The effect of same-sex marriage legalization on interstate migration in the United States

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ABSTRACT

The aim of this paper is to analyze the impact of marriage regulation on the migratory behavior of individuals using the history of the liberalization of same-sex marriage across the United States. Because the approval of same-sex marriage allows homosexuals access to legal rights and social benefits, marriage becomes more attractive relative to singlehood or other forms of partnership. The differences in the value of other forms of relationship status relative to marriage can affect the migration decisions of individuals, to the extent that those states approving same-sex marriage can be considered less discriminatory. Results show that that legal reform permanently increased the migration flow of homosexuals moving to tolerant states (i.e., those that have legalized same-sex marriage). The physical distance among states does not appear to be driving our estimates since the migration flow of homosexuals is not limited to border or close states. Supplemental analysis, developed to explore whether the migration flow is translated to a significant effect to the stock of homosexuals by state, suggests that that stock increased after the approval of same-sex marriage but that it was transitory, pointing to a 'no effect' on the spatial distribution of homosexuals as times went by. The liberalization of marriage for homosexuals also has an effect on the migration behavior of those individuals originating from countries in which same-sex sexual activity is illegal, for whom we observe an outflow migration from those states with same sex marriage, pointing to dissimilarities in cultural aspects related to homosexuality as important factors in migration decisions.

Keywords: Homosexuals, marriage, migration

JEL Codes: J12, J15, Z13

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1. INTRODUCTION

The location choice of homosexuals (gays and lesbians) has been partly analyzed in the economic literature on homosexual behavior (Black et al., 2007). Using urban economic models, it has been suggested that the geographic distribution of homosexuals depends on the access to amenities (Black et al., 2002, 2007). However, other factors can also play a role (Vossen et al., 2019). The homosexual-related factors that have dramatically changed during the last two decades across the world are located in the area of legislation (ILGA World, 2019). One of those major recent policy changes is the approval of same-sex marriage which has been introduced in 29 out of the 195 countries in the world (ILGA World, 2019; national legislations). In the U.S., since the Supreme Judicial Court of Massachusetts ruled in 2003 that the ban on same-sex marriage was unconstitutional (Goodridge v. Department of Public Health, 2003), there was a progressive increase in the number of states extending same-sex marriage until 2015. The U.S. Supreme Court (Obergefell v. Hodges, 2015) opened that form of partnership for same-sex couples to the rest of the country. Although researchers have found that Americans have not been historically tolerant of homosexuality because the majority of them—at least until the last decade—considered that homosexual practice is morally wrong (Brumbaugh et al., 2008), empirical evidence indicates that states where same-sex marriage was allowed were less prejudiced (Hooghe and Meeusen, 2013), making them more attractive to homosexuals (Black et al., 2007). In our work, we examine whether the introduction of same-sex marriage in the U.S. had an impact on the migratory behavior of homosexuals.[1]

It is not only being a homosexual friendly state (those that have liberalized same-sex marriage) that may matter for attracting homosexuals; access to marriage can also be a motivation for their change of residence. Marriage allows individuals access to more citizenship rights, welfare benefits, tax benefits, health care, social, property and parental rights than any other form of partnership in the U.S. For example, homosexuals cannot be covered by their partner's employer-provided health insurance and non-married couples cannot file taxes jointly in the U.S. (see an extensive review in Badgett, 2009). The gains derived from marriage are not limited to economic and welfare benefits and legal rights; researchers suggest that marriage may help homosexuals to gain recognition and support (Ocobock, 2013). From a theoretical point of view, the Beckerian framework, which mainly focuses on the behavior of heterosexual couples (Becker, 1973; Black et al., 2007), could be applicable here. In this setting, individuals choose to marry when their expected lifetime utility derived from marriage exceeds the expected utility from remaining single. Then, those states where same-sex marriage is legal would be a potentially attractive place of residence for those homosexuals whose expected utility in marriage exceeds that of remaining single.

Differences across regions or even countries in terms of public policies and legislation has been found to have an effect on the migration behavior of individuals (Gelbach, 2004; Gius, 2011; McKinnish, 2005, 2007; Fiva, 2009; Jofre-Monseny, 2014). In the case of how dissimilarities in legislation may affect the mobility of sexual minority groups, the literature

[1] We use the term homosexual to refer to gays and lesbians.

is inconclusive, since the homosexual community has consistently been overlooked in most migration studies (Black et al., 2007). Pinello (2016) carries out a comprehensive survey of the effects of same-sex marriage legalization on gay and lesbian couples across six states in the U.S., and Beaudin (2017), using micro-level data, suggests that heads of households in both different- and same-sex relationships are more likely to leave states where same-sex marriage is not legal. She also points (without showing empirical evidence) to the possibility that same-sex marriage could be increasing the imbalanced geographic distribution of same- and different-sex couples across the U.S. Further research is necessary to analyze the long-run effects of same-sex marriage legalization on the mobility of homosexuals.

There is a growing literature analyzing the effect of same-sex marriage legalization on different socioeconomic and demographic variables. Langbein and Yost (2009) explore whether the legal recognition of same-sex marriage has an adverse impact on outcomes related to traditional family values, finding that same-sex marriages do not have any negative externality. Hatzenbuehler et al. (2012) study the effect of the enactment of same-sex marriage legislation in Massachusetts on health care use and expenditure among gay and bisexual men, and Francis et al. (2012) analyze the relationship between same-marriage laws and sexually transmitted infections. Using a difference-in-difference strategy, Dillender (2014) examines how changes in U.S. legal recognition allowing same-sex couples to marry have altered marriage rates in the U.S., and Trandafir (2015) studies the effect on marriage, divorce and extramarital births in OECD countries, finding positive effects on family formation. More recently, Hansen et al. (2019) explore the effect of same-sex marriage on labor supply, and reveal mixed results (i.e., no effect on gay men and a negative effect on lesbian women labor supply).

