
West Virginia	Oct 9, 2014	Federal Court	
North Carolina	Oct 10, 2014	Federal Court	
Idaho	Oct 15, 2014	Federal Court	
Alaska	Oct 17, 2014	Federal Court	
Arizona	Oct 17, 2014	Federal Court	
Wyoming	Oct 21, 2014	Federal Court	
Montana	Nov 19, 2014	Federal Court	
South Carolina	Nov 19, 2014	Federal Court	
Florida	Jan 6, 2015	Federal Court	
Alabama	Jun 26, 2015	Federal Court	
		Federal Court	Legal from Feb 9-March 3, 2015
Arkansas	Jun 26, 2015	Federal Court	
		State Court	Legal from May 9-16, 2014
Georgia	Jun 26, 2015	Federal Court	
Kansas	Jun 26, 2015	Federal Court	
		County Courts	Up to counties since Nov 13, 2014
Kentucky	Jun 26, 2015	Federal Court	
Louisiana	Jun 26, 2015	Federal Court	
Michigan	Jun 26, 2015	Federal Court	
		Federal Court	Briefly legal on March 21, 2014
Mississippi	Jun 26, 2015	Federal Court	
Missouri	Jun 26, 2015	Federal Court	Recognition of Marriages Oct 3, 2014
		Federal Court	Legal since Nov 5, 2014 in St Louis
		Federal Court	Since Nov 7, 2014 in Jackson County
Nebraska	Jun 26, 2015	Federal Court	
North Dakota	Jun 26, 2015	Federal Court	
Ohio	Jun 26, 2015	Federal Court	
South Dakota	Jun 26, 2015	Federal Court	
Tennessee	Jun 26, 2015	Federal Court	
Texas	Jun 26, 2015	Federal Court	

"Effective" refers to the effective date when same-sex marriage became permanently legal. Some indigenous tribes allow same-sex marriage before or after it is legalized elsewhere in the state. Massachusetts allows out-of-state same-sex couples to marry since July 31, 2008. Exceptions to the marriage laws are only listed for states forced to legalise same-sex marriage resulting from the Supreme Court ruling in *Obergefell v. Hodges*.
[Source] Created using Table 1 from Hansen, Martell and Roncolato (2020), with additional information from the National Center for Lesbian Rights (2018).

A.2 Additional Summary Statistics

Table A2: Additional Individual-Level Summary Statistics

	MSS	NSS	MDS	NDS
Foodstamps	0.08	0.10	0.13	0.09
	(0.27)	(0.30)	(0.33)	(0.28)
TANF	0.02	0.02	0.02	0.01
	(0.13)	(0.15)	(0.14)	(0.12)
Soc Sec	0.06	0.10	0.05	0.10
	(0.23)	(0.30)	(0.22)	(0.30)
Supp Sec	0.02	0.03	0.02	0.02
	(0.13)	(0.18)	(0.13)	(0.15)
Employer Ins	0.76	0.81	0.63	0.77
	(0.43)	(0.39)	(0.48)	(0.42)
Private Ins	0.84	0.89	0.71	0.86
	(0.36)	(0.32)	(0.45)	(0.35)
Public Ins	0.17	0.21	0.20	0.18
	(0.38)	(0.41)	(0.40)	(0.38)
Purchased Ins	0.18	0.18	0.13	0.14
	(0.38)	(0.38)	(0.34)	(0.35)
Couple Moved from Abroad	0.00	0.00	0.01	0.00
	(0.06)	(0.04)	(0.07)	(0.05)
Couple Moved between States	0.02	0.02	0.02	0.02
	(0.15)	(0.15)	(0.13)	(0.13)
Couple Moved within State	0.12	0.12	0.11	0.09
	(0.33)	(0.33)	(0.31)	(0.28)
Couple Moved	0.16	0.16	0.14	0.11
	(0.37)	(0.37)	(0.35)	(0.31)
Partner Moved from Abroad	0.01	0.00	0.02	0.00
	(0.11)	(0.06)	(0.13)	(0.05)
Partner Moved between States	0.02	0.02	0.01	0.01
	(0.13)	(0.13)	(0.08)	(0.08)
Partner Moved within State	0.04	0.04	0.02	0.02
	(0.20)	(0.19)	(0.13)	(0.12)
Partner Moved	0.06	0.05	0.03	0.02
	(0.24)	(0.22)	(0.17)	(0.14)
One Partner Born in China	0.02	0.00	0.03	0.01
	(0.15)	(0.05)	(0.17)	(0.09)
One Partner Born in India	0.01	0.00	0.02	0.01
	(0.11)	(0.05)	(0.16)	(0.11)
One Partner Born in Mexico	0.25	0.02	0.34	0.05
	(0.43)	(0.13)	(0.47)	(0.22)
One Partner Born in Philippines	0.06	0.01	0.04	0.01
	(0.23)	(0.09)	(0.20)	(0.10)
NC Arrived ≤ 3 Years Ago	0.17	0.98	0.11	0.94
	(0.38)	(0.13)	(0.32)	(0.24)
Observations	9,034	149,138	639,427	11,429,990

This table reports means and standard deviations (in parentheses) for individuals in four couple types. The intersection of same- or different-sex and same- or mixed-citizenship determines the four couple types: mixed-citizenship same-sex (MSS), same-citizenship same-sex (NSS), mixed-citizenship different-sex (MDS), same-citizenship different-sex (NDS). The data are from the 2008-2019 rounds of the ACS.

Table A3: Individual-Level Summary Statistics - Married Individuals

	MSS	NSS	MDS	NDS
Age	40.14	44.09	36.57	36.37
	(10.46)	(11.37)	(9.63)	(9.80)
Male	0.69	0.44	0.50	0.50
	(0.46)	(0.50)	(0.50)	(0.50)
Years of Education	14.68	15.15	13.55	14.32
	(3.17)	(2.49)	(3.48)	(2.67)
Non-Citizen	0.52	0.02	0.51	0.08
	(0.50)	(0.14)	(0.50)	(0.28)
Married	1.00	1.00	1.00	1.00
	(0.00)	(0.00)	(0.00)	(0.00)
Any Transfer	0.10	0.16	0.15	0.13
	(0.31)	(0.37)	(0.36)	(0.34)
Any Insurance	0.93	0.97	0.86	0.93
	(0.25)	(0.17)	(0.34)	(0.25)
Couple Moved to New State	0.02	0.03	0.04	0.04
	(0.16)	(0.17)	(0.19)	(0.19)
Partner Moved to New State	0.02	0.01	0.04	0.01
	(0.15)	(0.12)	(0.20)	(0.10)
One Partner Born Abroad	0.74	0.09	0.56	0.07
	(0.44)	(0.29)	(0.50)	(0.25)
Interracial Couple	0.43	0.22	0.24	0.14
	(0.50)	(0.42)	(0.43)	(0.35)
Educ Gap $\geq$ 3 Years	0.32	0.23	0.29	0.19
	(0.47)	(0.42)	(0.45)	(0.39)
Age Gap $\geq$ 5 Years	0.59	0.45	0.46	0.30
	(0.49)	(0.50)	(0.50)	(0.46)
One Partner Employed	0.31	0.24	0.42	0.30
	(0.46)	(0.43)	(0.49)	(0.46)
One Partner in LF	0.25	0.21	0.36	0.26
	(0.44)	(0.41)	(0.48)	(0.44)
One Partner In School	0.15	0.11	0.13	0.12
	(0.36)	(0.31)	(0.34)	(0.33)
Both Speak English Very Well	0.70	0.97	0.54	0.91
	(0.46)	(0.17)	(0.50)	(0.28)
Observations	4,144	37,968	161,738	1,564,526

This table reports means and standard deviations (in parentheses) for married individuals in four couple types. The intersection of same- or different-sex and same- or mixed-citizenship determines the four couple types: mixed-citizenship same-sex (MSS), same-citizenship same-sex (NSS), mixed-citizenship different-sex (MDS), same-citizenship different-sex (NDS). The data are from the 2012-2019 rounds of the ACS and for couples married after 2008.

Table A4: Aditional Individual-Level Summary Statistics - Married Individuals

	MSS	NSS	MDS	NDS
Marriage Year	2,014.23	2,013.57	2,012.20	2,011.98
	(2.29)	(2.65)	(2.81)	(2.81)
Foodstamps	0.05	0.06	0.12	0.09
	(0.22)	(0.25)	(0.33)	(0.29)
TANF	0.01	0.01	0.02	0.01
	(0.12)	(0.12)	(0.13)	(0.12)
Soc Sec	0.05	0.10	0.03	0.04
	(0.22)	(0.29)	(0.17)	(0.19)
Supp Sec	0.01	0.02	0.01	0.02
	(0.11)	(0.15)	(0.11)	(0.13)
Employer Ins	0.77	0.84	0.63	0.78
	(0.42)	(0.36)	(0.48)	(0.41)
Private Ins	0.87	0.92	0.73	0.86
	(0.34)	(0.27)	(0.44)	(0.35)
Public Ins	0.15	0.18	0.21	0.15
	(0.36)	(0.38)	(0.40)	(0.36)
Purchased Ins	0.18	0.14	0.14	0.12
	(0.38)	(0.35)	(0.34)	(0.32)
Couple Moved from Abroad	0.00	0.00	0.01	0.01
	(0.04)	(0.05)	(0.09)	(0.08)
Couple Moved between States	0.02	0.03	0.03	0.03
	(0.15)	(0.16)	(0.16)	(0.18)
Couple Moved within State	0.11	0.10	0.15	0.14
	(0.31)	(0.30)	(0.35)	(0.35)
Couple Moved	0.14	0.13	0.20	0.18
	(0.35)	(0.34)	(0.40)	(0.39)
Partner Moved from Abroad	0.01	0.00	0.04	0.00
	(0.08)	(0.07)	(0.19)	(0.07)
Partner Moved between States	0.02	0.01	0.01	0.01
	(0.12)	(0.10)	(0.09)	(0.08)
Partner Moved within State	0.03	0.02	0.02	0.02
	(0.17)	(0.14)	(0.13)	(0.13)
Partner Moved	0.04	0.03	0.04	0.02
	(0.20)	(0.17)	(0.20)	(0.15)
One Partner Born in China	0.03	0.00	0.04	0.01
	(0.17)	(0.06)	(0.19)	(0.09)
One Partner Born in India	0.01	0.00	0.03	0.02
	(0.12)	(0.06)	(0.17)	(0.14)
One Partner Born in Mexico	0.25	0.02	0.29	0.04
	(0.43)	(0.12)	(0.45)	(0.20)
One Partner Born in Philippines	0.06	0.01	0.05	0.01
	(0.24)	(0.10)	(0.21)	(0.09)
NC Arrived $\leq$ 3 Years Ago	0.27	0.98	0.23	0.93
	(0.45)	(0.12)	(0.42)	(0.25)
Observations	4,144	37,968	161,738	1,564,526

