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

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Abstract

I compare mixed-citizenship couple formation under an immigration policy granting spousal visas to one without spousal visas, by leveraging federal same-sex marriage recognition from ending the Defense of Marriage Act. I estimate changes in mixed-citizenship same-sex couple counts and marriage counts, accounting for changes in other same-sex and other mixed-citizenship couples, using a triple difference design. Spousal visa access increases mixed-citizenship coupling by 36%, and mixed-citizenship marriages by 78%. Transfer benefits, health insurance, roommates, moving, or state-level heterogeneity do not explain the results. Informal calculations suggest 1.5 million people are currently together thanks to spousal visas.

JEL Codes: J12, J15, J18, K37

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Policy can impact partner choice. One federal marriage policy, spousal visas, grants permanent residency (Green Card) and an expedited path to citizenship for the non-citizen spouse of a citizen. Absent this policy, marrying a citizen violates most non-resident visas and failed visa renewal can dissolve *mixed-citizenship* couples—where one partner is a citizen and the other is a non-citizen. Therefore, spousal visas reduce barriers to mixed-citizenship couple formation and equip mixed-citizenship couples with a tool to preserve their union in the face of visa uncertainty. This paper studies the effect of access to spousal visas on couple formation, marriage, and assortative mating in the United States.

Measuring how spousal visas affect couple formation, marriage, and assortative mating is challenging because it requires policy variation. Meaningful policy change regarding access to spousal visas has not occurred for decades, when social norms regarding couple formation were substantively different and data sparser. Recently the federal government expanded its definition of spouse and, by extension, expanded access to federal marriage benefits. This followed the Supreme Court decision in *United States v. Windsor*, which ended the Defense Of Marriage Act (DOMA). This paper exploits this policy change to understand how access to spousal visas affected outcomes.

Passed in 1996, DOMA forbade the federal government from recognising the marriages of same-sex couples. Hence, same-sex couples could not access spousal visas. Non-permanent residents must switch to a spousal visa upon marrying a citizen because marrying a citizen shows an intent to stay in the United States permanently, which violates most non-permanent visas. Therefore, non-permanent residents were effectively barred from same-sex marriage. However, when DOMA was struck down in 2013, the federal government immediately recognised same-sex marriages and granted married same-sex couples all federal marriage benefits, including spousal visas. Consistent with access to spousal visas increasing net couple formation and marriage rates, the stock of mixed-citizenship same-sex couples recorded in the American Community Survey (ACS) doubled from 2012 to 2017 (Figure 1a), a larger proportional increase than same-citizenship same-sex couples. Similarly, the number of mixed-citizenship same-sex marriages permanently increased tenfold in 2013 (Figure 1b).

This paper analyses the 2008 to 2019 rounds of the ACS, repeated cross-sections that sample 1% of the United States population each year. The ACS designates a “head-of-household” and lists her or his relationship to every other household member. Possible relationships include “spouse” and “unmarried romantic partner”. Therefore, cohabiting same-sex couples are identifiable, but not the sexual orientation of non-coupled individuals or couples that live apart.

To account for unobserved same-sex attracted singles, I use a count model for the analysis. I create state-by-year counts for the number of individuals in four types of couples: mixed-

citizenship same-sex, same-citizenship same-sex, mixed-citizenship different-sex, and same-citizenship different-sex. The effect of access to spousal visas is the difference between the change over time in number of people in mixed-citizenship same-sex couples and the change over time in the number of people in same-citizenship same-sex couples, minus the difference between the change over time in number of people in mixed-citizenship different-sex couples and the change over time in the number of people in same-citizenship different-sex couples. I use a difference-in-differences-in-differences (DDD) design to identify this effect. I estimate the relative incidence of mixed-citizenship same-sex couples increases 36%, statistically significant at the 1% level. Similarly, I estimate the relative marriage rate of mixed-citizenship same-sex couples increases 78%, which jumps up in 2013 and persists. This suggests visa policy absent spousal visas is hostile to mixed-citizenship couples; and spousal visa policy enables mixed-citizenship couples to remain together, increasing net formation, and to marry. This improves the well-being of people (who would be) in mixed-citizenship couples. Lastly, these increases represent an increase in disassortative mating by citizenship by definition. I also find disassortative mating by birth country increases by 11%.

Robustness checks show the results are not driven by: access to other federal benefits, health insurance, roommates relabelling as couples, state-level timing of same-sex marriage legalisation, state-level non-citizen or illegally-present non-citizen shares, or couples moving across state lines. Consistent with new couples forming, the point estimates for younger couples are larger than those for older couples; and mixed-citizenship same-sex couples are relatively more likely to both move within-state.

This is the first paper to directly study spousal visa access. My findings quantify immigration policy’s importance for coupling and marriage. In doing so, I contribute new empirical evidence that a large understudied policy affects the rationale for and gains from marriage. This contributes to the literature on the rationale and benefits of coupling and marriage (Becker, 1991; Weiss, 1997; Stevenson and Wolfers, 2007; Edlund, 2013; Lafortune and Low, 2020). This also contributes to the literatures: studying immigrants’ marriage patterns (Kelly, 2010; Lafortune, 2013; Adserà and Ferrer, 2015; Kawaguchi and Lee, 2017; Dziadula, 2020); studying immigrant characteristics and visa policies (Jasso, Rosenzweig and Smith, 2000; Guven, Tong and Yuksel, 2020; Wang, 2021); linking government policies to marriage rates (Bitler et al., 2004; Francesconi and Klaauw, 2007; Klerman, 2009; Bobonis, 2011; Abramowitz, 2016); identifying determinants of assortative mating (Abramitzky, Delavande and Vasconcelos, 2011; Mansour and McKinnish, 2014; Chiappori, Salanié and Weiss, 2017); and examining marriage eligibility expansion (Fryer Jr, 2007; Gevrek, 2014; Carpenter et al., 2018; Carpenter, 2020). This paper also 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), and improved well-being resulting from same-sex marriage (Delhomme and Hamermesh, 2021).

The paper is organised as follows: Section 1 explains the institutional background and policy change. Section 2 describes the data. Section 3 explains the research design and estimation. 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. “Single/never married” and “Married” are classifications that affect federal and state tax and transfer policy. 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 labour supply to optimise over tax and transfer benefits. Transfer programs include Medicaid, Supplemental Nutrition Assistance Program, the Earned Income Tax Credit, and any other means tested program. Social Security benefits can also depend on marriage because of 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 residency, instead of the usual five. These benefits enable mixed-citizenship couples to stay together if other visas aren’t granted or renewed, they don’t 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 legalised same-sex marriage for its residents; and California followed suit in 2008, including for non-residents. This spurred a rush in same-sex marriages (visible in Figure 1b). Couples travelled from around the country and world to get married in California¹. 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 (that is, according to their marriage contracts). In 2015, the Supreme Court ruled in *Obergefell v. Hodges* that same-sex marriage is legal in all states, requiring the remaining states to immediately legalise, perform, and recognise same-sex marriages.²

The Defense of Marriage Act (DOMA) banned federal recognition of same-sex marriages in 1996. So as same-sex couples gained access to the marriage contract in 2008 and access to state-level marriage benefits, same-sex couples could not access 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 recognising 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 married same-sex couples.

This paper uses the variation in access to federal marriage benefits for same-sex couples induced by the end of DOMA. This change in federal policy was exogenously ordered after years of litigation and a close decision—made in a branch of government separate from those that grant the benefits or by elected officials. Importantly, this happened after same-sex couples gained access to the marriage contract in 2008.

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 an intent to stay in the United States. Therefore, upon marriage,

¹After Proposition 8 passed in November 2008, same-sex marriage became illegal in California. However, performed marriages remained lawful. California re-legalised same-sex marriage in 2013.

²Table 3 provides a timeline for same-sex marriage legalisation.

non-immigrant visas holders must switch to spousal visas to remain in the United States.

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 prior to 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.

While local authorities provide marriage licenses that grant classification as married for most purposes, 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. Indeed, 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 de-naturalisation (Smith and Elmilady, 2014).

It is unlikely that fraudulent marriages drive the results for three reasons. First, proving *bona fide* marriage for immigration purposes is challenging. The Immigration Marriage Fraud Amendments in 1986 made proving marriage for immigration purposes so challenging that the number of non-citizen men married to citizen women unambiguously declined (Jasso, Rosenzweig and Smith, 2000). Secondly, it's likely harder for same-sex couples to meet immigration officers' criteria (Carron, 2014). For example: public relationships publicly disclose sexual orientation (which is potentially costly), and filing taxes jointly was not possible in all states. Third, fraudulently married couples need not truly live together, respond to household surveys as if they are married, or even respond to household surveys at all. However, they should appear to live together to convince immigration officers their marriage is *bona fide*.

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/renter), all other members of the household are then given 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 they are both female or both male, and couples are “different-sex” if one is female and the other male. Married couples who do not live together and couples that live together but neither partner is the head-of-household are not identifiable in the sample and are, therefore, excluded from study. Likewise, single individuals’ sexual and romantic preferences are unobserved, so they are not in the sample. Lastly, I restrict the sample to individuals aged 18 or older and 64 or younger, regardless of partner’s age.