In our paper, we supplement the previous literature by firstly analyzing the dynamic response of homosexual migration to same-sex marriage legalization, which allows us to study whether the effect of the reforms is transitory or permanent. To do that, we construct a panel formed by the 50 states of the U.S. and the District of Columbia covering the period 2001 to 2015. We use data from the American Community Survey of the Integrated Public Use Microdata Series (IPUMS) (Ruggles et al., 2018), to analyze the effect of the legalization of same-sex marriage on homosexuals moving people between states. From that dataset, we can only observe the behavior of those gay men and lesbian women who are cohabiting, as in the previous literature (Black et al., 2007; Negrusa and Oreffice, 2011; Hansen et al., 2019). We identify the relationship between the migration flow of homosexuals and same-sex marriage by exploiting the legislative history of the liberalization of same-sex marriage across the United States. Our results suggest that the introduction of same-sex marriage increases the percentage of homosexuals who move to a state having same-sex marriage, and this effect does not disappear over time. In all our regressions, we account for unobservable state-specific factors by including state-fixed effects as well as time-varying characteristics by adding year-fixed effects. We also include state-specific time trends to control for unobserved time varying factors at the state level, such as changing social norms or slow-moving demographic trends. Our results are unaffected after controlling for observable characteristics at the state level. We provide additional evidence suggesting that our results

are not driven by other legislative changes related to discrimination based on gender identity in adoption, employment, housing and public accommodation, the gender marker change on birth certificates, and the repeal of sodomy laws.

We add to the literature, secondly, by studying whether the relationship between same-sex marriage legalization and homosexual migration varies depending on the physical distance between sending and receiving states. This can be important in this framework because the introduction of same-sex marriage was phased in and not all gays and lesbians had a close state with same-sex marriage. In addition, migration pattern in terms of physical distance of homosexuals may be different to that of their heterosexual counterparts when there is a change in a public policy or legislation. Homosexuals appear to earn less than their heterosexual counterparts in the U.S. and in other countries (Ahmed and Hammarstedt, 2010; Badgett, 1995; Clain and Leppel, 2001; Grossbard and Jepsen, 2008), generating budget constraints to move to a non-close state because the greater the physical distance the higher the migration costs (Belot and Hatton, 2012; Bellido and Marcén, 2015). However, the opposite could be possible. With low wages, opportunity costs would be lower for homosexuals, encouraging migration for homosexuals. Also, since homosexual households are less likely to have children, this reduces over a lifetime the necessities of some household resources (Black et al., 2002; Grossbard and Jensen, 2008), which can make them free for the migration process. Then, how the physical distance may affect the migration flow of homosexuals is not clear in the theoretical framework. Our empirical findings suggest that the migration flow of homosexuals as a consequence of the liberalization of same-sex marriage occurs between non-close states, and this is not a transitory movement. There is not a statistically significant effect in the case of neighboring states, suggesting that the migration costs caused by physical distance does not appear to matter.

Another unexplored issue related to the effect of same-sex marriage is how this can affect to the stock of homosexuals. As mentioned above, Beaudin (2017), without showing empirical evidence, points out the possibility that the phased introduction of same-sex marriage across the U.S. could be changing the spatial distribution of homosexuals. We can check this focusing on the analysis of the dynamic response of the stock of homosexuals to the liberalization of same-sex marriage. Thus, our work is not limited to the exploration of the migration flow of homosexuals; we also pay attention on the evolution of the stock of homosexuals, which is our third contribution to the literature. We find that there is an impact on the stock of homosexuals after the introduction of same-sex marriage, but that is transitory. Therefore, we do not detect empirical evidence in favor of a change in the geographic distribution of homosexuals as a consequence of same-sex marriage. It appears to have a permanent impact on mobility, but this is not translated to any significant degree to the spatial distribution of homosexuals.

To our knowledge, there is also a lack of research relating to how the introduction of same-sex marriage affects those individuals originating from countries that are not tolerant of same-sex relations. On the one hand, it can be surmised that tolerant states (those with same-sex marriage) would be more attractive for those individuals who flee persecution because of the criminalization of same-sex relations in their country of origin. One way to

examine this issue is exploring data on asylum seekers by type of persecution (including gender identity and sexual orientation). Unfortunately, as is explained by the Center for Gender & Refugee Studies, the absence of official reporting on asylum cases at most stages of adjudication make this analysis impossible. On the other hand, states having same-sex marriage would be culturally dissimilar to non-tolerant countries in terms of sexual orientation, reducing the incentives to live in those states for individuals originating from non-tolerant countries. We find empirical evidence that appears to confirm this behavior, which is our fourth contribution to the existing literature. The percentage of individuals originating from countries that criminalize same-sex relations decreases in those state with same-sex marriage, and the effect appears to be permanent.

The remainder of the paper is organized as follows. Section 2 presents the empirical strategy. Section 3 describes the data. Our results are discussed in Section 4, and Section 5 concludes.