Table A5: Individual-Level Summary Statistics - Birth Country of Non-Citizens in Mixed-Citizenship Marriages

	Same-Sex Spouse	Different-Sex Spouse
Mexico	0.234	0.327
Canada	0.052	0.041
Philippines	0.061	0.040
United Kingdom	0.041	0.036
China	0.027	0.032
El Salvador	0.018	0.026
Dominican Republic	0.014	0.021
India	0.012	0.025
Germany	0.019	0.020
Korea	0.007	0.020
Japan	0.012	0.019
Colombia	0.035	0.018
Vietnam	0.013	0.017
Guatemala	0.016	0.015
Jamaica	0.004	0.014
Cuba	0.016	0.012
Brazil	0.047	0.014
France	0.014	0.006
Venezuela	0.019	0.006
Australia	0.017	0.006
Observations	2,519	295,096

This table reports the share of non-citizens born in a given country, for same-sex coupled and different-sex coupled non-citizens. These countries are the union of the top 15 most common birth countries for both couple types. The data are from the 2008-2019 rounds of the ACS.

Table A6: Individual-Level Summary Statistics

	Same-Sex Coupled	
	Women	Men
Discordant Citizenships	0.04	0.08
	(0.20)	(0.27)
One Partner Born Abroad	0.09	0.15
	(0.28)	(0.36)
Interracial Couple	0.18	0.26
	(0.39)	(0.44)
Educ Gap $\geq$ 3 Years	0.21	0.25
	(0.41)	(0.44)
Age Gap $\geq$ 5 Years	0.44	0.50
	(0.50)	(0.50)
Couple Has Kids	0.32	0.13
	(0.47)	(0.34)
Observations	80,916	77,256

This table reports means and standard deviations (in parentheses) for individuals in same-sex couples, separately for women and men. The data are from the 2008-2019 rounds of the ACS.

Table A7: Individual-Level Summary Statistics - Share Living in a Metropolitan Area

	MSS	NSS	MDS	NDS
% of Women In Metro	0.902	0.817	0.899	0.718
% of Men In Metro	0.930	0.873	0.900	0.721
Observations	9,034	149,138	639,427	11,429,990

Table A8: Individual-Level Summary Statistics - Share Living in Each State

	Same-Sex Coupled		Non-Citizen	
	Women	Men	Women	Men
California	0.127	0.171	0.262	0.267
Texas	0.078	0.074	0.139	0.140
New York	0.063	0.073	0.071	0.072
New Jersey	0.024	0.025	0.042	0.042
Washington	0.033	0.027	0.026	0.025
Massachusetts	0.040	0.031	0.022	0.023
Nevada	0.009	0.012	0.015	0.014
Oregon	0.022	0.016	0.010	0.011
New Mexico	0.009	0.006	0.006	0.006
Rhode Island	0.004	0.005	0.003	0.003
DC	0.004	0.015	0.002	0.002
Delaware	0.004	0.005	0.002	0.002
New Hampshire	0.007	0.005	0.002	0.002
Vermont	0.004	0.002	0.001	0.000
Maine	0.007	0.005	0.001	0.001
Observations	78,470	72,689	474,826	438,653

A.3 Additional Results

A.3.1 Federal Transfer Benefits

Table A9: DDD Estimates Where Groups are Based on Transfer Receipt

	Coupled Rate Per Adult				
	Food Stamps	Welfare	Soc Sec	Supp Sec	Any
post × A × SS	-0.079	0.054	0.028	-0.154	-0.029
	(0.051)	(0.067)	(0.035)	(0.061)	(0.033)
post × SS	0.391	0.384	0.381	0.387	0.389
	(0.020)	(0.019)	(0.019)	(0.018)	(0.021)
post × A	0.053	-0.179	0.013	0.177	0.026
	(0.028)	(0.024)	(0.008)	(0.015)	(0.014)
Observations	2,448	2,448	2,448	2,448	2,448
Log Likelihood	-2,508,784	-858,100	-721,517	-914,538	-1,993,173
Relative IRR	0.924	1.056	1.029	0.857	0.971
SE	0.047	0.071	0.036	0.053	0.032
p-value	0.108	0.431	0.424	0.007	0.367
χ^2 Pre-Trend Test	1.963	2.652	1.599	7.539	0.574
p-value	0.743	0.618	0.809	0.110	0.966

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on use of federal transfer benefits of same-sex couples. The benefits are are Food Stamps (SNAP), Welfare (TANF), Social Security, Supplemental Security Income, and Any Transfer (an indicator for any of the previous four). The relative incidence rate ratio (IRR) is the exponentiated coefficient of interest. The χ^2 statistic is for a test of parallel pre-trends. Standard errors are clustered at the group-state level. [Source] Created using the 2008-2019 rounds of the American Community Survey.

A.3.2 Health Insurance

Table A10: DDD Estimates Where Groups are Based on Health Insurance

	Coupled Rate Per Adult				
	Employer	Private	Public	Purchased	Any
post × A × SS	-0.008	0.075	0.009	-0.081	0.148
	(0.032)	(0.046)	(0.044)	(0.037)	(0.098)
post × SS	0.389	0.313	0.376	0.395	0.232
	(0.023)	(0.040)	(0.026)	(0.018)	(0.096)
post × A	0.005	0.132	0.243	0.072	0.427
	(0.011)	(0.015)	(0.024)	(0.020)	(0.051)
Observations	2,448	2,448	2,448	2,448	2,436
Log Likelihood	-1,125,724	-1,536,496	-1,535,074	-1,231,567	-2,435,592
Relative IRR	0.992	1.078	1.009	0.922	1.160
SE	0.031	0.049	0.045	0.034	0.114
p-value	0.810	0.116	0.836	0.021	0.160
χ^2 Pre-Trend Test	0.634	0.934	8.448	0.850	2.546
p-value	0.959	0.920	0.076	0.932	0.636

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on the type of health insurance owned by same-sex couple. Health insurance could be from an Employer, it could be Private or Public, it could be Purchased, or it could be any health insurance. The relative incidence rate ratio (IRR) is the exponentiated coefficient of interest. The χ^2 statistic is for a test of parallel pre-trends. Standard errors are clustered at the group-state level. [Source] Created using the 2008-2019 rounds of the American Community Survey.

A.3.3 Moved Recently

Table A11: DDD Estimates Where Groups are Based on Jointly Moving within the Past Year

	Coupled Rate Per Adult			
	Abroad	Different State	Within State	Any Move
post × A × SS	0.202	-0.009	0.115	0.092
	(0.220)	(0.056)	(0.046)	(0.037)
post × SS	0.384	0.383	0.370	0.368
	(0.018)	(0.018)	(0.018)	(0.018)
post × A	0.210	0.105	-0.005	0.021
	(0.032)	(0.016)	(0.025)	(0.021)
Observations	2,232	2,436	2,448	2,448
Log Likelihood	-588,695	-664,517	-835,785	-830,593
Relative IRR	1.223	0.991	1.122	1.096
SE	0.270	0.056	0.051	0.041
p-value	0.407	0.874	0.018	0.019
χ^2 Pre-Trend Test	17.766	1.418	1.311	1.803
p-value	0.001	0.841	0.859	0.772

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on the likelihood same-sex couples moved within the past year. Couples could both move from abroad (Abroad), from another state (Different State), within their state of residence (Within State), either from abroad or from another state (Abroad or Diff State), or exactly one partner moved from abroad (One Abroad). The relative incidence rate ratio (IRR) is the exponentiated coefficient of interest. The χ^2 statistic is for a test of parallel pre-trends. Standard errors are clustered at the group-state level. [Source] Created using the 2008-2019 rounds of the American Community Survey.

Table A12: DDD Estimates Where Groups are Based on One Partner Moving within the Past Year

	Coupled Rate Per Adult			
	Abroad	Different State	Within State	Any Move
post × A × SS	0.053	-0.007	0.152	0.132
	(0.111)	(0.068)	(0.047)	(0.040)
post × SS	0.383	0.383	0.379	0.379
	(0.018)	(0.019)	(0.019)	(0.019)
post × A	-0.116	0.043	-0.064	-0.061
	(0.029)	(0.017)	(0.011)	(0.011)
Observations	2,316	2,436	2,448	2,448
Log Likelihood	-591,833	-626,574	-627,646	-627,425
Relative IRR	1.054	0.993	1.164	1.141
SE	0.117	0.067	0.055	0.046
p-value	0.642	0.917	0.003	0.002
χ^2 Pre-Trend Test	2.176	8.501	5.075	7.988
p-value	0.703	0.075	0.280	0.092

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on the likelihood same-sex couples moved within the past year. Couples could both move from abroad (Abroad), from another state (Different State), within their state of residence (Within State), either from abroad or from another state (Abroad or Diff State), or exactly one partner moved from abroad (One Abroad). The relative incidence rate ratio (IRR) is the exponentiated coefficient of interest. The χ^2 statistic is for a test of parallel pre-trends. Standard errors are clustered at the group-state level. [Source] Created using the 2008-2019 rounds of the American Community Survey.