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

Prior to 2013, same-sex married couples were re-coded as unmarried romantic partners and only 2012 has a data quality flag to identify re-coded couples. Therefore, to understand the stock of couples, I pool together married and unmarried couples and order them by survey year. Whereas to understand entry into marriage, 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 main analysis. Note that this selects on marriage duration: couples in the pre-period are married for 0-12 years and couples in the post-period are married for 0-6 years.

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 than MDS couples to have any health insurance (0.91 to 0.84). These summary statistics do not suggest federal transfer benefits or access to health insurance are likely to explain differential mixed-citizenship or

same-sex coupling patterns.³

2.3 Couple Counts

To identify the policy’s effect on changes in mixed-citizenship same-sex coupling net of changes in other mixed-citizenship coupling and other same-sex coupling, I employ a triple difference regression design. This design is not defined at the individual level because individuals’ preferences over partner sex and partner citizenship 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 in MSS marriages increases tenfold, virtually overnight in 2013 for MSS marriages. There is also a jump in NSS marriages in 2008, because California legalised 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. For ancillary analyses, I also group couples by another couple-level binary variable. For example, an indicator for: receipt of a federal transfer benefit, health insurance type, disassortative mating characteristics, or moving within the past year.

3 Method

I employ a difference-in-differences-in-differences (DDD) design and 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 couple formation

³Tables 4, 5, and 6 provide summary statistics for additional variables and for married couples only.

and assortative mating, as follows:

$$E[y_{gst}|\mathbf{x}_{gst}] = \exp(\beta_0 + \beta_1 post_t + \beta_2 M_g \times post_t + \beta_3 SS_g \times post_t + \beta_4 M_g \times SS_g \times post_t + \sigma_{gs} + \tau_t + \Gamma_1 \mathbf{X}_{gst} + \Gamma_2 \mathbf{X}_{st}). \quad (1)$$

Where y_{gst} is the number of individuals in group g , in state s , in year t ; M_g is an indicator variable for mixed-citizenship; SS_g is an indicator variable for same-sex; $post_t$ is an indicator variable for the post-period, when married same-sex couples can access spousal visas; σ_{gs} are group-state fixed effects; τ_t are year fixed effects; t are survey years or marriage years. $\mathbf{X}_{gst}$ are group-state-year-level covariates: counts for the number of couples with any transfer benefits and any health insurance. $\mathbf{X}_{st}$ are state-year-level covariates: individual population shares for male, white, Hispanic, black, non-citizen, naturalised, student, active-duty military, welfare or foodstamp receipt, and age categories (18-24, 25-34, 35-44, 45-54, 55-64, ≥ 65); household population shares for cohabitation; proportion of different-sex cohabiting couples that are unmarried; and median family income.

β_4 is the coefficient of interest: $\exp(\beta_4)$ is the incidence rate ratio of the increase in MSS coupled individuals relative to the increase in NSS coupled individuals and net of the same ratio for MDS coupled individuals relative to NDS coupled individuals.

The Poisson model has a log-linear relationship between the dependent and independent variables. This has two advantages. First, it can implicitly control for singles' sexual orientation. Suppose the sub-populations with same-sex attraction and different-sex attraction are constant within states, or suppose they evolve annually the same way across states. Take this number or growth rate as given. Then an increase in a group's sub-population is interpretable as an increase in the coupling rate for the sub-population whose preferences align with that group. For example, an increase in mixed-citizenship same-sex couples is also interpretable as an increase in the proportion of same-sex attracted individuals in a mixed-citizenship same-sex couple. Thus $\exp(\beta_4)$ is interpretable as the incidence rate ratio (IRR) of the mixed-citizenship coupling rate relative to the same-citizenship coupling rate for same-sex attracted individuals, net of the ratio of the mixed-citizenship coupling rate relative to the same-citizenship coupling rate for different-sex attracted individuals.

Second, the Poisson model does not drop observations with zero couples, as would the typical log-linear model. (The typical log-linear model has the logarithm on the inside of the expectation.) Hence, despite the scarcity of MSS couples in small states, the Poisson model 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, 2021).

The conditional fixed effects Poisson model partials out the fixed effects, so σ_{gs} and τ_t are not estimated. Similarly, indicator variables M_g and SS_g are not included in Equation (1) because they are subsumed by σ_{gs} .

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). That is, Quasi-Maximum Likelihood Estimation (QMLE) for Poisson regression does not assume the mean and variance are equal⁴. Instead, Quasi-MLE computes the variance/covariance matrix using the outer product of the gradient vector. 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 problems described by Bertrand, Duflo and Mullainathan (2004) regarding difference-in-differences inference. I cluster the standard errors at the group-state-level in all specifications.

For the difference-in-differences-in-differences design to isolate the effect, the groups must have parallel pre-trends. Dynamic estimates also provide insight into how the effects evolve over time. Therefore, I estimate the following:

$$\begin{aligned}
E[y_{gst}|\mathbf{x}_{gst}] = \exp(&\alpha + \sum_{k=2008}^{2019} \delta_k M_g \times 1\{t = k\}_t \\
&+ \sum_{k=2008}^{2019} \gamma_k SS_g \times 1\{t = k\}_t \\
&+ \sum_{k=2008}^{2019} \beta_k M_g \times SS_g \times 1\{t = k\}_t \\
&+ \sigma_{gs} + \tau_t),
\end{aligned} \tag{2}$$

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

$$\beta_{2008} = \beta_{2009} = \beta_{2010} = \beta_{2011} = 0. \tag{3}$$

For Poisson regression, the pre-trends test yields a χ^2 -statistic instead of an F -statistic.

I estimate Equation 1 for couples married between 2008 and 2019 and surveyed between 2012 and 2019. As mentioned above, coding 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

⁴The Poisson probability distribution has the property of equal mean and variance and the generic MLE Poisson regression assumes this.

survey year is useful for two reasons. First, the survey year estimates capture changes in the *stock* of couples. The marriage year estimates capture entry into marriage, hence they represent a *flow* into marriage and marriage rates. The dynamic estimates from the marriage specification also inform whether the relative flow into mixed-citizen same-sex couples is temporary or persistent, which is important for understanding the policy. Second, marriage year estimates provide a simple robustness check: the response should only come in the post-period. That is, if the policy change facilitates MSS coupling, then those couples who marry should marry after the policy change.

4 Results & Discussion

4.1 Main Results

Table 2 reports the Poisson Conditional Fixed Effects quasi-maximum likelihood estimates for the difference-in-differences-in-differences effect of spousal visa access on the number of mixed-citizenship same-sex coupled individuals or married individuals, described in Equation (1). The coefficient of interest is for $post \times \text{Same-Sex Couple} \times \text{Mixed-Citizenship Couple}$, given in the first row. The first two columns report the estimates for cohabiting individuals (married and unmarried), where year refers to the year an individual is surveyed. The second two columns report the estimates for cohabiting married individuals, where year refers to the year of marriage. The first and third columns' estimates are from models without covariates, whereas the other two include them. The parallel pre-trends test statistics and p-values, described by Equations (2) and (3), are at the bottom of the table. Finally, Figure 2 plots the dynamic estimates, described by Equation (2).

This paper's primary effect of interest is in Column 1 of Table 2. The increase in mixed-citizenship same-sex coupled individuals is 0.304 log points. The exponentiated coefficient, the relative IRR, is 1.355 with a standard error of 0.076. This represents a 35.5% increase in mixed-citizenship same-sex coupling, statistically significant at the 1% level. The χ^2 -statistic for parallel pre-trends 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 is consistent with higher net couple formation. Higher net couple formation results from decreased dissolution or increased formation. Hence, this result suggests fewer dissolutions resulting from immigration policy and more formations resulting from greater value to MSS coupling. (MSS matches are relatively more valuable in the post-period because they gain access to marriage and spousal visas.)

Column 3 shows the increase in mixed-citizenship same-sex married individuals is 0.577

log points. The relative IRR is 1.780 with a standard error of 0.323. This represents a 78.0% increase in mixed-citizenship same-sex marriages, statistically significant at the 5% level. The χ^2 statistic for parallel pre-trends is 1.276, which fails to reject the assumption of parallel pre-trends. Figure 2b plots the dynamic estimates. The 2008 estimate is off-trend because a disproportionate number of same-citizenship same-sex marriages occurred when California legalised 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.

The estimates in Columns 2 and 4 are from a model including covariates. They are smaller but not statistically different. This means other federal transfer benefits, health insurance, or state-year demographic fluctuations do not explain the result.

4.2 Ancillary Results

4.2.1 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, therefore, explain why mixed-citizenship same-sex couples are differentially affected. Spousal visas, for example, matter to mixed-citizenship couples only and same-sex couples recently gained access to them. Other alternatives do not offer credible explanations for differential treatment of MSS couples. Specifically, I find no evidence to support alternative explanations related to transfer benefits, health insurance, moving across state lines, state-level timing of same-sex marriage legalisation, the non-citizen population, the illegally present non-citizen population, same-sex couples masquerading as roommates, or non-citizen partners' birth countries.