2. EMPIRICAL STRATEGY

To identify the effect of same-sex marriage legalization on the interstate migration flow of individuals, our empirical approach makes use of the variations in the timing of the introduction of same-sex marriage across the U.S. Since the exact date on which same-sex marriage was legalized can be considered exogenous, the use of the history of legalization of same-sex marriage allows us to analyze the causal link between same-sex marriage and the migration behavior of individuals.[2] We follow Wolfers's methodology (Wolfers, 2006) to pick up the dynamic effect of same-sex marriage legalization. Formally, we estimate:

$$PHM_{ct} = \Sigma_s \beta_s legalization_{cts} + \Sigma_c StateFE_c + \Sigma_t YearFE_t + [\Sigma_c State_c \times Time_t + \Sigma_c State_c \times Time_t^2] + u_{ct} \quad (1)$$

where PHM_{ct} is the percentage of homosexuals who move to state *c* in the year *t*. This variable is defined as the number of homosexual migrants over the total homosexuals *at risk* of migrating multiplied by 100. In the denominator, the individuals *at risk* of migrating incorporates all identifiable homosexuals living in the rest of the states in year *t*, excluding those living in state *c* in year *t*. Our main explanatory variable, $legalization_{cts}$, is a dummy variable that takes value *1* when state *c* has legal same-sex marriage in year *t* for *s* period, and *0* otherwise. In this way, equation (1) includes dummies showing whether same-sex marriage has been effective for 1-2 years, 3-4 years, and so on. As explained above, those states that have same-sex marriage can be considered tolerant and are more attractive to homosexuals, but the access to marriage (which implies legal rights and social benefits) may

[2] Using methodologies quite similar to that presented here, we have found those papers that examine the role of several law reforms on different outcomes. For example, some researchers focus their attention on the impact of divorce law reforms on divorce rates (Wolfers, 2006; González-Val and Marcén, 2012), fertility rates (Bellido and Marcén, 2014), marriage rates (Drewianka, 2008) and suicide and domestic violence (Stevenson and Wolfers, 2006). Other papers have considered the effect of custody law reforms on marriage rates and fertility rates (Halla, 2013), economic well-being (Del Boca and Ribero, 1998; Allen et al., 2011) and educational attainment (Leo, 2008; Nunley and Seals, 2011). In all these cases, the empirical approach is based on the exogeneity of the exact date on which the law reforms are introduced.

alone be sufficient to encourage their migration. In this setting, we would expect β_s parameters to be positive indicating that the inflow migration of homosexuals to state *c* has increased after *s* periods since the introduction of same-sex marriage. The interpretation of a negative sign would be just the opposite. We include state- and year-fixed effects in equation (1) to account for evolving unobserved attributes varying at the state level and over time. In addition, we account for pre-existing differences across states incorporating the interaction between the state-fixed effects and calendar and quadratic calendar time. It is possible that unobservable factors such as culture or demographic trends evolve over time at different paces in different states. For example, in one state, it may be more socially acceptable to have a same-sex partner, while in others it may be less so. Those states where the social norm associated with homosexual couples was reducing faster would experience higher increases in the percentage of homosexuals moving in and might also be more likely to introduce same-sex marriage. Adding state-specific linear and quadratic trends can capture these issues. Regressions are estimated by population-weighted least squares.

This methodology allows us to analyze the dynamic response of the homosexual migration flow to changes in marriage access (dynamic model). Prior literature is limited to the exploration of how same-sex marriage may affect the probability of homosexual and heterosexual couple migration using microdata (Beaudin, 2017). In our case, we use aggregate data to examine how same-sex marriage affects the evolution of homosexual migration flow. The rest of our work also applies a similar empirical strategy to that presented in this section (see below for a detailed explanation) to examine the importance of the physical distance on the migration process, the possible impact on the stock of homosexuals, and the migration process of those individuals originating from non-tolerant countries with same-sex relations.

3. DATA

The dataset used in this work cover the 50 states of the U.S. and the District of Columbia from 2001 to 2015. The migration flow of individuals is calculated by using data from the American Community Survey of Integrated Public Use Microdata Series (IPUMS, Ruggles et al., 2018). The IPUMS provides information on the state of residence during the previous year. This allows us to calculate the number of individuals who have moved from one state to another in the previous year.[3] To identify whether an individual is homosexual, we are only capable of observing those men and women living with a partner of the same-sex in the IPUMS sample. This data limitation is common to other works using the IPUMS (Black et al., 2007; Negrusa and Oreffice, 2011; Hansen et al., 2019, among others).[4] Our sample selection consists of homosexuals aged 30 (beyond the education period and after the period of more intense job mobility (Bureau of Labor and Statistics, 2018; Borghans and Golsteyn, 2012)) to 64 (below retirement age) who can legally marry (single, divorcee, or widower).

[3] To do this, we use the weights provided by the IPUMS.
[4] Note that we use information on individuals who are cohabiting, so the possible measurement error problem that the practice of inputing the gender for some married couples made by the Census because of a misidentification of that characteristic should be mitigated with our sample (Hansen et al., 2019).

With respect to our variable of interest, we have obtained the information on same-sex marriage from Gerstmann (2017). As mentioned above, the introduction of same-sex marriage in the U.S. began in 2003, when Massachusetts became the first state to legally recognize same-sex marriage.[5] Between 2008 and 2009 four more states (Connecticut, Iowa, New Hampshire, and Vermont) and the District of Columbia followed. By 2015, the legalization of homosexual marriage had already been established in 37 states (Alabama, Alaska, Arizona, California, Colorado, Delaware, Florida, Hawaii, Idaho, Illinois, Indiana, Kansas, Maine, Maryland, Minnesota, Montana, Nevada, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Utah, Virginia, Washington, West Virginia, Wisconsin, Wyoming, and the five states mentioned above) and District of Columbia. Since 2015, all states have allowed same-sex marriage (see Table 1).