A.3.4 Birth Country Heterogeneity

Table A13: Heterogeneity by Birth Country - DDD Estimates Restricted by Birth Country

	Same-Sex Marriage Legal	Homosexuality Legal	Binding Visa Cap Country	Low Income Country
post × A × SS	-0.033	0.328	0.170	0.043
	(0.088)	(0.215)	(0.089)	(0.092)
post × SS	0.750	0.417	0.673	0.703
	(0.057)	(0.210)	(0.062)	(0.068)
post × A	-0.154	-0.084	0.072	0.153
	(0.021)	(0.050)	(0.027)	(0.022)
Observations	1,400	1,295	1,407	1,414
Log Likelihood	-162,543	-172,408	-182,293	-166,902
Relative IRR	0.968	1.389	1.185	1.044
SE	0.085	0.299	0.105	0.096
p-value	0.706	0.193	0.078	0.647
χ^2 Pre-Trend Test	0.446	0.088	1.727	0.839
p-value	0.800	0.957	0.422	0.658

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on differential mixed-citizenship same-sex coupling, by birth country categories. The sample is necessarily restricted to mixed-citizenship couples only. Countries are split based on the legality of same-sex marriage (SSM Legal), the legality of homosexuality (Gay Legal), special filing deadlines related to some visas (Longer Visa Waits), and PPP adjusted GNP (Low Income). The relative incidence rate ratio (IRR) is the exponentiated coefficient of interest. The χ^2 statistic is for a test of parallel pre-trends. Standard errors are clustered at the group-state level. [Source] Created using the 2008-2019 rounds of the American Community Survey.

A.3.5 Main Result without California

Table A14: DDD Estimates for the Main Specification without California

	Coupled Rate Per Adult
post × M × SS	0.286
	(0.067)
post × SS	0.379
	(0.018)
post × M	0.087
	(0.015)
Observations	2,400
Log Likelihood	-636,562
Relative IRR	1.331
SE	0.090
p-value	0.000
χ^2 Pre-Trend Test	1.927
p-value	0.749

This table reports the Poisson Conditional Fixed Effects estimates for Equation (3). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is post×SS×M and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 pre-trend test reports the test statistic for the test of parallel pre-trends, described by Equation (6). Standard errors in parentheses, clustered at the group-state level. [Source] Created using the 2008-2019 rounds of the American Community Survey.

A.3.6 State-Level Heterogeneity

Table A15: Heterogeneity by State - DDD Estimates Restricted by State

	Legalized SSM		Non-Citizen Share		Unofficial Share	
	Before 2011	In 2015	High	Low	High	Low
post × M × SS	0.248	0.494	0.229	0.329	0.274	0.335
	(0.068)	(0.156)	(0.108)	(0.060)	(0.045)	(0.094)
post × SS	0.333	0.425	0.408	0.348	0.353	0.382
	(0.018)	(0.037)	(0.018)	(0.024)	(0.015)	(0.034)
post × M	0.051	0.119	0.127	0.059	0.071	0.075
	(0.012)	(0.018)	(0.011)	(0.018)	(0.014)	(0.024)
Observations	336	576	1,248	1,200	1,248	1,200
Log Likelihood	-79,646	-167,188	-255,385	-388,900	-330,918	-312,695
Relative IRR	1.281	1.638	1.258	1.389	1.315	1.398
SE	0.087	0.255	0.136	0.083	0.059	0.131
p-value	0.001	0.012	0.058	0.000	0.000	0.002
χ^2 Pre-Trend Test	12.807	38.802	1.449	5.856	3.753	29.934
p-value	0.012	0.000	0.836	0.210	0.440	0.000

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on mixed-citizenship same-sex coupling, by different state categories. States are split based on same-sex marriage (SSM) legalization timing, the proportion of people that are non-citizens, and the proportion of non-citizens that are illegally present. The relative incidence rate ratio (IRR) is the exponentiated coefficient of interest. The χ^2 statistic is for a test of parallel pre-trends. Standard errors are clustered at the group-state level. [Source] Created using the 2008-2019 rounds of the American Community Survey.

A.3.7 Same-Sex Roommates

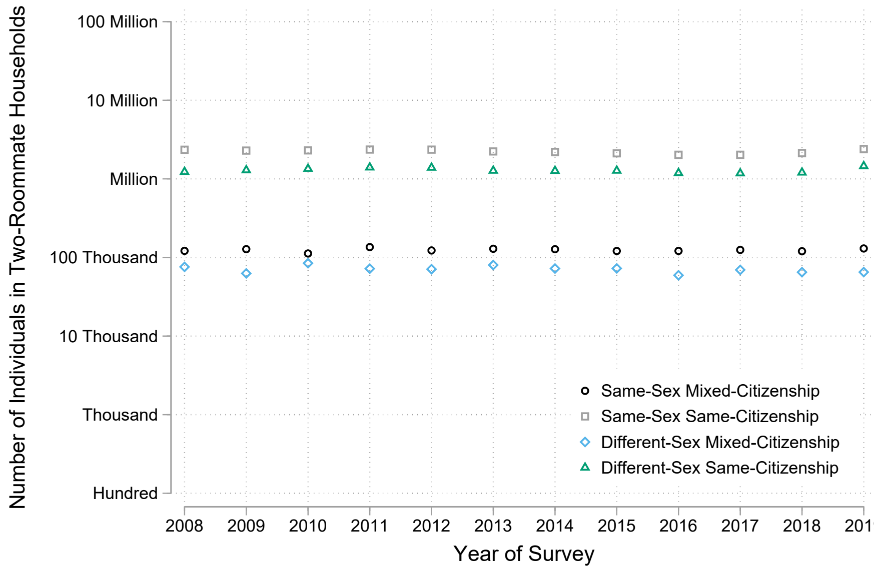


Figure A1: Number of Individuals in a Two-Roommate Household, by Survey Year

Each point is the population estimate for the number of individuals in a given roommate type and year, representative of the United States population in the given year. The vertical axis depicts the number of individuals on a logarithmic scale. The horizontal axis depicts years. The four roommate types are determined by the intersection of same- or different-sex and same- or mixed-citizenship. The sample is restricted to roommates in households with exactly two adults.

Table A16: DDD Estimates for Roommates

	Roommates
post $\times$ M $\times$ SS	0.085
	(0.059)
post $\times$ SS	-0.031
	(0.020)
post $\times$ M	0.057
	(0.046)
Observations	2,448
Log Likelihood	-595,933
Relative IRR	1.088
SE	0.064
p-value	0.166
χ^2 Pre-Trend Test	9.548
p-value	0.049

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on the number of mixed-citizenship same-sex roommates. The relative incidence rate ratio (IRR) is the exponentiated coefficient of interest. The χ^2 statistic is for a test of parallel pre-trends. Standard errors are clustered at the group-state level. [Source] Created using the 2008-2019 rounds of the American Community Survey.

A.3.8 Household Characteristics

Table A17: DDD Estimates Where Groups are Based on Household Characteristics

	Coupled Rate Per Adult				
	High Income	Good English	High Educ	Has Kids	Extra Adults
post × A × SS	-0.112	-0.008	-0.149	-0.060	-0.020
	(0.029)	(0.051)	(0.029)	(0.033)	(0.036)
post × SS	0.467	0.395	0.416	0.390	0.385
	(0.021)	(0.048)	(0.020)	(0.018)	(0.018)
post × A	0.010	-0.054	0.186	-0.019	0.044
	(0.010)	(0.019)	(0.010)	(0.009)	(0.011)
Observations	2,448	2,448	2,448	2,448	2,448
Log Likelihood	-677,026	-743,443	-1,057,153	-661,740	-694,506
Relative IRR	0.894	0.992	0.862	0.942	0.980
SE	0.026	0.051	0.025	0.031	0.035
p-value	0.000	0.870	0.000	0.059	0.568
χ^2 Pre-Trend Test	2.511	10.831	7.520	6.756	4.959
p-value	0.643	0.029	0.111	0.149	0.292

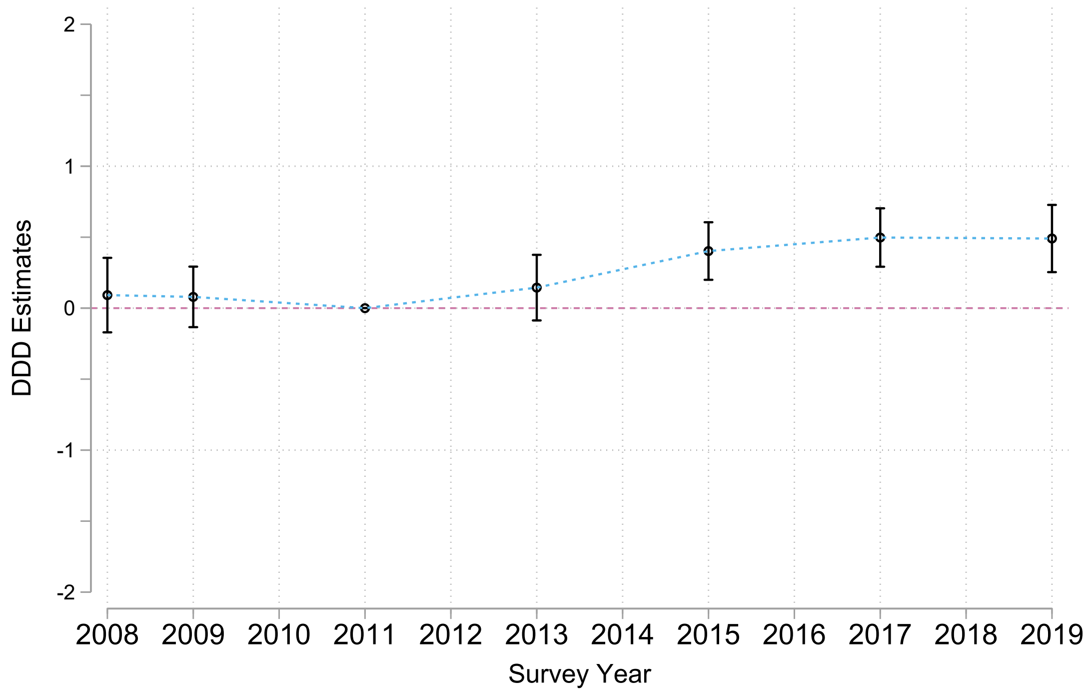
This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on household characteristics of same-sex couples. Household characteristics are: above state-year median income (High Inc), both partners speak English, either "very well" or "only speaks english" (Good English), both partners have a Bachelor's degree (High Educ), children are present in the household (Has Kids), or the presence of other adults in the household (Extra Adults). The relative incidence rate ratio (IRR) is the exponentiated coefficient of interest. The χ^2 statistic is for a test of parallel pre-trends. Standard errors are clustered at the group-state level. [Source] Created using the 2008-2019 rounds of the American Community Survey.