4.2.2 Mechanism

Given the results and the institutional setting, I expect non-permanent residents drive the results. Because removing restrictions on their marriages should increase their marriages; and removing pressure to dissolve from visa challenges should increase the stock of couples over time. I cannot test this mechanism directly, because visa or residency status is unobserved. Nevertheless, I find results consistent with this mechanism; and I find results inconsistent with disproportionate increases in “mail order” spouses or marriage fraud.

4.2.3 Assortative Mating

Mixed-citizenship couples are by definition disassortatively matched by citizenship. Furthermore, the increase in MSS couples naturally increases the proportion of same-sex couples with the characteristics of MSS couples.⁵ Thus, increases in mixed-citizenship couples have implications for assortative mating.

5 Conclusion

The Defense of Marriage Act was not merely symbolic, instead it tore mixed-citizenship same-sex couples apart. It prevented their marriages and barred access to spousal visas. Mixed-citizenship couples can use spousal visas to maintain legal status when employment or matriculation change, or when facing a visa cap. That's because work or study visas are capped and require employment or matriculation, but spousal visas are unlimited. Simple calculations⁶ suggest that DOMA separated 80,000 people from their same-sex partners and prevented 50,000 people from marrying, between 2008 and 2012. Thus DOMA caused some LGB individuals to suffer irrevocable loss.

In a world without spousal visas, mixed-citizenship different-sex couples would also be torn apart. Overall, approximately 1.5 million people have their current partners thanks to spousal visas, as suggested by back-of-the-envelope calculations⁷. These current matches maximise total utility or social benefit, according to matching theory (Shapley and Shubik, 1971; Choo and Siow, 2006; Dupuy and Galichon, 2014). Hence, without spousal visas, immigration policy reallocates millions of people to new partners or to no partner. In doing so, it lowers the total social benefit of coupling.

⁵For example, mixed-citizenship couples are more likely composed of partners: of different races, with large age or education gaps, or born in different countries (Table 4).

⁶An estimated 65825 people marry a mixed-citizenship same-sex partner from 2008 to 2012, based on the 2012-2019 ACSs. After DOMA, there are 1.78 times more marriages. So $65825 \times 0.78 = 51343$ people are prevented from marrying. Similarly, there are 233489 mixed-citizenship same-sex coupled individuals sampled from 2008 to 2012 in the ACS. After DOMA, there are 1.36 times more couples. So $233489 \times 0.36 = 84056$ people were prevented from forming a couple.

⁷Take the estimate in Table 2 as the true population effect. Then the proportion of mixed-citizenship couples benefiting from a spousal visa is $0.36/1.36 = 0.26$. There are 5729983 mixed-citizenship coupled individuals estimated from the 2019 ACS. So $5729983 \times 0.26 = 1489796$ people benefit from a spousal visa.

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Table 1: Individual-Level Summary Statistics

	MSS	NSS	MDS	NDS
	Mixed- Citizenship SS	Same- Citizenship SS	Mixed- Citizenship DS	Same- Citizenship DS
Citizens	0.00 (0.00)	0.98 (0.14)	0.00 (0.00)	0.93 (0.25)
Married	0.53 (0.50)	0.33 (0.47)	0.90 (0.29)	0.88 (0.33)
Age	40.62 (10.62)	43.06 (11.70)	41.39 (10.72)	44.79 (11.53)
Male	0.66 (0.47)	0.47 (0.50)	0.50 (0.50)	0.49 (0.50)
<i>Transfers</i>				
Foodstamps	0.08 (0.27)	0.10 (0.30)	0.13 (0.33)	0.09 (0.28)
TANF	0.02 (0.13)	0.02 (0.15)	0.02 (0.14)	0.01 (0.12)
Soc Sec	0.06 (0.23)	0.10 (0.30)	0.05 (0.22)	0.10 (0.30)
Supp Sec	0.02 (0.13)	0.03 (0.18)	0.02 (0.13)	0.02 (0.15)
Any Transfer	0.14 (0.34)	0.20 (0.40)	0.18 (0.38)	0.18 (0.39)
<i>Insurance</i>				
Employer Ins	0.76 (0.43)	0.81 (0.39)	0.63 (0.48)	0.77 (0.42)
Private Ins	0.84 (0.36)	0.89 (0.32)	0.71 (0.45)	0.86 (0.35)
Public Ins	0.17 (0.38)	0.21 (0.41)	0.20 (0.40)	0.18 (0.38)
Purchased Ins	0.18 (0.38)	0.18 (0.38)	0.13 (0.34)	0.14 (0.35)
Any Insurance	0.91 (0.28)	0.95 (0.21)	0.84 (0.37)	0.92 (0.26)
Observations	9,034	149,138	639,427	11,429,990

This table reports means and standard deviations for demographic, transfer, and insurance variables. Each column represents individuals in a specific couple type: mixed-citizenship same-sex, same-citizenship same-sex, mixed-citizenship different-sex, and same-citizenship different-sex. Data are from the 2008-2019 rounds of American Community Survey.

(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 four couple types are determined by the intersection of same- or different-sex and same- or mixed-citizenship. 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. Data are from the 2008 to 2019 rounds of the American Community Survey. Figure 1a uses all years; Figure 1b uses 2019 only.

Table 2: DDD Estimates For Coupled and Married Individuals

	Coupled Individuals by Survey Year		Married Individuals by Marriage Year	
post $\times$ M $\times$ SS	0.304 (0.053)	0.278 (0.052)	0.577 (0.182)	0.466 (0.196)
post $\times$ SS	0.367 (0.018)	0.357 (0.016)	1.398 (0.153)	1.317 (0.164)
post $\times$ M	0.074 (0.015)	0.059 (0.013)	0.144 (0.016)	0.067 (0.035)
post	-0.062 (0.006)	-0.020 (0.004)	-0.745 (0.006)	0.173 (0.026)
Observations	2448	2300	2405	2134
Log Likelihood	-666,781	-427,173	-14,917,134	-2,841,546
Covariates		X		X
Relative IRR	1.355	1.321	1.780	1.593
SE	0.072	0.068	0.323	0.312
p-value	0.000	0.000	0.016	0.057
χ^2 Pre-trend Test	3.174	3.902	1.276	2.109
p-value	0.529	0.419	0.865	0.716

This table reports the Poisson Conditional Fixed Effects estimates for Equation (1). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. 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 pre-trend test reports the test statistic for the test of parallel pre-trends, described by Equation (3). Standard errors in parentheses, clustered at the group-state level. Data are from the American Community Survey. The first two columns use the 2008-2019 rounds; the second two columns use the 2012-2019 rounds.

(a) Coupled Individuals by Survey Year

(b) Married Individuals by Marriage Year

Figure 2: Dynamic DDD Estimates

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (2), where time is either Survey Year or Marriage Year. Standard errors are clustered at the group-state level. Data are from the American Community Survey. The first subfigure uses the 2008-2019 rounds; the second subfigure uses the 2012-2019 rounds.

A Online Appendix

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

Table 3 lists states by their timing of same-sex marriage legalisation, noting the method and existing alternatives to marriage.

Table 3: Timing of Same-Sex Marriage Legalisation

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 legalised 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*. Created using Table 1 from Hansen, Martell and Roncolato (2020), with additional information from the National Center for Lesbian Rights (2018).

A.2 Ancillary Summary Statistics

Table 4: Additional Individual-Level Summary Statistics - All Co-habiting Couples

	MSS	NSS	MDS	NDS
	Mixed- Citizenship SS	Same- Citizenship SS	Mixed- Citizenship DS	Same- Citizenship DS
Survey Year	2,014.74 (3.32)	2,014.08 (3.44)	2,013.53 (3.44)	2,013.40 (3.46)
year married	1,252.72 (973.52)	947.75 (1,000.40)	1,880.05 (477.38)	1,836.24 (540.90)
1 Born Abroad	0.74 (0.44)	0.08 (0.27)	0.52 (0.50)	0.06 (0.24)
Other Domestic	0.41 (0.49)	0.21 (0.41)	0.20 (0.40)	0.10 (0.30)
Interracial Couple	0.16 (0.37)	0.12 (0.33)	0.10 (0.30)	0.08 (0.27)
Other Out	0.32 (0.47)	0.22 (0.42)	0.32 (0.47)	0.20 (0.40)
Educ Gap ≥ 3 Years	0.57 (0.50)	0.46 (0.50)	0.43 (0.50)	0.29 (0.45)
Age Gap ≥ 5 Years	0.97 (0.18)	1.00 (0.06)	0.92 (0.27)	0.98 (0.13)
Both Speak English Very Well	0.33 (0.47)	0.33 (0.47)	0.18 (0.38)	0.24 (0.43)
Both University Educated	0.00 (0.06)	0.00 (0.04)	0.01 (0.07)	0.00 (0.05)
Couple Moved between Country	0.02 (0.15)	0.02 (0.15)	0.02 (0.13)	0.02 (0.13)
Couple Moved between States	0.12 (0.33)	0.12 (0.33)	0.11 (0.31)	0.09 (0.28)
Couple Moved within State	0.03 (0.16)	0.03 (0.16)	0.02 (0.15)	0.02 (0.14)
Couple Moved to a new State	0.01 (0.11)	0.00 (0.06)	0.02 (0.13)	0.00 (0.05)
1 Partner Abroad Last Year	0.71 (0.45)	0.75 (0.44)	0.55 (0.50)	0.73 (0.45)
HH Income > State Median	0.54 (0.50)	0.66 (0.48)	0.57 (0.50)	0.74 (0.44)
Couple Owns Home	0.22 (0.41)	0.23 (0.42)	0.70 (0.46)	0.60 (0.49)
Couple Has Kids	0.18 (0.39)	0.13 (0.34)	0.16 (0.37)	0.10 (0.30)
HH Has ≥ 3 Adults	0.16 (0.36)	0.20 (0.40)	0.23 (0.42)	0.32 (0.47)
HH Has ≥ 5 Bedrooms	9034	149138	639427	11429990
Observations				

This table reports means and standard deviations for additional demographic variables. Each column represents individuals in a specific couple type: mixed-citizenship same-sex, same-citizenship same-sex, mixed-citizenship different-sex, and same-citizenship different-sex. Data are from the 2008-2019 rounds of American Community Survey.