As can be seen in Figure 1, the percentage of U.S. people living in a state having same-sex marriage was below 10% until 2012 when it rose to 20%. After that, a considerable increase is observed until 2015 when 100% of the population live in a state with that marriage regulation. This figure also shows the evolution of the migration flow of homosexuals. We have represented there the percentage of homosexual migrants, defined as the number of homosexual migrants over the total number of homosexuals *at risk* of migrating from 2001 to 2015, which was multiplied by more than four during that period. This increase occurs after the introduction of gay marriage in Massachusetts in 2003. Therefore, it can be argued that there is a response of the homosexual population to the introduction of same-sex marriage. It is also worth noting that the rise in the migration flow of homosexuals does not appear to be mitigated over time, pointing to a possible permanent effect. Figure 2 provides additional evidence in favor of this possible relationship, since the number of homosexuals moving to states without access to same-sex marriage decreased considerably after 2006, whereas the number of homosexuals moving to states with access to same-sex marriage slightly increased after 2003 and took off after 2008. Thus, it can be surmised that it is not the migration flow to states without same-sex marriage which is driving the behavior of the homosexual migration. Of course, this is not a conclusive analysis and we need to test it more thoroughly.

4. RESULTS

a) Same-sex marriage and migration flow of homosexuals

Table 2 reports our estimates on the effect of same-sex marriage on the migration flow of homosexuals. The first column, which includes state- and year-fixed effects in addition to state-specific linear and quadratic time trends, shows an increase in the percentage of homosexual migrants following the introduction of same-sex marriage. We also observe that this positive effect does not fade over subsequent years. Our results point to the possibility that states having same-sex marriage would be more attractive for homosexuals. In the other

[5] We are not considering here the effective date of the legislation since the announcement of the introduction of same-sex marriage can also attract homosexuals. Note that we are using annual data, so the differences between the effective date and the date used here are not likely to have an impact on our dataset.

columns, we have separated the sample by gender.[6] This is necessary since it can be surmised that our estimated coefficients are capturing the responses from gay men in addition to/instead of the responses from lesbian women. This argument is based on the idea that there can be differences between female and male migration because of possible dissimilarities in the factors affecting migration decisions by gender (Enchautegui, 1997). In our setting, it is possible to hypothesize that differences in discrimination against gays and lesbians can make migration decisions more/less attractive to those individuals. Column 2 incorporates as the dependent variable the percentage of gay men, whereas column 3 includes the percentage of lesbian women. Estimations indicate some gender differences. A positive and statistically significant effect is found in all years subsequent to the introduction of same-sex marriage for gay men. However, this effect is only detected five to six years after the introduction of same-sex marriage for lesbian women, which may point to a late migration process as a consequence of same-sex marriage. In column 4, we run the analysis without those states and years in which there is no available separate information about gay men or lesbian women, and the estimated coefficients are very similar to those obtained in the first column.

Although all our previous specifications incorporate controls for unobservable characteristics that can vary at the state level and/or over time, we run additional regressions to check whether our findings are driven by omitted economic and/or demographic variables. The impact of these omitted variables, if correlated with the outcome of interest, could be captured by the coefficients measuring the effect of same-sex marriage legalization. To tackle this issue, we add more controls to our baseline regression (see Table 3). Since the characteristics of the individuals (e.g., race, education) living in a state can make it more/less attractive to the individuals living in the rest of the country, we have added controls by state and year for the proportion of individuals by race (white and black) and education (the proportion of people who has completed high school, one to three years of college, and four or more years of college). The economic situation of the potential state of residence may also affect migration decisions, and for this reason we have added the employment rate by state and year. After adding these variables in column 1 of Table 3, the dynamic response of homosexuals to the introduction of same-sex marriage is quite similar. Our results are also maintained when we include all these controls in male and female samples (see columns 2 and 3).[7]

To reinforce the consistency of previous results, we estimate supplementary analysis using different samples. Results are reported in Table 4. We have first redefined the sample of homosexuals including not only those individuals who can legally marry but also those married homosexuals. The observed effect of same-sex marriage on the migration flow of those who can legally marry could be due to a change in the population at risk of marrying, since it can be assumed that there are fewer homosexuals who can legally marry after the introduction of same-sex marriage (some of them have had access to marriage). Columns 1 and 2 (with controls for observable characteristics at the state level) report our results. As

[6] The variation in the sample size is due to the availability of separate information for women and men.
[7] We have re-run these specifications including each of these additional controls separately and results do not vary.

both columns show, our conclusions are maintained and the coefficients do not change with/without those married homosexuals. Then, a possible decrease in the homosexual population who can legally marry is not driving our findings. We have tested our findings considering a young sample since younger individuals can have different incentives to change their place of residence than older individuals. Results are displayed in columns 3 and 4 for a sample of individuals aged 25 to 45 years old. Our estimations appear to reveal a later migration process for this sample since we find that the effect of same-sex marriage is positive and statistically significant three to four years after its introduction. Once again, the impact appears to be permanent.