A.3.9 Age Heterogeneity

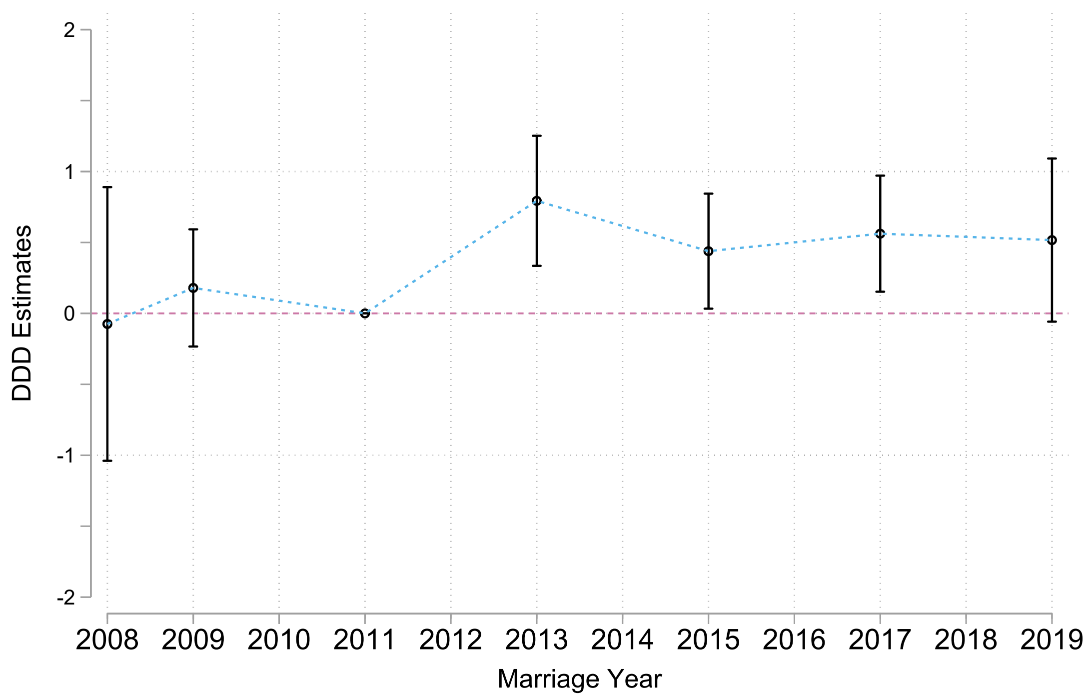
Table A18: Heterogeneity by Age - DDD Estimates Restricted by Age

	Coupled Rate		Marrying Rate	
	Older	Younger	Older	Younger
post × M × SS	0.354	0.593	0.264	0.517
	(0.062)	(0.157)	(0.069)	(0.314)
post × SS	0.535	1.400	0.304	1.141
	(0.022)	(0.126)	(0.021)	(0.272)
post × M	0.024	-0.036	0.134	0.068
	(0.018)	(0.016)	(0.021)	(0.026)
Observations	1,421	1,414	1,414	1,393
Log Likelihood	-297,114	-7,371,243	-258,817	-2,814,778
Relative IRR	1.425	1.810	1.302	1.678
SE	0.089	0.284	0.090	0.527
p-value	0.000	0.004	0.001	0.198
χ^2 Pre-Trend Test	0.649	1.028	2.684	1.356
p-value	0.723	0.598	0.261	0.508

This table reports the Poisson Conditional Fixed Effects estimates for Equation (3). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is post×SS×M and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 pre-trend test reports the test statistic for the test of parallel pre-trends, described by Equation (6). Standard errors in parentheses, clustered at the group-state level. [Source] Created using the American Community Survey. Columns 1 and 3, with coupled individuals, uses the 2008-2019 rounds. Columns 2 and 4, with married individuals only, uses the 2012-2019 rounds.



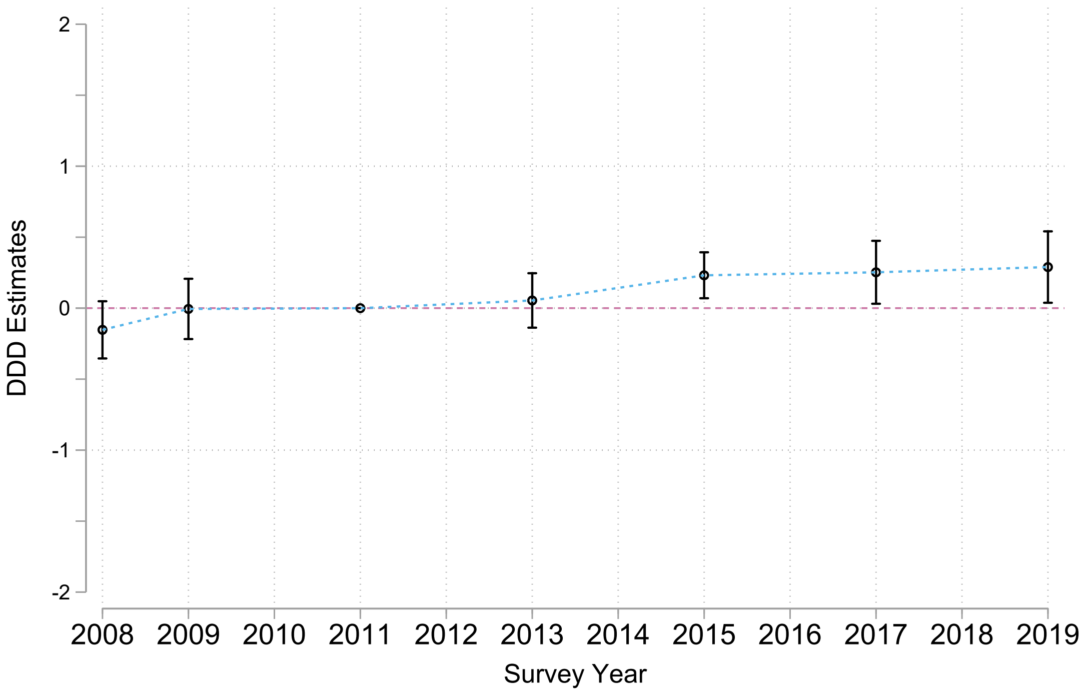
(a) Young Coupled Individuals by Survey Year



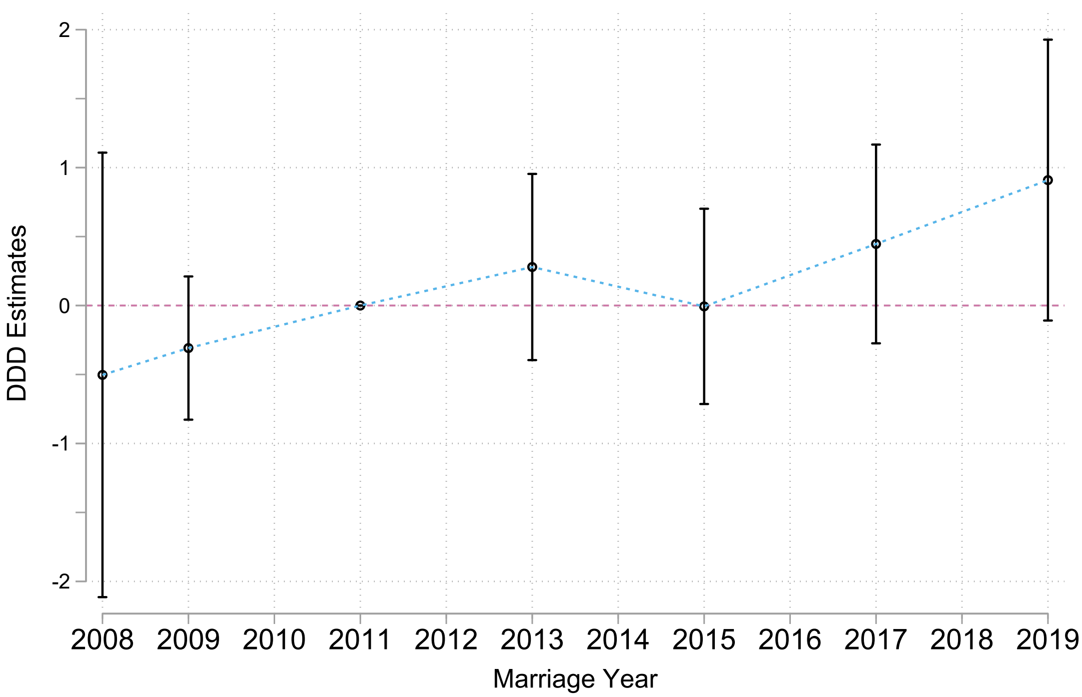
(b) Young Married Couples by Marriage Year

Figure A2: Dynamic DDD Estimates for Young Couples

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (5), where time is either Survey Year or Marriage Year. The sample is restricted to individuals younger than 40 only. Standard errors are clustered at the group-state level. [Source] Data are from the American Community Survey. The first subfigure uses the 2008-2019 rounds; the second subfigure uses the 2012-2019 rounds.