Table 5: Individual-Level Summary Statistics - Married Individuals

	MSS	NSS	MDS	NDS
	Mixed- Citizenship SS	Same- Citizenship SS	Mixed- Citizenship DS	Same- Citizenship DS
Citizens	0.00 (0.00)	0.98 (0.14)	0.00 (0.00)	0.92 (0.28)
Married	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)
age	40.14 (10.46)	44.09 (11.37)	36.57 (9.63)	36.37 (9.80)
Male	0.69 (0.46)	0.44 (0.50)	0.50 (0.50)	0.50 (0.50)
Foodstamps	0.05 (0.22)	0.06 (0.25)	0.12 (0.33)	0.09 (0.29)
TANF	0.01 (0.12)	0.01 (0.12)	0.02 (0.13)	0.01 (0.12)
Soc Sec	0.05 (0.22)	0.10 (0.29)	0.03 (0.17)	0.04 (0.19)
Supp Sec	0.01 (0.11)	0.02 (0.15)	0.01 (0.11)	0.02 (0.13)
Any Transfer	0.10 (0.31)	0.16 (0.37)	0.15 (0.36)	0.13 (0.34)
Employer Ins	0.77 (0.42)	0.84 (0.36)	0.63 (0.48)	0.78 (0.41)
Private Ins	0.87 (0.34)	0.92 (0.27)	0.73 (0.44)	0.86 (0.35)
Public Ins	0.15 (0.36)	0.18 (0.38)	0.21 (0.40)	0.15 (0.36)
Purchased Ins	0.18 (0.38)	0.14 (0.35)	0.14 (0.34)	0.12 (0.32)
Any Insurance	0.93 (0.25)	0.97 (0.17)	0.86 (0.34)	0.93 (0.25)
Observations	4144	37968	161738	1564526

This table reports means and standard deviations for demographic, transfer, and insurance variables. Each column represents individuals in a specific couple type: mixed-citizenship same-sex, same-citizenship same-sex, mixed-citizenship different-sex, and same-citizenship different-sex. Data are from the 2012-2019 rounds of American Community Survey.

Table 6: Additional Individual-Level Summary Statistics - Married Individuals

	MSS	NSS	MDS	NDS
	Mixed- Citizenship SS	Same- Citizenship SS	Mixed- Citizenship DS	Same- Citizenship DS
Survey Year	2,016.89 (1.73)	2,016.72 (1.86)	2,016.05 (2.22)	2,016.12 (2.21)
year married	2,014.23 (2.29)	2,013.57 (2.65)	2,012.20 (2.81)	2,011.98 (2.81)
1 Born Abroad	0.74 (0.44)	0.09 (0.29)	0.56 (0.50)	0.07 (0.25)
Other Domestic Interracial Couple	0.43 (0.50)	0.22 (0.42)	0.24 (0.43)	0.14 (0.35)
1 In School, Other Out	0.15 (0.36)	0.11 (0.31)	0.13 (0.34)	0.12 (0.33)
Educ Gap ≥ 3 Years	0.32 (0.47)	0.23 (0.42)	0.29 (0.45)	0.19 (0.39)
Age Gap ≥ 5 Years	0.59 (0.49)	0.45 (0.50)	0.46 (0.50)	0.30 (0.46)
Both Speak English Very Well	0.97 (0.16)	1.00 (0.05)	0.95 (0.23)	0.99 (0.12)
Both University Educated	0.34 (0.47)	0.40 (0.49)	0.23 (0.42)	0.30 (0.46)
Couple Moved between Country	0.00 (0.04)	0.00 (0.05)	0.01 (0.09)	0.01 (0.08)
Couple Moved between States	0.02 (0.15)	0.03 (0.16)	0.03 (0.16)	0.03 (0.18)
Couple Moved within State	0.11 (0.31)	0.10 (0.30)	0.15 (0.35)	0.14 (0.35)
Couple Moved to a new State	0.02 (0.16)	0.03 (0.17)	0.04 (0.19)	0.04 (0.19)
1 Partner Abroad Last Year	0.01 (0.08)	0.00 (0.07)	0.04 (0.19)	0.00 (0.07)
HH Income > State Median	0.72 (0.45)	0.79 (0.40)	0.53 (0.50)	0.71 (0.46)
Couple Owns Home	0.52 (0.50)	0.70 (0.46)	0.45 (0.50)	0.62 (0.49)
Couple Has Kids	0.15 (0.35)	0.25 (0.43)	0.61 (0.49)	0.61 (0.49)
HH Has ≥ 3 Adults	0.18 (0.39)	0.12 (0.32)	0.14 (0.35)	0.08 (0.27)
HH Has ≥ 5 Bedrooms	0.15 (0.36)	0.23 (0.42)	0.17 (0.37)	0.25 (0.43)
Observations	4144	37968	161738	1564526

This table reports means and standard deviations for additional demographic variables. Each column represents individuals in a specific couple type: mixed-citizenship same-sex, same-citizenship same-sex, mixed-citizenship different-sex, and same-citizenship different-sex. Data are from the 2012-2019 rounds of American Community Survey.

A.3 Ancillary Results

A.3.1 Ancillary Regression Models

I estimate a model similar to Equation (1), where groups are based on same-sex partnership and another household-level characteristic Z_g , as follows:

$$E[y_{gst}|\mathbf{x}_{gst}] = \exp(\beta_0 + \beta_1 post_t + \beta_2 Z_g \times post_t + \beta_3 SS_g \times post_t + \beta_4 Z_g \times SS_g \times post_t + \sigma_{gs} + \tau_t). \quad (4)$$

Where y_{gst} is the number of individuals in group g , in state s , in year t ; Z_g is an indicator variable for a household-level characteristic; SS_g is an indicator variable for same-sex couples; $post_t$ is an indicator variable for the post-period $t \geq 2013$, when married same-sex couples can access spousal visas; σ_{gs} are group-state fixed effects; τ_t are year fixed effects; t are survey years. β_4 is the coefficient of interest, representing the increase in the number of same-sex coupled individuals with Z_g net of increases in same-sex couples without Z_g and net of increases in different-sex couples with Z_g over those without. β_4 represents the relative entry into same-sex couples of couples with characteristic Z_g . A non-zero β_4 could indicate a downstream effect of increased MSS couples, a mechanism through which MSS couples increase, differential selection into same-sex couples in the post-period, or a factor other than spousal visas that could explain their rise.

I also estimate a model with the right-hand-side of Equation (1) fully interacted with the new characteristic Z_g . This is a standard quadruple difference design, difference-in-differences-in-differences-in-differences, as follows:

$$E[y_{gst}|\mathbf{x}_{gst}] = \exp(\beta_0 + \beta_1 post_t + \beta_2 Z_g \times post_t + \beta_3 M_g \times post_t + \beta_4 SS_g \times post_t + \beta_5 Z_g \times M_g \times post_t + \beta_6 Z_g \times SS_g \times post_t + \beta_7 M_g \times SS_g \times post_t + \beta_8 Z_g \times M_g \times SS_g \times post_t + \sigma_{gs} + \tau_t). \quad (5)$$

Where variables are defined above. The coefficient of interest is β_8 representing the increase in the number of mixed-citizenship same-sex coupled individuals with Z_g net of increases in mixed-citizenship same-sex couples, in same-sex couples with Z_g , and mixed-citizenship couples with Z_g . β_8 represents the relative entry into MSS couples of couples with characteristic Z_g . A non-zero β_8 could indicate a downstream effect for MSS couples, a mechanism through which MSS couples increase, or differential selection into MSS couples in the post-period, or a factor other than spousal visas that could explain their rise.

For heterogeneity analyses, I split the sample and run separate regressions. For state-level heterogeneity, I leave years unchanged. For birth country, age, and gender heterogeneity, the individual-level data within state-years are split. This increases the number of zeros and noise. To counter the noise, I combine years for these individual-level splits. 2008 and 2019 are unchanged; however, these pairs are combined into one: 2009/2010, 2011/2012, 2013/2014, 2015/2016, 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 4, but restrict the sample to individuals in mixed-citizenship couples only. In this case, Z_g indicates a characteristic of the non-citizen’s birth country.