The migration process in the U.S. is not limited to interstate migration; international migration might be affected by the introduction of same-sex marriage. We have extended the sample by adding those living in another country in the previous year in columns 5 and 6 of Table 4. The results are maintained. Also, we repeat the analysis by excluding the non-native population since several studies have shown evidence of the existence of differences between non-native and native individuals in interstate migration. Rogers and Raymer (1998) find that the migration patterns of the foreign-born, in general, have exhibited levels of spatial focus that exceed those of their native-born counterparts, and Gurak and Kritz (2000) indicate that while human capital factors are the most important sources of differences between immigrants and natives in internal migration patterns, contextual dimensions associated with the social capital of native groups and state economic conditions strongly influence the interstate migration of immigrants. To check whether this is driving our results, we have repeated our main analysis including only those homosexuals originating from the U.S. (see column 7 and 8). Results are unchanged, and so the behavior of non-native individuals does not appear to affect to our findings. However, it is possible to suppose that the behavior of the non-native individuals differs depending on their country of origin since there are considerable differences in the way same-sex relations are considered throughout the world. We revisit this issue below when we explore the behavior of non-native individuals originating from non-tolerant countries (where same-sex relations are illegal). In short, all the results described in this section suggest that the introduction of same-sex marriage positively affects the migration flow of homosexuals to those states that have same-sex marriage, and this does not disappear over time.

b) Is it the effect of same-sex marriage, or is it the effect of other regulations?

Same-sex marriage legalization was accompanied by related legal changes that may also have affected the interstate migration of lesbian, gay, bisexual, and trans (LGBT) people. During our period of study, four states (California, Nevada, Oregon, and Rhode Island) and the District of Columbia introduced laws aiming to prohibit discrimination by adoption agencies based on sexual orientation and gender identity (see Table A1 in the Appendix). Since the time of these legal changes varies by state, it could be possible that our estimated coefficient capturing the effect of same-sex marriage might be capturing the effect of the prohibition of discrimination based on gender identity in adoption rather than the introduction of same-sex marriage.

There have been other important developments. From the 1990s, regulations were introduced prohibiting discrimination based on gender identity in either employment, housing, and/or public accommodation. By 2019, 21 states and the District of Columbia have such laws (see Appendix for a detailed review of the legislation) (Movement Advancement Project, 2019). Similarly, policies for changing gender markers on birth certificates vary state by state. By 2019, 22 states and the District of Columbia have issued new style birth certificates with new gender markers (see Appendix) (Movement Advancement Project, 2019). From the 1970s, some states began to repeal their sodomy laws. These laws made certain kinds of sexual activity illegal. By 2003, 36 states and the District of Columbia had repealed them (see Appendix) (Kane, 2003). As before, we need to control for this issue to observe whether our estimations are capturing the effect of same-sex marriage rather than other differences in LGBT legislation across states.

To capture the impact of all the LGBT related legislation mentioned above, we use the variation in the timing of these reforms by adding explanatory variables to control for the years since each law was adopted. None of the prior literature considers this legislation in its totality, so with regard to previous research on the impact of same-sex marriage on socio-economic and demographic variables, there can be some concerns about what exactly is being picked up by the estimated coefficients on same-sex marriage legalization. Table 5 shows the dynamic response of interstate homosexual migration to same-sex marriage legalization, after controlling for the prohibition of discrimination based on gender identity in adoption (column 1); employment (column 2); housing (column 3); public accommodation (column 4); the approval of gender marker changes on birth certificates (column 5); and the introduction of the repeal of sodomy laws (column 6). All are included in column 7. It is reassuring to observe that, even after adding those controls, our findings are unaffected, which suggests that it was not the LGBT related legal changes that are driving our findings. It therefore appears that the same-sex marriage does play a role in the migration flow of homosexuals.

c) Physical distance

Up to this point, we have focused on the relationship between same-sex marriage legalization and interstate homosexual migration. In this section, we examine whether that relationship varies depending on physical distance between sending and receiving states. The literature on this subject offers a consensus on the effect of distance on migration (Davies et al., 2001). Prior research has shown that, among the variables affecting the costs of migration, distance between destination and origin appears to be one of the most important: the further away the two places are, the higher the monetary travel costs for the initial move, as well as for visits back home (Long et al., 1988; Mayda, 2010). Another explanation as to why distance may negatively affect migration is that it is costlier to acquire information about far-away places (Greenwood, 1997; Lucas, 2001).

To analyze the importance of physical distance, we have re-run the entire analysis, considering homosexuals migrating between contiguous states, non-contiguous states, between states at a distance of 1000 km or less, 2000 km or less, and 3000 km or less. As can

be seen in Table 6, our findings are not consistent with the previous literature, pointing to a non-statistically significant effect of same-sex marriage legalization for migration flow among bordering states (see column 1). However, when we extend the distance, the estimates for homosexuals moving between non-contiguous states and those migrating to a distant of less than 1000, 2000 or 3000 km (columns 2 to 5) show a statistically significant effect even seven years after the introduction of same-sex marriage legislation. These findings should be approached with caution since it can depend on the timing of its introduction. Figure 3 illustrates this temporal evolution using a map. After Massachusetts introduced the first same-sex marriage legislation, no other state followed until five years later, in 2008, and was not until 2014 that a large number of states did likewise. In this setting, since the number of states with same-sex marriage before 2014 was quite small, the majority of homosexuals who wanted to live in a state allowing same-sex marriage before then had to move to non-contiguous states. It is not until the end of our period of study that the majority of homosexuals had the opportunity to move to a contiguous state allowing same-sex marriage. In any case, it is reassuring that the physical distance between states does not affect our estimations.