(a) Old Coupled Individuals by Survey Year



(b) Old Married Couples by Marriage Year

Figure A3: Dynamic DDD Estimates for Old Couples

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (5), where time is either Survey Year or Marriage Year. The sample is restricted to individuals 40 or older only. Standard errors are clustered at the group-state level. [Source] Data are from the American Community Survey. The first subfigure uses the 2008-2019 rounds; the second subfigure uses the 2012-2019 rounds.

A.3.10 Main Result with pre-2013 Arrivals

Table A19: DDD Estimates for the Main Specification where all Non-Citizens Arrived pre-2013

	Coupled Rate Per Adult	Marrying Rate Per Adult Per Year
post × M × SS	0.129	0.623
	(0.062)	(0.188)
post × SS	0.374	1.401
	(0.018)	(0.156)
post × M	-0.048	-0.435
	(0.016)	(0.021)
Observations	2,436	2,412
Log Likelihood	-836,277	-13,978,769
Relative IRR	1.138	1.865
SE	0.070	0.350
p-value	0.049	0.013
χ^2 Pre-Trend Test	3.174	0.256
p-value	0.529	0.992

This table reports the Poisson Conditional Fixed Effects estimates for Equation (3). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is post×SS×M and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 pre-trend test reports the test statistic for the test of parallel pre-trends, described by Equation (6). Standard errors in parentheses, clustered at the group-state level. [Source] Created using the the American Community Survey. Column 1, with coupled individuals, uses the 2008-2019 rounds. Column 2, with married individuals only, uses the 2012-2019 rounds.

A.3.11 Main Result with Recent Arrivals

Table A20: DDD Estimates for the Main Specification where all Non-Citizens in the Past Three Years

	Coupled Rate Per Adult	Marrying Rate Per Adult Per Year
post × M × SS	0.905	0.478
	(0.237)	(0.237)
post × SS	0.617	1.513
	(0.173)	(0.201)
post × M	-0.169	0.500
	(0.041)	(0.027)
Observations	2,208	2,160
Log Likelihood	-426,480	-1,232,446
Relative IRR	2.472	1.613
SE	0.585	0.383
p-value	0.012	0.109
χ^2 Pre-Trend Test	9.774	0.556
p-value	0.044	0.968

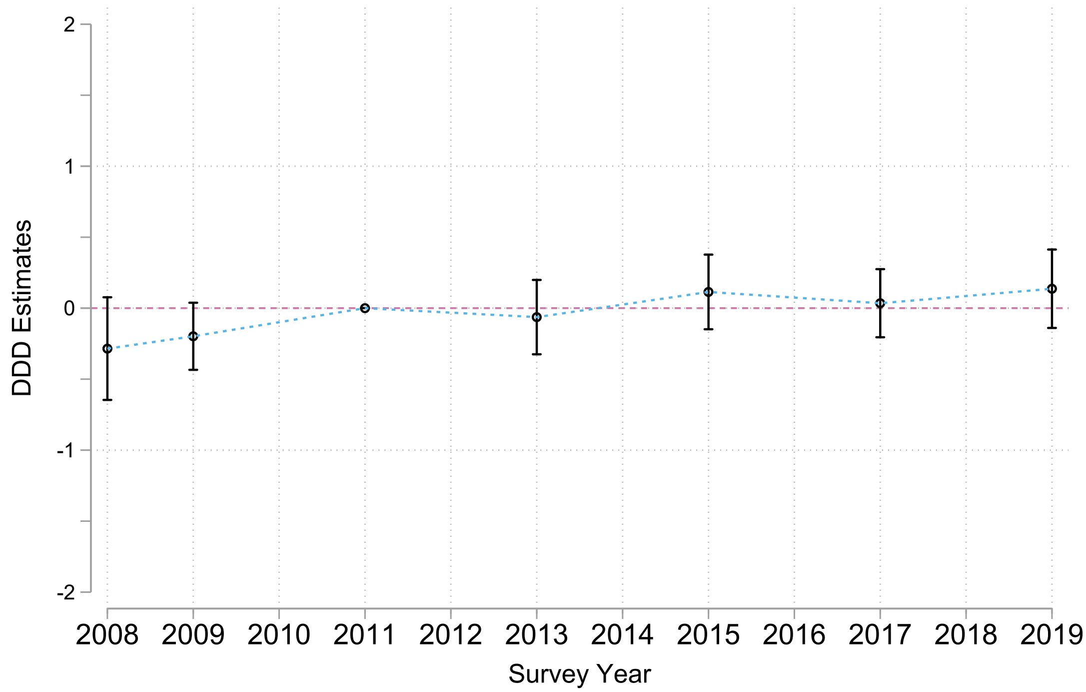
This table reports the Poisson Conditional Fixed Effects estimates for Equation (3). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is post×SS×M and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 pre-trend test reports the test statistic for the test of parallel pre-trends, described by Equation (6). Standard errors in parentheses, clustered at the group-state level. [Source] Created using the the American Community Survey. Column 1, with coupled individuals, uses the 2008-2019 rounds. Column 2, with married individuals only, uses the 2012-2019 rounds.

A.3.12 Sex Heterogeneity

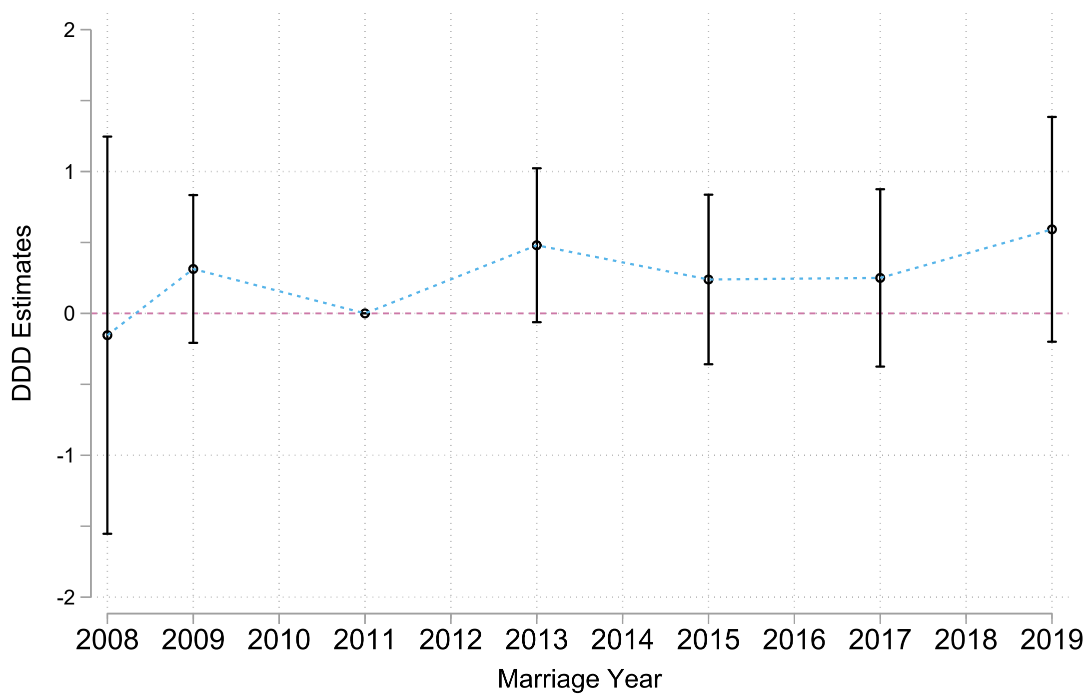
Table A21: Heterogeneity by Sex - DDD Estimates Restricted by Sex

	Women		Men	
	Coupled	Marrying	Coupled	Marrying
main				
post × M × SS	0.211	0.354	0.397	0.785
	(0.077)	(0.246)	(0.066)	(0.229)
post × SS	0.408	1.385	0.379	1.185
	(0.028)	(0.217)	(0.018)	(0.197)
post × M	0.080	-0.011	0.080	-0.011
	(0.017)	(0.017)	(0.017)	(0.017)
Observations	1,414	1,386	1,414	1,407
Log Likelihood	-321,321	-9,699,032	-323,507	-9,643,772
Relative IRR	1.235	1.425	1.488	2.191
SE	0.095	0.351	0.097	0.501
p-value	0.014	0.226	0.000	0.017
χ^2 Pre-Trend Test	2.843	1.734	5.079	1.198
p-value	0.241	0.420	0.079	0.549

This table reports the Poisson Conditional Fixed Effects estimates for Equation (3). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is post×SS×M and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 pre-trend test reports the test statistic for the test of parallel pre-trends, described by Equation (6). Standard errors in parentheses, clustered at the group-state level. [Source] Created using the American Community Survey. Columns 1 and 3, with coupled individuals, uses the 2008-2019 rounds. Columns 2 and 4, with married individuals only, uses the 2012-2019 rounds.