Lastly, for naturalisation, I consider a group defined as “possibly naturalised through marriage”, which indicates a couple is married, mixed-citizenship, and has been married and mixed-citizenship for at least three years. I order the couples by Survey Year to assess changes in the stock of naturalised coupled individuals and by Naturalisation Year to assess flow into naturalisation. The post period also changes: naturalizations can occur three years after marriage so, given time for paperwork, the first naturalizations due to same-sex marriage begin in 2017.

A.3.2 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, therefore, 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 alternatives offer a credible explanation for differential treatment of MSS couples and I find no evidence to support them.

Other federal transfer benefits and health insurance are incentives for couples to form and marry. However, including the number of couples with transfer benefits or health insurance in Columns 2 and 4 in Table 2 does not statistically significantly change the coefficients of interest; and MSS couples appear advantaged on some measures in Table 1. Moreover, robustness checks show no differential entry into same-sex coupling (Table 7) or MSS coupling (Table 8) by transfer receipt or by health insurance (Tables 9, 10).

Same-sex couples might move across states to access state-level marriage benefits. However, same-sex and MSS couples are not more likely to move across state lines or from abroad within the past year (Tables 11 and 12).

Many states legalised same-sex marriage in 2013, including California. However, results

for early (≤ 2012) and late (2015) legalisation states are statistically similar to each other and the main result (Table 13). Likewise, omitting California does not change the results (Table 14).

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 13). (Estimates for illegally present immigrant numbers are from Van Hook et al. (2014).) There is also little heterogeneity by the non-citizen’s partner birth country, including per capita income or longer visa wait-times (Table 15). Thus illegally present immigrants do not account for the results.

One limitation is 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 3). Estimating Equation (1) on unmarried individuals in two-roommate households shows a slight upward trend in MSS roommates (Table 16)—the opposite of what could account for the main effect. Furthermore, the number of other adults in the household does not meaningfully change (Tables 17, 18).

Stigma against same-sex marriage could be stronger for non-citizens; and non-citizens could disproportionately decrease stigma after the Supreme Court confirms the legal rights of same-sex couples. Hence, one might expect greater entry into MSS couples by non-citizens from countries whose immigrant communities are most likely to update their beliefs. However, there is no change in relative entry into MSS couples by the legality of same-sex marriage in the non-citizen’s birth country (Table 15). Although there is increased relative entry into MSS couples for those from countries with legal homosexuality. Neither result suggests a role for stigma.

Lastly, note that same-sex marriage legalisation does not impact different-sex marriage (Dillender, 2014; Carpenter, 2020). It is not the case that different-sex coupling changed or that it explains the main results.

A.3.3 Mechanism

Given the results and the institutional setting, I expect non-permanent residents to drive the results. Because removing restrictions on their marriages should increase their marriages; and removing pressure to dissolve from visa challenges should increase the stock of couples over time. I cannot test this mechanism directly, because visa or residency status is unobserved. Nevertheless, suggestive evidence supports this channel over others.

Immigration policy has country specific visa caps and favours highly educated and high income immigrants. Therefore, visa trouble is likelier for those from specific countries and those with lower education. I find an increase in relative entry into MSS couples from countries with unique visa filing deadlines, which indicate longer waits (China, India, Mexico, Philippines) (Table 15); and that MSS couples are relatively more likely to have less than university education or above state median income (Table 18). These results are consistent with spousal visas helping MSS couples remain together in the face of visa uncertainty.

In this paper, couples form when they move in together. Consistent with couple formation, I find that same-sex and MSS couples are relatively more likely to both move within state (within the past year), but not across state lines (Table 12). Likewise, I do not find a significant increase in the relative incidence of MSS couples where exactly one partner was abroad last year. This suggests “mail order” spouses are not an important channel for spousal visas to increase couple formation and marriage.

Partners meet and date before moving in together. So moving in could reflect 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’ve dated. Therefore, I cannot distinguish between these two channels. However, it is unlikely that couples previously living apart account for the entire 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 MSS and NSS couples and only MSS couples living apart moved in together, that would account for a third of the increase. Second, if 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), then they should move in relatively quickly. However, the relative incidence of MSS couples does not jump up, it slowly increases (Figure 1a).

Young people are more likely to be single and, therefore, can form couples and marry in larger proportions. I find the results are larger for those under 40 (Table 19).

It is unlikely marriage fraud drives the result because proving marriage for immigration purposes is difficult and proving same-sex marriage for immigration purposes can be more difficult, as mentioned in Section 1. Immigration officers can consider assortative mating in their decisions and can penalise large age gaps or interracial couples. I find that MSS couples become relatively more closely matched by age, but not race (Table 21). This is consistent with reduced partner search frictions for same-sex couples, especially at university or at work (Mansour and McKinnish, 2014). It is also inconsistent with an increase in mail order spouses.

Furthermore, the increase in marriages is driven by non-citizens who moved to the United

States before 2013 (Table 22). This is inconsistent with marriage fraud as an important channel for the result. However, it is consistent with letting MSS couples marry and preventing their dissolution.

The point estimates for men are larger than those for women (Table 23). They are statistically different from each other for coupling, but not for marriage. It is unclear why this pattern emerges and exploring it is beyond the scope of this paper. Nevertheless, I speculate upon a technical explanation and three social explanations. First, despite combining years to avoid null counts, many observations are dropped. Hence, these heterogeneity results are not necessarily representative for women and men nationally. Second, geographic sorting: same-sex attracted men may live in areas with more non-citizens relative to same-sex attracted women. Third, differential stigma: same-sex attracted men may face greater stigma and higher (opportunity) costs relative to same-sex attracted women either abroad or in immigrant communities. Hence, men may differentially immigrate or leave their immigrant communities; and marrying a citizen can facilitate that. Fourth, barriers to reproduction: men face greater costs to having children together than women. Constrained from enjoying the benefits of children, male couples may benefit from other household public goods, which could be contingent upon an age gap.

A.3.4 Downstream Outcomes

The increase in MSS couples naturally increases the proportion of same-sex couples with the characteristics of MSS couples. Thus, more mixed-citizenship couples leads to an increase in disassortative mating by citizenship (36%), birth country (11%, born domestically or abroad), and race (7%), although the latter is insignificant (Table 20). There’s also a 7% increase in the relative incidence of couples with an age gap less than five years.

The relative entry into MSS couples is greater for couples with some characteristics than others. Thus, spousal visa policy may favour certain couples or non-citizens. After 2013, the MSS couples are relatively more likely to have below state median income (11%), no university education (14%), and no children (6%) (Table 18). However, this is consistent with two other findings. First, younger couples drive the effects (Table 19) and they have less income, education, and children. Second, same-sex couples are more positively selected on income and education than different-sex couples (Table 4). So decreases in income and education could mechanically reflect greater same-sex coupling. Furthermore, new MSS couples are just as likely to speak English “very well” or to “only speak English”; and non-citizen partners in new MSS couples are also relatively more likely to come from countries with unique visa filing deadlines, which indicate longer waits (China, India, Mexico, Philippines) (Table 15). This evidence suggests spousal visas differentially assist those who have difficulty

getting other visas.

Lastly, assessing how spousal visa access leads to greater naturalisation is challenging because, more same-sex married couples can mechanically lead to more naturalizations for those with a same-sex spouse. It appears the number of new citizens married to a same-sex citizen for at least three years (the condition for spousal naturalisation) increases absolutely (Figure 8) and relative to other same-sex couples (Figure 9a). This is consistent with increases in same-sex marriage, but also consistent with increases in naturalizations resulting from greater access to spousal visas.

A.3.5 Federal Transfer Benefits

Table 7 assesses relative entry into same-sex couples by federal transfer receipt.

Table 8 assesses relative entry into mixed-citizenship same-sex couples by federal transfer receipt.

Table 7: DDD Estimates Where Groups are Based on Transfer Receipt

	Food Stamps	Welfare	Soc Sec	Supp Sec	Any
post	-0.063 (0.007)	-0.055 (0.007)	-0.059 (0.007)	-0.062 (0.007)	-0.063 (0.007)
postSSCT	-0.079 (0.051)	0.054 (0.067)	0.028 (0.035)	-0.154 (0.061)	-0.029 (0.033)
postSSC	0.391 (0.020)	0.384 (0.019)	0.381 (0.019)	0.387 (0.018)	0.389 (0.021)
postCT	0.053 (0.028)	-0.179 (0.024)	0.013 (0.008)	0.177 (0.015)	0.026 (0.014)
Observations	2448	2448	2448	2448	2448
Log_Likelihood	-2508783.890	-858,099.669	-721,516.550	-914,537.507	-1993172.957
Relative_IRR	0.924	1.056	1.029	0.857	0.971
Relative_IRR_se	0.047	0.071	0.036	0.053	0.032
IRR_pvalue	0.108	0.431	0.424	0.007	0.367
Chi2_Stat	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. Created using the 2008-2019 rounds of the American Community Survey.