d) The effect of same-sex marriage legalization on the stock of homosexual migrants

To our knowledge, there is only one paper that explores the possible impact of same-sex marriage on migration decisions at the individual level (Beaudin, 2017). However, there are no studies of the possible effect of same-sex marriage on the geographical distribution of homosexuals across the U.S. Beaudin (2017) points to the possibility of an increasing imbalance in the distribution of homosexuals, but without providing empirical evidence. In our work, we examine the impact of same-sex marriage on the stock of homosexuals by state. Formally, we estimate this using the following equation:

$$Stock_{ct} = \Sigma_s \beta_s legalization_{cts} + \Sigma_c StateFE_c + \Sigma_t YearFE_t + [\Sigma_c State_c \times Time_t + \Sigma_c State_c \times Time_t^2] + u_{ct} \qquad (2)$$

where $Stock_{ct}$ is defined as the number of homosexuals living in state *c* in year *t* per one hundred inhabitants. The rest of the variables have been defined before. We would expect β_s parameters to be positive since the impact on the migration flow appears to be positive and permanent. Table 7 presents the estimations in columns 1 and 2 (with additional controls). There appears to be empirical evidence in favor of an increase in the stock of homosexuals following the introduction of same-sex marriage, but after five to six years no statistically significant coefficient is detected. The positive effect on inflow migration is not translated to any significant degree into the stock of homosexuals. Thus, after five to six years there is no clear empirical evidence of a change in the geographical distribution of homosexuals as a consequence of same-sex marriage.

e) The effect of same-sex marriage on non-native individuals originating from non-tolerant countries

There can be some specific individuals for whom the introduction of same-sex marriage in a state can reduce the attractiveness of moving there. States having same-sex marriage would perhaps unsurprisingly not be culturally similar to non-tolerant countries in terms of sexual orientation. We are going to study this issue in this subsection. It can also be argued that tolerant states (those with same-sex marriage) would be more attractive for those individuals who flee persecution because of the criminalization of same-sex relations in their country of origin. Unfortunately, this relationship cannot be examined since there is no available information. Data on asylum seekers by type of persecution (including gender identity and sexual orientation) is quite scarce (see some data on the Center for Gender & Refugee Studies).

Focusing on the possible negative effect that cultural differences can generate, we calculate the percentage of non-native individuals originating from non-tolerant countries moving from one state to another over the total number of non-native individuals originating from non-tolerant countries who are at risk of migrating (and multiplied by 100). The sample selection of individuals is the same as before, that is, we have selected individuals between the ages of 25 and 64 who can legally marry. Those non-tolerant countries of origin are classified following the information provided by the ILGA in 2019. All countries for which same-sex relations are not legal for men in the period under examination are considered here as non-tolerant countries. As can be observed in Table 8, our estimations suggest that same-sex marriage reduces the incentive for non-native individuals originating from non-tolerant countries to move to a state that permits same-sex marriage. All coefficients are negative and statistically significant. The effect is also permanent here. This provides additional evidence that same-sex marriage may encourage social acceptance of homosexuals which can diminish the attractiveness of those places for individuals originating from less tolerant countries.

5. CONCLUSIONS

The aim of this paper is to analyze the impact of the same-sex marriage on the interstate migration evolution of homosexuals in the United States. Since LGBT people attempt to leave discriminatory regions in search of more tolerant ones (those allowing homosexual couples to legally marry), those states having same-sex marriage can be more attractive in terms of migration for homosexuals. But also, the mere access to marriage can encourage individuals to move to states having same-sex marriage if their lifetime expected utility in marriage is greater than that obtained in other forms of partnership or in singlehood (Black et al., 2007). From a theoretical point of view, the expected effect on the migration flow of homosexual appears to be positive.

To examine this issue, we use data covering the 50 states of the U.S. and the District of Columbia. Our results suggest that the introduction of same-sex marriage has a positive and permanent effect on the interstate migration flow of homosexuals to states having same-sex marriage. This response of homosexual migration to same-sex marriage regulation is robust after controlling for state- and year-fixed effects, and after the inclusion of state-specific linear and quadratic trends. Our findings are also unaltered after adding controls for

observable state-specific factors, to different subsamples, and in consideration of the physical distance between sending and receiving states, which does not appear to matter in this scenario.

A potential concern with prior research on the impact of same-sex marriage legislation on socio-demographic outcomes is that it omits other legal reforms affecting LGBT individuals. It could be surmised that they are driving our results. The battle for LGBT rights has not ended, since even now LGBT parents and their children in some states of the U.S. can be refused by social services or ejected from a business by someone who cites a religious belief. In our paper, we show that the effect of same-sex marriage on homosexual migration between states is robust to the control of the prohibition of discrimination based on gender identity in adoption, employment, housing and public accommodation, the legalization of gender marker change on birth certificates, and the repeal of sodomy laws.

This study is the first that examines the dynamic response to same-sex marriage in terms of migration. Moreover, by exploiting the different timing of homosexual marriage legislation, this research fills a gap in the literature by exploring the impact of same-sex marriage on the geographical distribution of homosexuals in the U.S. Results appear to point to a positive but temporary effect. After five to six years, the positive effect on inflow migration is not translated to a statistically significant effect on the distribution of homosexuals in the U.S. Same-sex marriage legislation appears to play a role in the movement of homosexuals across the U.S. but it is not sufficiently important to change their spatial distribution.