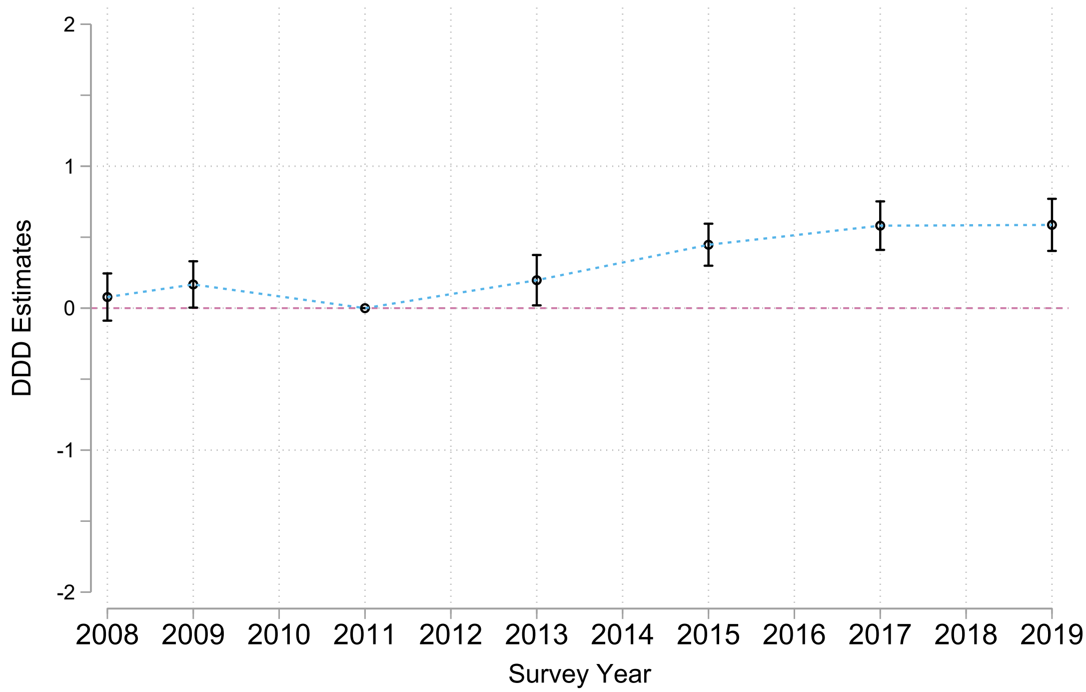
(a) Coupled Women by Survey Year



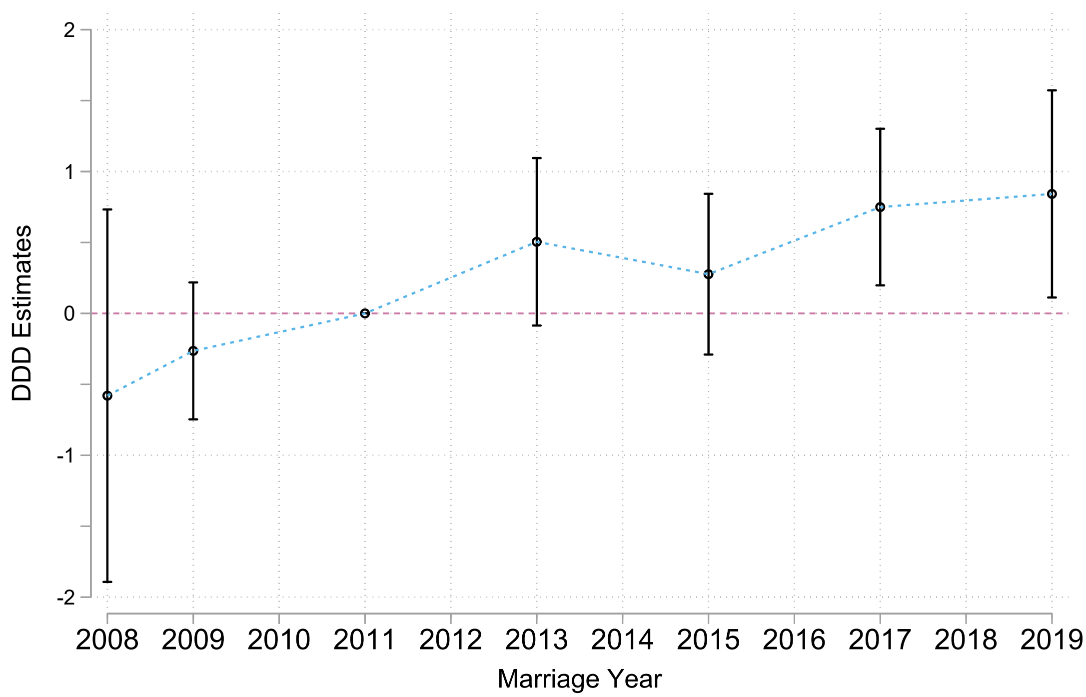
(b) Married Women by Marriage Year

Figure A4: Dynamic DDD Estimates for Women

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (5), where time is either Survey Year or Marriage Year. The sample is restricted to women only. Standard errors are clustered at the group-state level. [Source] Data are from the American Community Survey. The first subfigure uses the 2008-2019 rounds; the second subfigure uses the 2012-2019 rounds.



(a) Coupled Men by Survey Year



(b) Married Men by Marriage Year

Figure A5: Dynamic DDD Estimates for Men

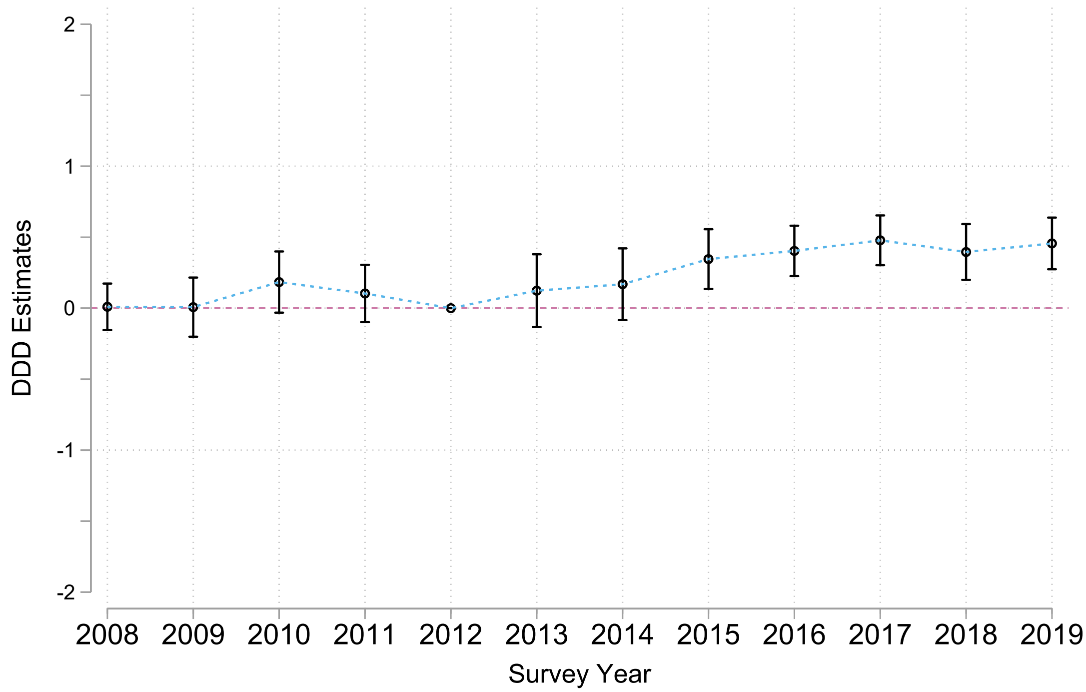
This figure plots the Poisson Conditional Fixed Effects estimates for Equation (5), where time is either Survey Year or Marriage Year. The sample is restricted to men only. Standard errors are clustered at the group-state level. [Source] Data are from the American Community Survey. The first subfigure uses the 2008-2019 rounds; the second subfigure uses the 2012-2019 rounds.

A.3.13 Urban Heterogeneity

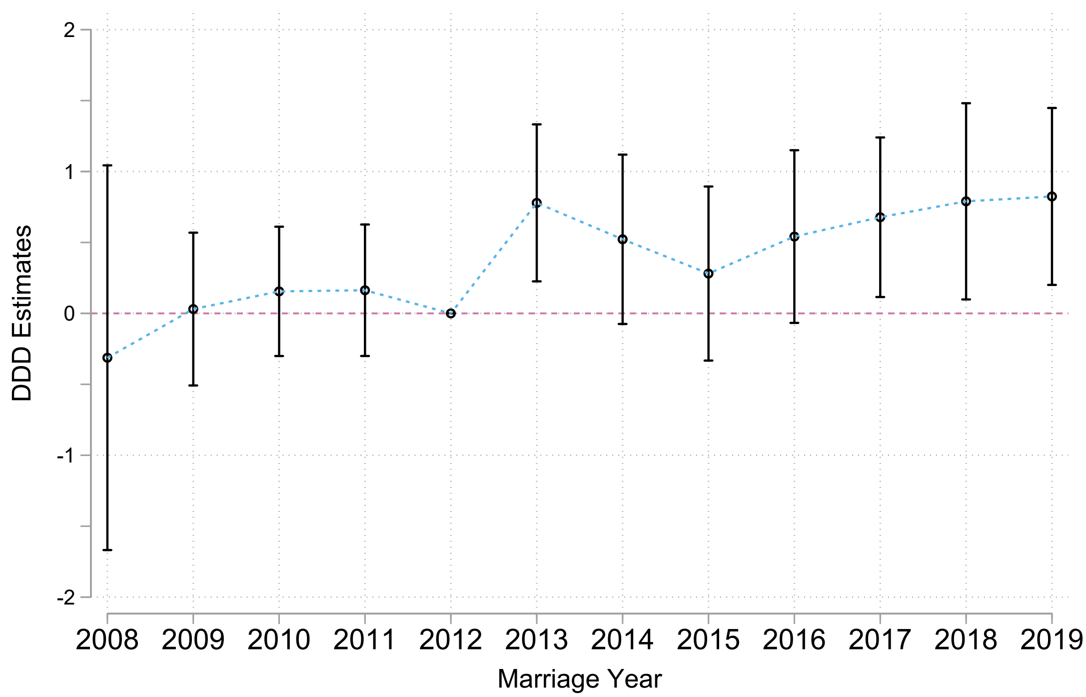
Table A22: Heterogeneity by Urbanicity - DDD Estimates Restricted by Metro Area