Table 8: DDDD Estimates Where Groups are Based on Transfer Receipt

	Food Stamps	Welfare	Soc Sec	Supp Sec	Any
post	-0.066 (0.006)	-0.060 (0.006)	-0.064 (0.007)	-0.066 (0.006)	-0.066 (0.007)
postSSCT	-0.054 (0.050)	0.036 (0.069)	0.041 (0.034)	-0.191 (0.061)	-0.002 (0.031)
postSSC	0.371 (0.020)	0.367 (0.019)	0.362 (0.019)	0.370 (0.018)	0.367 (0.021)
postCT	0.046 (0.026)	-0.184 (0.024)	0.014 (0.008)	0.179 (0.014)	0.022 (0.013)
postMC	0.064 (0.022)	0.074 (0.016)	0.073 (0.016)	0.076 (0.015)	0.063 (0.022)
postSSMC	0.310 (0.061)	0.261 (0.055)	0.286 (0.055)	0.268 (0.055)	0.334 (0.061)
postDCCT	0.065 (0.055)	0.066 (0.046)	0.033 (0.029)	-0.031 (0.046)	0.067 (0.034)
postDDDD	-0.482 (0.178)	0.121 (0.314)	-0.244 (0.190)	-0.138 (0.238)	-0.441 (0.135)
Observations	4521	4178	4580	4153	4631
Log Likelihood	-2843114.213	-1102466.128	-1007575.469	-1162973.923	-2343041.333
Relative_IRR	0.948	1.036	1.042	0.826	0.998
Relative_IRR_se	0.047	0.071	0.036	0.050	0.031
IRR_pvalue	0.268	0.608	0.239	0.001	0.943
Chi2_Stat	3.915	0.699	1.451	12.226	0.560
p_value	0.418	0.951	0.835	0.016	0.967

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on use of federal transfer benefits of mixed-citizenship 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. Created using the 2008-2019 rounds of the American Community Survey.

A.3.6 Health Insurance

Table 9 assesses relative entry into same-sex couples by health insurance type.

Table 10 assesses relative entry into mixed-citizenship same-sex couples by health insurance type.

Table 9: DDD Estimates Where Groups are Based on Health Insurance

	Employer	Private	Public	Purchased	Any
post	-0.062 (0.006)	-0.169 (0.012)	-0.101 (0.010)	-0.068 (0.006)	-0.450 (0.050)
postSSCT	-0.007 (0.031)	0.080 (0.046)	0.009 (0.044)	-0.081 (0.037)	0.111 (0.095)
postSSC	0.389 (0.023)	0.308 (0.040)	0.376 (0.026)	0.395 (0.018)	0.268 (0.093)
postCT	0.005 (0.011)	0.132 (0.015)	0.243 (0.024)	0.072 (0.020)	0.427 (0.051)
Observations	2436	2412	2448	2448	2335
Log_Likelihood	-1120801.266	-1523743.429	-1535073.692	-1231566.714	-2402064.358
Relative_IRR	0.993	1.083	1.009	0.922	1.117
Relative_IRR_se	0.031	0.049	0.045	0.034	0.106
IRR_pvalue	0.826	0.091	0.836	0.021	0.267
Chi2_Stat	0.634	0.856	8.448	0.850	2.529
p_value	0.959	0.931	0.076	0.932	0.639

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. Created using the 2008-2019 rounds of the American Community Survey.

Table 10: DDDD Estimates Where Groups are Based on Health Insurance

	Employer	Private	Public	Purchased	Any
post	-0.069 (0.006)	-0.178 (0.011)	-0.103 (0.009)	-0.071 (0.006)	-0.453 (0.046)
postSSCT	-0.018 (0.033)	0.063 (0.047)	0.036 (0.040)	-0.080 (0.035)	0.121 (0.097)
postSSC	0.381 (0.025)	0.307 (0.041)	0.353 (0.025)	0.378 (0.018)	0.243 (0.095)
postCT	0.009 (0.010)	0.135 (0.014)	0.231 (0.021)	0.061 (0.018)	0.423 (0.046)
postMC	0.075 (0.015)	0.071 (0.025)	0.035 (0.033)	0.049 (0.016)	0.026 (0.101)
postSSMC	0.075 (0.062)	0.051 (0.100)	0.349 (0.068)	0.243 (0.063)	0.253 (0.173)
postDCCT	0.002 (0.030)	0.032 (0.037)	0.174 (0.059)	0.202 (0.059)	0.102 (0.103)
postDDDD	0.286 (0.090)	0.294 (0.122)	-0.372 (0.164)	-0.012 (0.123)	0.042 (0.183)
Observations	4529	4453	4662	4638	4292
Log_Likelihood	-1477808.502	-1882863.639	-1879171.728	-1575632.120	-2773497.924
Relative_IRR	0.982	1.065	1.037	0.923	1.129
Relative_IRR_se	0.032	0.050	0.042	0.033	0.110
IRR_pvalue	0.567	0.194	0.376	0.018	0.241
Chi2_Stat	0.169	0.864	5.511	1.583	6.347
p_value	0.997	0.930	0.239	0.812	0.175

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 mixed-citizenship same-sex couples. 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. Created using the 2008-2019 rounds of the American Community Survey.

A.3.7 Moved Recently

Table 11 assesses relative entry into same-sex couples by recent moves (within the past year).

Table 12 assesses relative entry into mixed-citizenship same-sex couples by recent moves (within the past year).

Table 11: DDD Estimates Where Groups are Based on Moving within the Past Year

	Abroad	Different State	Within State	Abroad or Diff State	One Abroad
post	-0.059 (0.006)	-0.060 (0.006)	-0.057 (0.008)	-0.060 (0.006)	-0.057 (0.007)
postSSCT	0.199 (0.220)	-0.009 (0.056)	0.115 (0.046)	-0.000 (0.050)	0.053 (0.111)
postSSC	0.384 (0.018)	0.383 (0.018)	0.370 (0.018)	0.383 (0.018)	0.383 (0.018)
postCT	0.213 (0.032)	0.105 (0.016)	-0.005 (0.025)	0.114 (0.017)	-0.116 (0.029)
Observations	2212	2436	2448	2436	2313
Log_Likelihood	-579,499.685	-664,517.358	-835,784.587	-671,941.929	-590,041.600
Relative_IRR	1.221	0.991	1.122	1.000	1.054
Relative_IRR_se	0.269	0.056	0.051	0.050	0.117
IRR_pvalue	0.412	0.874	0.018	0.997	0.644
Chi2_Stat	17.741	1.418	1.311	1.100	2.186
p_value	0.001	0.841	0.859	0.894	0.702

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. Created using the 2008-2019 rounds of the American Community Survey.

Table 12: DDDD Estimates Where Groups are Based on Moving within the Past Year

	Abroad	Different State	Within State	Abroad or Diff State	One Abroad
post	-0.063 (0.006)	-0.064 (0.006)	-0.063 (0.007)	-0.065 (0.006)	-0.062 (0.006)
postSSCT	0.031 (0.202)	-0.046 (0.056)	0.117 (0.045)	-0.031 (0.052)	0.094 (0.098)
postSSC	0.367 (0.018)	0.366 (0.018)	0.352 (0.018)	0.366 (0.018)	0.367 (0.018)
postCT	0.243 (0.033)	0.111 (0.016)	0.003 (0.022)	0.122 (0.017)	-0.208 (0.037)
postMC	0.075 (0.015)	0.076 (0.015)	0.088 (0.015)	0.077 (0.015)	0.074 (0.015)
postSSMC	0.265 (0.054)	0.270 (0.054)	0.276 (0.057)	0.271 (0.054)	0.271 (0.056)
postDCCT	-0.297 (0.074)	-0.100 (0.053)	-0.120 (0.058)	-0.127 (0.046)	0.226 (0.049)
postDDDD	-0.245 (0.590)	-0.194 (0.256)	-0.097 (0.119)	-0.201 (0.249)	-0.550 (0.292)
Observations	3479	4279	4543	4313	3888
Log_Likelihood	-796,584.151	-929,417.740	-1149815.737	-942,380.444	-823,485.534
Relative_IRR	1.031	0.955	1.125	0.970	1.098
Relative_IRR_se	0.208	0.054	0.051	0.050	0.108
IRR_pvalue	0.881	0.407	0.014	0.547	0.361
Chi2_Stat	.	3.900	1.554	3.887	2.779
p_value	.	0.420	0.817	0.421	0.595

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on the likelihood mixed-citizenship 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. Created using the 2008-2019 rounds of the American Community Survey.

A.3.8 State-Level Heterogeneity

Table 13: Heterogeneity by State - DDD Estimates Restricted by State

	SSM Legalized		Non-Citizen Share		Unauthorized Share	
	Early	Late	High	Low	High	Low
post	-0.089 (0.008)	-0.053 (0.016)	-0.078 (0.003)	-0.053 (0.009)	-0.075 (0.006)	-0.051 (0.008)
postSSCT	0.248 (0.068)	0.494 (0.156)	0.229 (0.108)	0.329 (0.060)	0.274 (0.045)	0.335 (0.094)
postSSC	0.333 (0.018)	0.425 (0.037)	0.408 (0.018)	0.348 (0.024)	0.353 (0.015)	0.382 (0.034)
postCT	0.051 (0.012)	0.119 (0.018)	0.127 (0.011)	0.059 (0.018)	0.071 (0.014)	0.075 (0.024)
Observations	336	576	1248	1200	1248	1200
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
Relative_IRR_se	0.087	0.255	0.136	0.083	0.059	0.131
IRR_pvalue	0.001	0.012	0.058	0.000	0.000	0.002
Pre_Trend	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) legalisation 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. Created using the 2008-2019 rounds of the American Community Survey.