The existence of different social attitudes towards homosexuality can also generate outflow migration of those individuals who are less tolerant of same-sex relationships. We test this using data on the migration behavior of non-native individuals originating from non-tolerant countries (in which same-sex relations are illegal). These individuals may consider states that permit same-sex marriage to be less attractive because the cultural differences with their home countries discourages them from moving there. Our findings appear to confirm this. We observe a negative effect on the interstate migration of non-native migrants originating from non-tolerant countries following the introduction of same-sex marriage. This provides additional evidence that cultural differences regarding homosexuality may be of significance in the migration decisions of some individuals.

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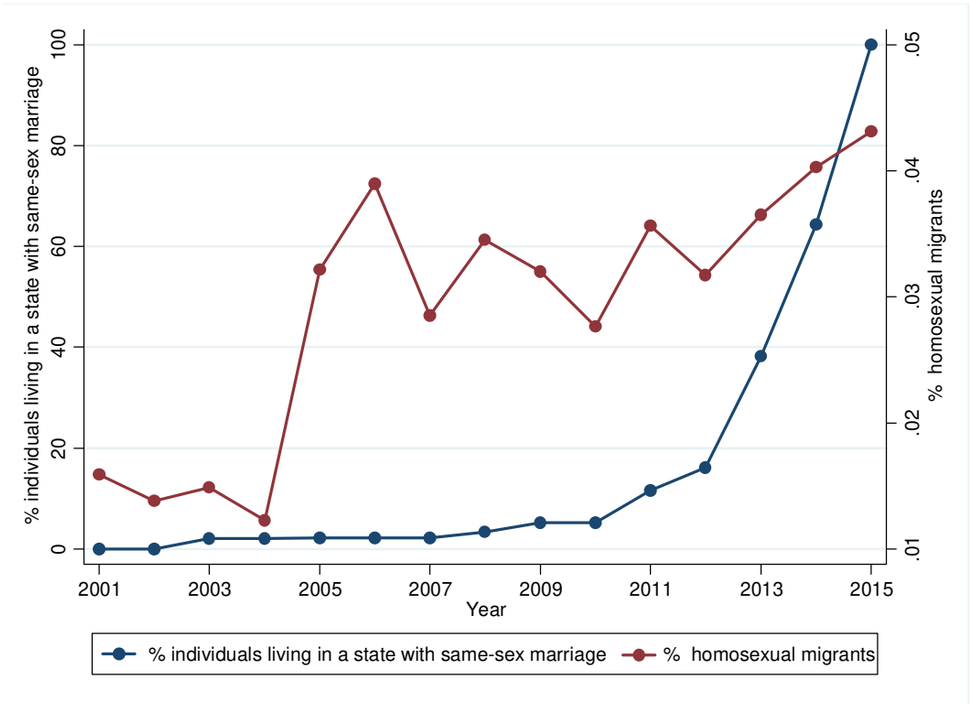
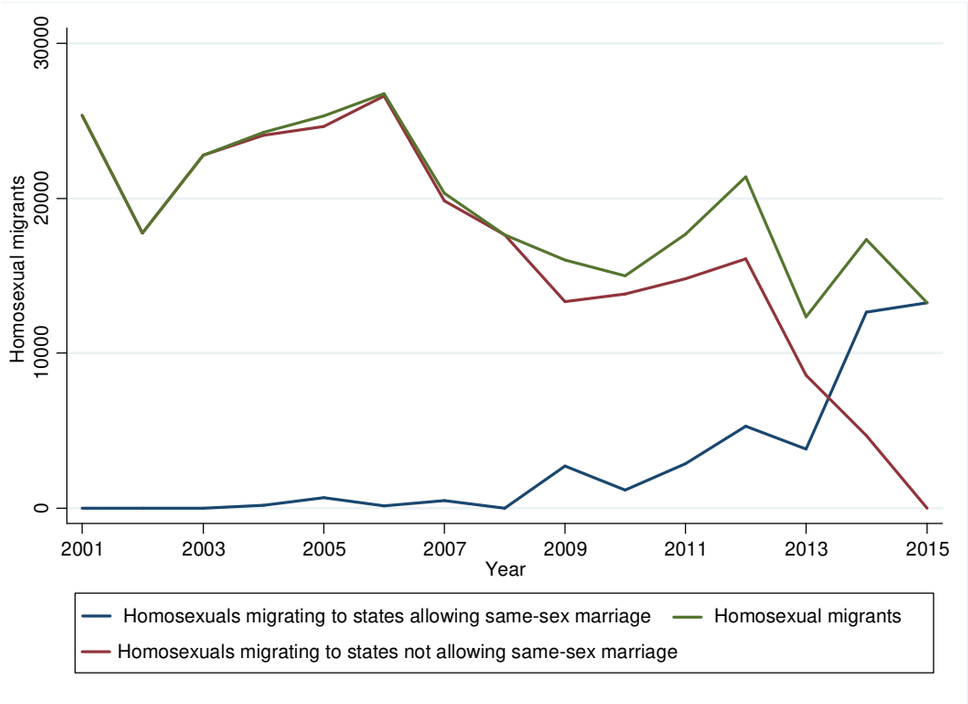
Figure 1: Percentage of individuals living in a state with same-sex marriage and percentage of homosexual migrants during the period 2001-2015