	Coupled Rate Per Adult		Marrying Rate Per Adult Per Year	
	In Metro	Not In Metro	In Metro	Not In Metro
post × M × SS	0.296	0.660	0.606	0.005
	(0.053)	(0.248)	(0.194)	(0.213)
post × SS	0.341	0.425	1.358	1.557
	(0.021)	(0.057)	(0.159)	(0.134)
post × M	0.055	0.025	-0.004	-0.043
	(0.018)	(0.059)	(0.017)	(0.029)
Observations	2,388	2,328	2,376	2,232
Log Likelihood	-2,164,843	-3,122,633	-12,103,267	-3,120,534
Relative IRR	1.344	1.936	1.832	1.005
SE	0.071	0.479	0.355	0.214
p-value	0.000	0.051	0.019	0.982
χ^2 Pre-Trend Test	5.177	7.343	1.912	5.438
p-value	0.270	0.119	0.752	0.245

This table reports the Poisson Conditional Fixed Effects estimates for Equation (3). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is post×SS×M and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 pre-trend test reports the test statistic for the test of parallel pre-trends, described by Equation (6). Standard errors in parentheses, clustered at the group-state level. [Source] Created using the American Community Survey. Columns 1 and 2, with coupled individuals, uses the 2008-2019 rounds. Columns 3 and 4, with married individuals only, uses the 2012-2019 rounds.



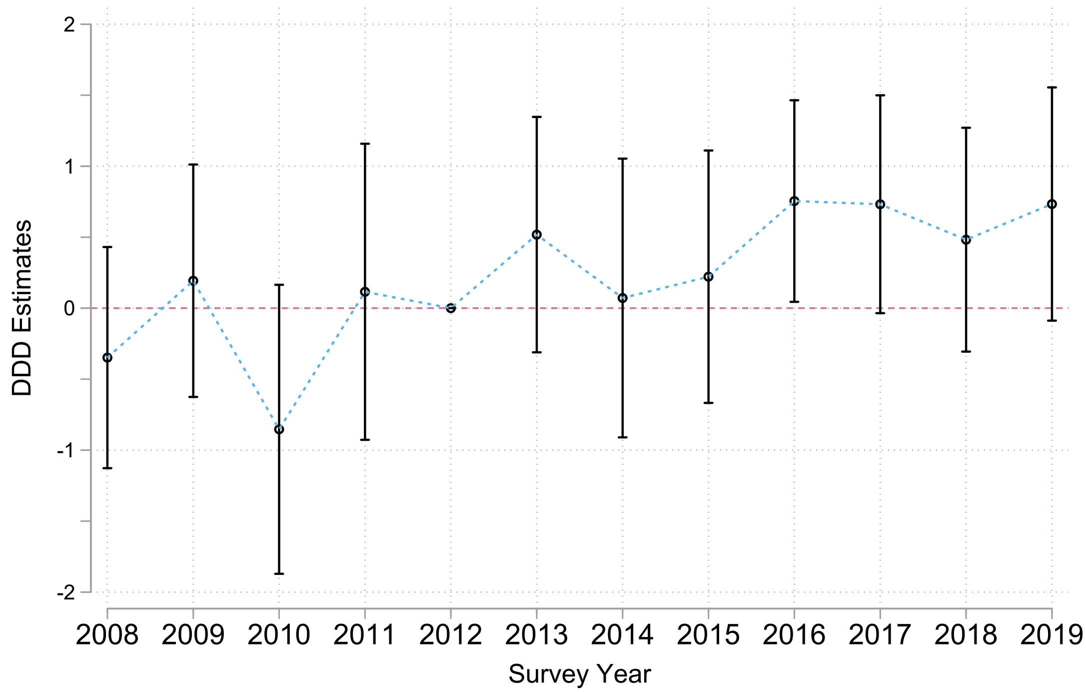
(a) Urban by Survey Year



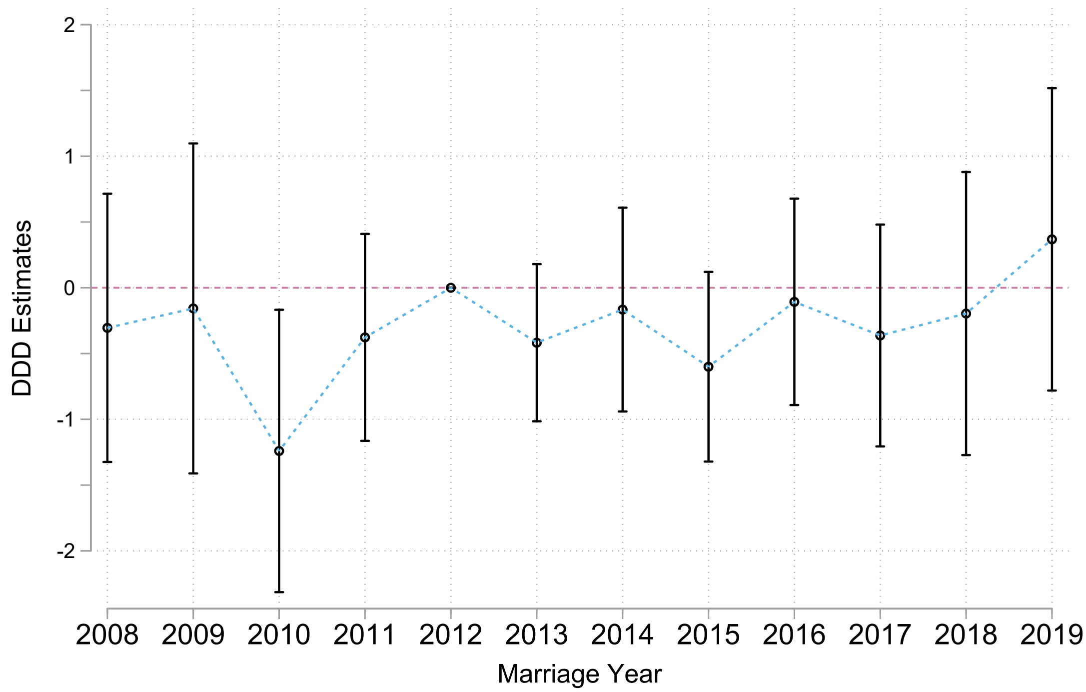
(b) Urban Sample by Marriage Year

Figure A6: Dynamic DDD Estimates for Urban Sample

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (5), where time is either Survey Year or Marriage Year. The sample is restricted to those in metro areas only. Standard errors are clustered at the group-state level. [Source] Data are from the American Community Survey. The first subfigure uses the 2008-2019 rounds; the second subfigure uses the 2012-2019 rounds.



(a) Non-Urban by Survey Year



(b) Non-Urban Sample by Marriage Year

Figure A7: Dynamic DDD Estimates for Non-Urban Sample

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (5), where time is either Survey Year or Marriage Year. The sample is restricted to those not in metro areas only. Standard errors are clustered at the group-state level. [Source] Data are from the American Community Survey. The first subfigure uses the 2008-2019 rounds; the second subfigure uses the 2012-2019 rounds.

A.3.14 Naturalization

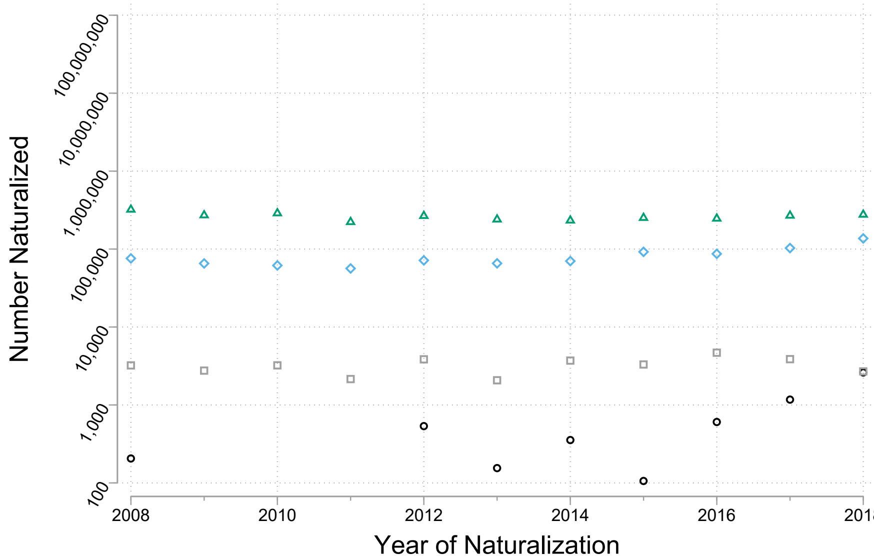


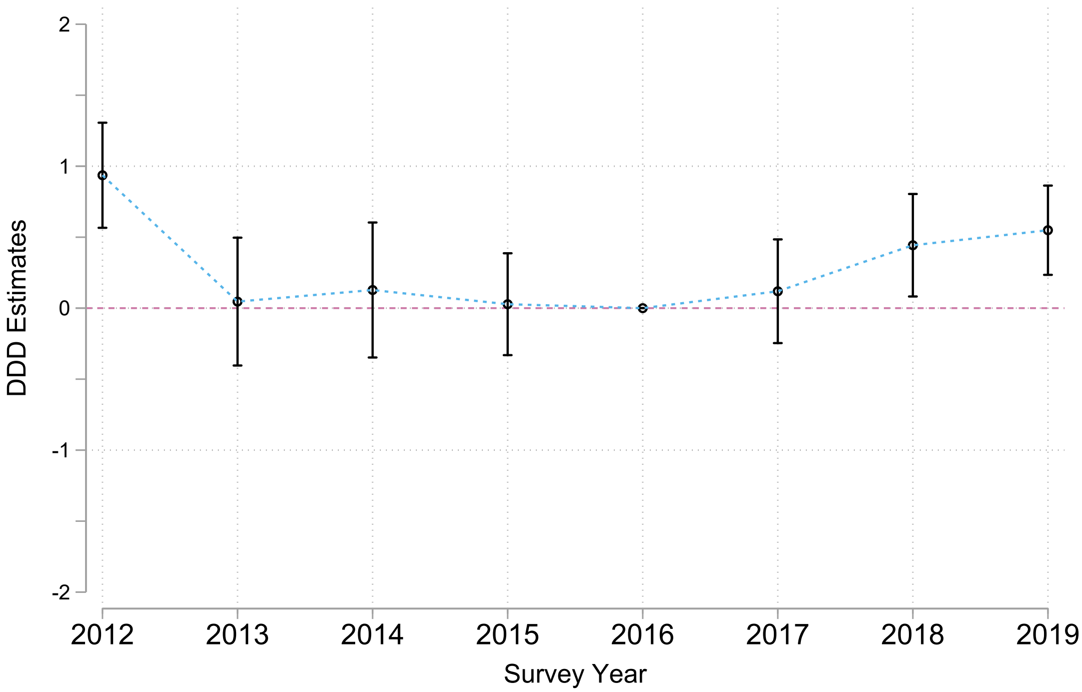
Figure A8: Number of Naturalized Individuals by Naturalization Year