A.3.9 Main Result without California

Table 14: DDD Estimates for the Main Specification without California

	Coupled Individuals
post	-0.064 (0.007)
postSSCT	0.286 (0.067)
postSSC	0.379 (0.018)
postCT	0.087 (0.015)
Observations	2400
Log_Likelihood	-636,561.610
Relative_IRR	1.331
Relative_IRR_se	0.090
IRR_pvalue	0.000
Pre_Trend	1.927
p-value	0.749

This table reports the Poisson Conditional Fixed Effects estimates for Equation (1). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is $\text{post} \times \text{SS} \times \text{M}$ 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 (3). Standard errors in parentheses, clustered at the group-state level. Created using the 2008-2019 rounds of the American Community Survey.

A.3.10 Birth Country Heterogeneity

Table 15: Heterogeneity by Birth Country - DDD Estimates Restricted by Birth Country

	SSM Legal	Gay Legal	Longer Visa Waits	Low Income
post	0.037 (0.018)	0.092 (0.048)	-0.017 (0.018)	-0.112 (0.011)
postSSCT	0.007 (0.089)	0.557 (0.174)	0.202 (0.088)	0.115 (0.094)
postSSC	0.710 (0.058)	0.189 (0.168)	0.640 (0.061)	0.632 (0.071)
postCT	-0.154 (0.021)	-0.085 (0.050)	0.072 (0.027)	0.153 (0.022)
Observations	1319	1160	1318	1287
Log Likelihood	-151,145.507	-159,719.192	-170,564.441	-156,520.554
Relative_IRR	1.007	1.746	1.224	1.121
Relative_IRR_se	0.089	0.304	0.108	0.105
IRR_pvalue	0.940	0.014	0.038	0.249
Chi2_Stat	0.056	6.256	2.510	0.875
p_value	0.972	0.044	0.285	0.646

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. Created using the 2008-2019 rounds of the American Community Survey.

A.3.11 Same-Sex Roommates

Figure 3 shows the number of individuals in two-roommate households, grouped by same-sex and mixed-citizenship. The numbers are stable over time, suggesting there is no relabelling from same-sex roommates to same-sex couples, and that relabelling does not explain the estimated effect size. Specifically, there are 123 695 mixed-citizenship same-sex roommates in 2008 and 128 823 in 2019, ranging between 115 524 and 135 070 across the twelve years. Whereas in Figure 1a, there are 38 819 mixed-citizenship same-sex couples in 2008 and 109 781 in 2019, an increase of nearly 70 000 for which roommate numbers cannot account.

Table 16 shows the number of mixed-citizenship same-sex roommates increased by 8.7% in the post-period, rather than fell. However, the effect is statistically insignificant and the hypothesis of parallel pre-trends is rejected at the 10% level.

Figure 3: 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. Created using the 2008-2019 rounds of the American Community Survey.

Table 16: DDD Estimates for Roommates

	Roommates
post	-0.064 (0.016)
postSSCT	0.083 (0.058)
postSSC	-0.031 (0.020)
postCT	0.058 (0.045)
Observations	2321
Log_Likelihood	-566,078.362
Relative_IRR	1.087
Relative_IRR_se	0.063
IRR_pvalue	0.167
Pre_Trend	9.425
p_value	0.051

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. Created using the 2008-2019 rounds of the American Community Survey.

A.3.12 Household Characteristics

Table 17 assesses relative entry into same-sex couples by household characteristics.

Table 18 assesses relative entry into mixed-citizenship same-sex couples by household characteristics.

Table 17: DDD Estimates Where Groups are Based on Household Characteristics

	High Income	Good English	High Educ	Has Kids	Extra Adults
post	-0.065 (0.008)	-0.011 (0.017)	-0.102 (0.007)	-0.046 (0.005)	-0.062 (0.007)
postSSCT	-0.112 (0.029)	0.008 (0.052)	-0.149 (0.029)	-0.060 (0.033)	-0.020 (0.036)
postSSC	0.467 (0.021)	0.379 (0.049)	0.416 (0.020)	0.390 (0.018)	0.385 (0.018)
postCT	0.010 (0.010)	-0.054 (0.019)	0.186 (0.010)	-0.019 (0.009)	0.044 (0.011)
Observations	2441	2319	2448	2448	2448
Log_Likelihood	-671,654.483	-718,781.086	-1057152.589	-661,740.217	-694,506.327
Relative_IRR	0.894	1.008	0.862	0.942	0.980
Relative_IRR_se	0.025	0.053	0.025	0.031	0.035
IRR_pvalue	0.000	0.884	0.000	0.059	0.568
Chi2_Stat	2.402	10.297	7.520	6.756	4.959
p_value	0.662	0.036	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. Created using the 2008-2019 rounds of the American Community Survey.

Table 18: DDDD Estimates Where Groups are Based on Household Characteristics

	High Income	Good English	High Educ	Has Kids	Extra Adults
post	-0.075 (0.008)	-0.017 (0.018)	-0.109 (0.007)	-0.051 (0.004)	-0.067 (0.006)
postSSCT	-0.123 (0.028)	0.112 (0.059)	-0.154 (0.030)	-0.029 (0.033)	-0.035 (0.037)
postSSC	0.459 (0.020)	0.261 (0.056)	0.401 (0.020)	0.366 (0.017)	0.369 (0.018)
postCT	0.018 (0.010)	-0.050 (0.019)	0.192 (0.010)	-0.019 (0.009)	0.048 (0.010)
postMC	0.103 (0.012)	0.026 (0.025)	0.101 (0.016)	0.103 (0.017)	0.083 (0.016)
postSSMC	0.049 (0.085)	0.290 (0.096)	0.207 (0.064)	0.341 (0.064)	0.248 (0.063)
postDCCT	-0.046 (0.025)	0.056 (0.031)	-0.079 (0.025)	-0.039 (0.024)	-0.070 (0.028)
postDDDD	0.306 (0.103)	0.010 (0.118)	0.136 (0.092)	-0.481 (0.112)	0.098 (0.117)
Observations	4559	4410	4647	4675	4582
Log_Likelihood	-1026423.112	-1062284.248	-1389133.655	-1017926.763	-1022319.468
Relative_IRR	0.884	1.119	0.857	0.971	0.966
Relative_IRR_se	0.025	0.065	0.026	0.032	0.036
IRR_pvalue	0.000	0.069	0.000	0.374	0.344
Chi2_Stat	2.832	10.272	8.742	8.999	3.815
p_value	0.586	0.036	0.068	0.061	0.432

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on household characteristics of mixed-citizenship 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. Created using the 2008-2019 rounds of the American Community Survey.

A.3.13 Age Heterogeneity

Table 19: Heterogeneity by Age - DDD Estimates Restricted by Age

	Coupled Individuals		Married Individuals	
	Older	Younger	Older	Younger
post	-0.079 (0.006)	-0.883 (0.007)	-0.058 (0.009)	-0.762 (0.011)
post $\times$ SameSexDiffCiti	0.354 (0.062)	0.693 (0.152)	0.264 (0.069)	0.527 (0.323)
post $\times$ SameSexCouple	0.535 (0.022)	1.418 (0.128)	0.304 (0.021)	1.179 (0.277)
post $\times$ CitizenshipType	0.024 (0.018)	0.136 (0.018)	0.134 (0.021)	0.238 (0.025)
Observations	1421	1380	1414	1349
Log_Likelihood	-297,114.401	-7360356.187	-258,817.416	-2781468.454
Relative_IRR	1.425	2.000	1.302	1.694
Relative_IRR_se	0.089	0.303	0.090	0.546
IRR_pvalue	0.000	0.001	0.001	0.204
Pre_Trend	0.649	4.378	2.684	1.877
p_value	0.723	0.112	0.261	0.391

This table reports the Poisson Conditional Fixed Effects estimates for Equation (1). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is $\text{post} \times \text{SS} \times \text{M}$ 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 (3). Standard errors in parentheses, clustered at the group-state level. 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 4: Dynamic DDD Estimates for Young Couples

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (2), 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. 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 5: Dynamic DDD Estimates for Old Couples

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (2), 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. 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 Disassortativeness

Table 20 assesses relative entry into same-sex couples by a type of disassortative mating.

Table 21 assesses relative entry into mixed-citizenship same-sex couples by a type of disassortative mating.