Each point represents the number of individuals in a given couple type by naturalization year, representative of the United States population in 2019. The vertical axis depicts the number of naturalized individuals on a logarithmic scale. The horizontal axis depicts the year in which a partner is naturalized. The four couple types are determined by the intersection of same- or different-sex and possibly naturalized through marriage or not naturalized through marriage. Possible naturalization through marriage means a naturalized individual married a citizen three or more years before naturalization. Not naturalized through marriage means a naturalized individual is unmarried or married to a citizen for less than three years. [Source] Created using the 2019 round of the American Community Survey.

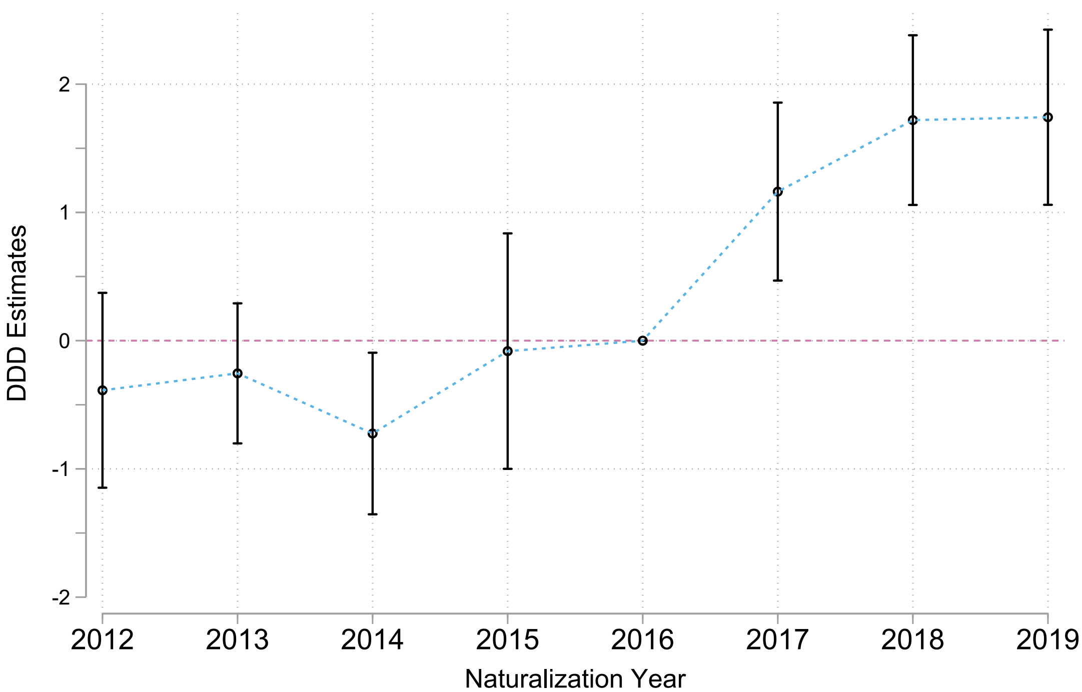
Table A23: DDD Estimates for Naturalized Coupled Individuals

	Naturalized Coupled Individuals	
	by Survey Year (Stock)	by Naturalization Year (Flow)
post × A × SS	0.155	1.722
	(0.119)	(0.200)
post × SS	0.296	-0.005
	(0.048)	(0.127)
post × A	0.046	0.247
	(0.028)	(0.027)
Observations	1,536	1,416
Log Likelihood	-195,348	-737,261
Relative IRR	1.167	5.595
SE	0.139	1.117
p-value	0.228	0.000
χ^2 Pre-Trend Test	29.571	7.003
p-value	0.000	0.136

This table reports estimates for the relationship between access to federal marriage benefits for same-sex couples and naturalizations possibly resulting from same-sex marriage. Possible naturalization through marriage (PNTM) means a naturalized individual married a citizen three or more years before naturalization. Not naturalized through marriage means a naturalized individual is unmarried or married to a citizen for less than three years. The relative incidence rate ratio (IRR) is the exponentiated coefficient of interest. The χ^2 statistic is for a test of parallel pre-trends. Standard errors are clustered at the group-state level. [Source] Created using the 2012-2019 rounds of the American Community Survey.



(a) Naturalized Individuals by Survey Year



(b) Naturalized Individuals by Naturalization Year

Figure A9: Dynamic DDD Estimates for Naturalized Individuals
This figure plots the Poisson Conditional Fixed Effects estimates for Equation (5), where time is either Survey Year or Naturalization Year. The sample is restricted to naturalized individuals only. Standard errors are clustered at the group-state level. [Source] Data are from 2012-2018 rounds of the American Community Survey.

A.3.15 Main Result without Non-Citizen Same-Citizenship Couples

Table A24: DDD Estimates for the Main Specification where Same-Citizenship Couples are both Citizens

	Coupled Rate Per Adult	Marrying Rate Per Adult Per Year
post × M × SS	0.301	0.550
	(0.053)	(0.183)
post × SS	0.370	1.374
	(0.018)	(0.158)
post × M	0.078	-0.026
	(0.015)	(0.015)
Observations	2,448	2,436
Log Likelihood	-651,825	-13,643,317
Relative IRR	1.351	1.733
SE	0.072	0.317
p-value	0.000	0.021
χ^2 Pre-Trend Test	2.830	0.502
p-value	0.587	0.973

This table reports the Poisson Conditional Fixed Effects estimates for Equation (3). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is post×SS×M and the Relative Incidence Rate Ratio (IRR) is the exponentiated coefficient of interest. The χ^2 pre-trend test reports the test statistic for the test of parallel pre-trends, described by Equation (6). Standard errors in parentheses, clustered at the group-state level. [Source] Created using the the American Community Survey. Column 1, with coupled individuals, uses the 2008-2019 rounds. Column 2, with married individuals only, uses the 2012-2019 rounds.

A.3.16 Difference-in-Difference Results and Results from Non-Citizens Only

Table A25: DD and DDD Estimates for Entire Sample and Non-Citizen Sample

	Coupled Rate			Non-Citizen Coupled Rate		
	ΔΔ SS only	ΔΔ M only	ΔΔΔ	ΔΔ SS only	ΔΔ M only	ΔΔΔ
post × M × SS			0.304			0.318
			(0.053)			(0.097)
post × SS		0.670	0.367		0.680	0.362
		(0.050)	(0.018)		(0.050)	(0.083)
post × M	0.378		0.074	0.347		0.029
	(0.051)		(0.015)	(0.094)		(0.024)
Observations	1,224	1,224	2,448	1,176	1,224	2,400
Log Likelihood	-241,964	-240,497	-666,781	-132,583	-125,105	-418,621
Relative IRR	1.459	1.955	1.355	1.414	1.974	1.374
SE	0.074	0.098	0.072	0.133	0.099	0.133
p-value	0.000	0.000	0.000	0.002	0.000	0.005
χ^2 RESET Test	1.236	1.759	2.764	1.284	3.047	1.134
p-value	0.539	0.415	0.251	0.526	0.218	0.567
χ^2 Pre-Trend Test	5.647	6.995	3.174	11.255	5.894	11.979
p-value	0.227	0.136	0.529	0.024	0.207	0.018

Table A26: DD and DDD Estimates for Entire Sample and Non-Citizen Sample

	Marriage Rate			Non-Citizen Marriage Rate		
	ΔΔ SS only	ΔΔ M only	ΔΔΔ	ΔΔ SS only	ΔΔ M only	ΔΔΔ
post × M × SS			0.540			0.719
			(0.179)			(0.165)
post × SS		1.923	1.383		1.951	1.232
		(0.093)	(0.153)		(0.090)	(0.139)
post × M	0.532		-0.008	0.883		0.163
	(0.178)		(0.015)	(0.164)		(0.016)
Observations	1,212	1,212	2,436	1,032	1,212	2,256
Log Likelihood	-1,266,248	-1,844,300	-14,930,592	-127,910	-938,519	-2,470,639
Relative IRR	1.702	6.845	1.716	2.417	7.037	2.053
SE	0.303	0.636	0.307	0.397	0.631	0.339
p-value	0.021	0.000	0.020	0.000	0.000	0.002
χ^2 RESET Test	21.094	1.534	3.167	0.507	1.217	3.903
p-value	0.000	0.464	0.205	0.776	0.544	0.142
χ^2 Pre-Trend Test	0.695	15.038	0.457	2.263	15.340	1.535
p-value	0.952	0.005	0.978	0.688	0.004	0.820