Table 20: DDD Estimates Where Groups are Based on Disassortativeness Measures

	Birthplace	Race	Student	Education	Age
post	-0.068 (0.006)	-0.077 (0.006)	-0.047 (0.006)	-0.063 (0.007)	-0.050 (0.007)
postSSCT	0.101 (0.046)	0.068 (0.046)	-0.026 (0.038)	-0.047 (0.031)	-0.076 (0.029)
postSSC	0.369 (0.017)	0.350 (0.017)	0.393 (0.018)	0.394 (0.021)	0.424 (0.021)
postCT	0.114 (0.010)	0.181 (0.016)	-0.134 (0.013)	0.026 (0.009)	-0.027 (0.010)
Observations	2448	2448	2448	2447	2448
Log_Likelihood	-668,806.376	-850,750.980	-738,266.302	-625,506.802	-639,833.655
Relative_IRR	1.106	1.070	0.974	0.954	0.927
Relative_IRR_se	0.051	0.049	0.037	0.030	0.027
IRR_pvalue	0.038	0.155	0.485	0.120	0.006
Chi2_Stat	4.809	2.231	5.010	1.266	7.855
p_value	0.307	0.693	0.286	0.867	0.097

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on disassortativeness of same-sex couples. Disassortativeness is measured as having: one partner born abroad and the other domestically (Birthplace), different races (Race), a student partner and non-student partner (Student), an education gap of five or more years (Education), or an age gap of three or more years (Age). 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. Created using the 2008-2019 rounds of the American Community Survey.

Table 21: DDDD Estimates Where Groups are Based on Disassortativeness Measures

	Birthplace	Race	Student	Education	Age
post	-0.072 (0.006)	-0.082 (0.006)	-0.052 (0.006)	-0.068 (0.007)	-0.054 (0.006)
postSSCT	-0.031 (0.047)	0.030 (0.047)	-0.039 (0.038)	-0.057 (0.031)	-0.091 (0.029)
postSSC	0.366 (0.018)	0.340 (0.017)	0.377 (0.018)	0.379 (0.021)	0.414 (0.021)
postCT	0.154 (0.012)	0.196 (0.017)	-0.132 (0.013)	0.025 (0.009)	-0.029 (0.009)
postMC	0.117 (0.029)	0.092 (0.015)	0.080 (0.016)	0.082 (0.016)	0.081 (0.015)
postSSMC	0.260 (0.077)	0.225 (0.062)	0.258 (0.057)	0.255 (0.059)	0.160 (0.096)
postDCCT	-0.219 (0.033)	-0.186 (0.028)	-0.035 (0.026)	-0.032 (0.022)	-0.005 (0.022)
postDDDD	0.087 (0.108)	0.169 (0.098)	0.087 (0.131)	0.056 (0.108)	0.216 (0.114)
Observations	4416	4626	4612	4647	4638
Log_Likelihood	-1045630.152	-1197032.705	-1076873.142	-967,361.857	-979,492.780
Relative_IRR	0.970	1.031	0.962	0.945	0.913
Relative_IRR_se	0.046	0.048	0.037	0.029	0.026
IRR_pvalue	0.507	0.526	0.302	0.057	0.001
Chi2_Stat	6.313	1.867	5.786	1.512	7.376
p_value	0.177	0.760	0.216	0.825	0.117

This table reports estimates for the effect of access to federal marriage benefits for same-sex couples on disassortativeness of mixed-citizenship same-sex couples. Disassortativeness is measured as having: one partner born abroad and the other domestically (Birthplace), different races (Race), a student partner and non-student partner (Student), an education gap of five or more years (Education), or an age gap of three or more years (Age). 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. Created using the 2008-2019 rounds of the American Community Survey.

A.3.15 Main Result with pre-2013 Arrivals

Table 22: DDD Estimates for the Main Specification where all Non-Citizens Arrived pre-2013

	Coupled Individuals	Married Individuals
post	-0.078 (0.005)	-0.769 (0.008)
post $\times$ M $\times$ SS	0.128 (0.062)	0.671 (0.193)
post $\times$ SS	0.374 (0.018)	1.416 (0.156)
post $\times$ M	-0.048 (0.016)	-0.275 (0.018)
Observations	2436	2367
Log_Likelihood	-842,932.311	-1.389e+07
Relative_IRR	1.137	1.955
Relative_IRR_se	0.070	0.378
IRR_pvalue	0.051	0.011
Pre_Trend	3.174	1.412
p_value	0.529	0.842

This table reports the Poisson Conditional Fixed Effects estimates for Equation (1). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is $\text{post} \times \text{SS} \times \text{M}$ 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 (3). Standard errors in parentheses, clustered at the group-state level. 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 Sex Heterogeneity

Table 23: Heterogeneity by Sex - DDD Estimates Restricted by Sex

	Women		Men	
	Coupled	Married	Coupled	Married
post	-0.065 (0.007)	-0.856 (0.007)	-0.065 (0.007)	-0.856 (0.007)
postSSCT	0.143 (0.083)	0.291 (0.243)	0.345 (0.062)	0.677 (0.225)
postSSC	0.408 (0.028)	1.413 (0.220)	0.379 (0.018)	1.204 (0.196)
postCT	0.080 (0.017)	0.159 (0.018)	0.080 (0.017)	0.159 (0.018)
Observations	1362	1246	1364	1260
Log_Likelihood	-319,134.228	-9681829.643	-321,213.562	-9630718.549
Relative_IRR	1.154	1.338	1.411	1.968
Relative_IRR_se	0.095	0.325	0.088	0.442
IRR_pvalue	0.106	0.298	0.000	0.028
Pre_Trend	2.443	3.365	2.686	1.294
p_value	0.295	0.186	0.261	0.524

This table reports the Poisson Conditional Fixed Effects estimates for Equation (1). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is $\text{post} \times \text{SS} \times \text{M}$ 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 (3). Standard errors in parentheses, clustered at the group-state level. 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 6: Dynamic DDD Estimates for Women

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (2), 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. 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 7: Dynamic DDD Estimates for Men

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (2), 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. Data are from the American Community Survey. The first subfigure uses the 2008-2019 rounds; the second subfigure uses the 2012-2019 rounds.

A.3.17 Naturalisation

It is difficult to estimate the downstream effect of spousal visa access onto naturalizations because as same-sex marriages increase then, mechanically, the number of naturalised persons married to a same-sex partner increases. I attempt to shed light onto whether or not spousal visa access leads to naturalisation by dividing couple according to whether or not a naturalisation could be due to a spousal visa. That is, individuals possibly naturalised through marriage are naturalised after three years of marriage to a citizen and individuals not naturalised through marriage are either unmarried, married to a non-citizen, or married to a citizen for less than three years. Figure 8 plots the number of naturalizations by couple type. Four years after the jump in mixed-citizenship same-sex marriages, there is an increase in naturalizations possibly through same-sex marriage, while other naturalizations are relatively constant. This could be because same-sex couples with spousal visas gain citizenship as well, or because there are many same-sex married couples by that time.

Figure 8: Number of Naturalised Individuals by Naturalisation Year

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

Table 24: DDD Estimates for Naturalised Coupled Individuals

	Naturalized Coupled Individuals	
	by Survey Year	by Naturalization Year
post	0.068 (0.023)	-1.210 (0.020)
post $\times$ PNTM $\times$ SS	0.165 (0.118)	1.446 (0.231)
post $\times$ SS	0.285 (0.046)	0.271 (0.172)
post $\times$ PNTM	0.046 (0.028)	0.247 (0.027)
Observations	1454	1221
Log_Likelihood	-185,471.142	-721,514.579
Relative_IRR	1.180	4.244
Relative_IRR_se	0.139	0.980
IRR_pvalue	0.198	0.001
Pre_Trend	27.941	6.428
p_value	0.000	0.169

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 naturalisation through marriage (PNTM) means a naturalised individual married a citizen three or more years before naturalisation. Not naturalised through marriage means a naturalised 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. Created using the 2012-2019 rounds of the American Community Survey.

(a) Naturalised Individuals by Survey Year

(b) Naturalised Individuals by Naturalisation Year

Figure 9: Dynamic DDD Estimates for Naturalised Individuals

This figure plots the Poisson Conditional Fixed Effects estimates for Equation (2), where time is either Survey Year or Naturalisation Year. The sample is restricted to naturalised individuals only. Standard errors are clustered at the group-state level. Data are from 2012-2018 rounds of the American Community Survey.

A.3.18 Main Result without Non-Citizen Same-Citizenship Couples

Table 25: DDD Estimates for the Main Specification where Same-Citizenship Couples are both Citizens

	Coupled Individuals	Married Individuals
post	-0.066 (0.006)	-0.742 (0.006)
post $\times$ M $\times$ SS	0.301 (0.053)	0.575 (0.185)
post $\times$ SS	0.370 (0.018)	1.401 (0.157)
post $\times$ M	0.078 (0.015)	0.141 (0.016)
Observations	2448	2405
Log_Likelihood	-651,824.701	-1.378e+07
Relative_IRR	1.351	1.776
Relative_IRR_se	0.072	0.329
IRR_pvalue	0.000	0.018
Pre_Trend	2.830	1.293
p_value	0.587	0.862

This table reports the Poisson Conditional Fixed Effects estimates for Equation (1). SS refers to same-sex coupled individuals and M refers to mixed-citizenship coupled individuals. The coefficient of interest is $\text{post} \times \text{SS} \times \text{M}$ 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 (3). Standard errors in parentheses, clustered at the group-state level. 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.