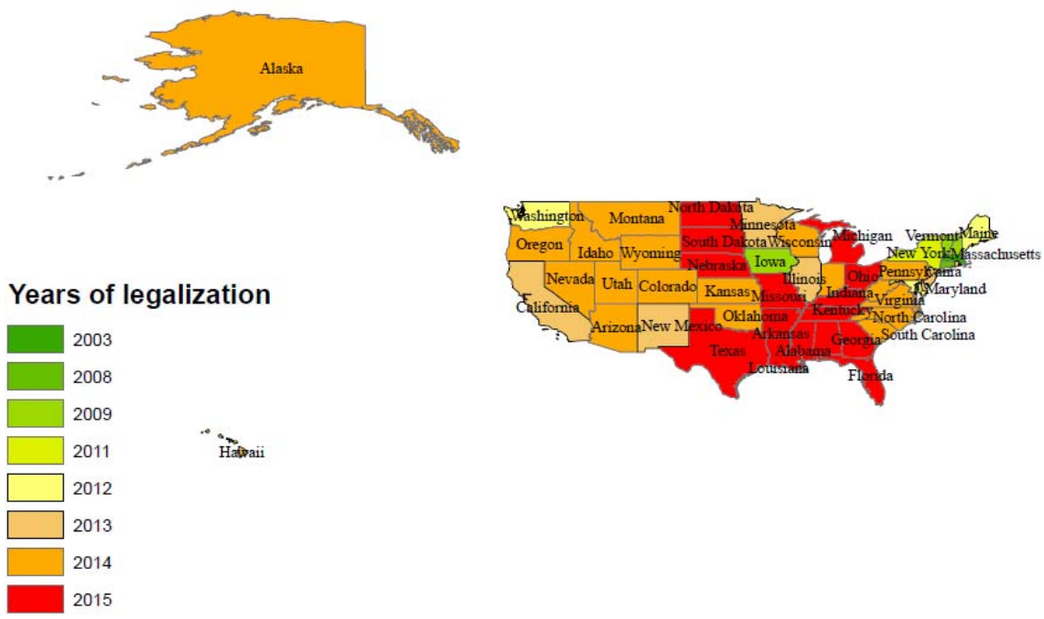
Note: Data comes from IPUMS.

Figure 2: Homosexuals migrating to states allowing same-sex marriage vs homosexuals migrating to states not allowing same-sex marriage



Note: This figure has been calculated using data from IPUMS.

Figure 3: Evolution of same-sex marriage across states



Note: This figure presents a map showing the different years of the introduction of same-sex marriage.

Table 1: Data on the year of same-sex legalization

State	Year same-sex marriage legalization
Alabama	2015
Alaska	2014
Arizona	2014
Arkansas	2015
California	2013
Colorado	2014
Connecticut	2008
Delaware	2013
District of Columbia	2009
Florida	2015
Georgia	2015
Hawaii	2013
Idaho	2014
Illinois	2013
Indiana	2014
Iowa	2009
Kansas	2014
Kentucky	2015
Louisiana	2015
Maine	2012
Maryland	2012
Massachusetts	2003
Michigan	2015
Minnesota	2013
Mississippi	2015
Missouri	2015
Montana	2014
Nebraska	2015
Nevada	2014
New Hampshire	2009
New Jersey	2013
New Mexico	2013
New York	2011
North Carolina	2014
North Dakota	2015
Ohio	2015
Oklahoma	2014
Oregon	2014
Pennsylvania	2014
Rhode Island	2013
South Carolina	2014
South Dakota	2015
Tennessee	2015
Texas	2015
Utah	2014
Vermont	2009
Virginia	2014
Washington	2012
West Virginia	2014
Wisconsin	2014
Wyoming	2014

Note: This table shows the year in which same-sex marriage was legalized in each state.

Table 2: The effect of same-sex marriage legalization on the percentage of homosexual migrants

Dependent variable: Percentage of homosexual migrants	(1)	(2)	(3)	(4)
Same-sex marriage 1–2	0.039***	0.059***	0.024	0.039***
	(0.014)	(0.020)	(0.018)	(0.015)
Same-sex marriage 3-4	0.135***	0.233***	0.056	0.135***
	(0.031)	(0.044)	(0.040)	(0.031)
Same-sex marriage 5-6	0.188***	0.274***	0.125*	0.187***
	(0.052)	(0.073)	(0.067)	(0.053)
Same-sex marriage >7	0.296***	0.367***	0.265***	0.296***
	(0.071)	(0.102)	(0.089)	(0.072)
Year FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
State*time	Yes	Yes	Yes	Yes
State*time^2	Yes	Yes	Yes	Yes
Observations	765	760	763	752
R^2	0.781	0.777	0.549	0.781

Note: Column 1 shows our baseline estimate. We have excluded lesbian women in column 2 and gay men in column 3. In column 4, we have repeated the main analysis without those states and years in which there is not available information about lesbian women or gay men. Estimates are weighted. Standard errors are in parentheses. ***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

Table 3: Adding additional controls

Dependent variable: Percentage of homosexual migrants	(1)	(2)	(3)
Same-sex marriage 1–2	0.038***	0.054***	0.028
	(0.015)	(0.021)	(0.019)
Same-sex marriage 3-4	0.137***	0.222***	0.070*
	(0.032)	(0.044)	(0.041)
Same-sex marriage 5-6	0.189***	0.258***	0.140**
	(0.053)	(0.074)	(0.068)
Same-sex marriage >7	0.298***	0.341***	0.293***
	(0.073)	(0.104)	(0.091)
White	0.224	-0.495	1.017*
	(0.400)	(0.546)	(0.522)
Black	-0.656	0.897	-1.407
	(1.618)	(2.193)	(2.138)
High school graduate	1.049	2.405*	-0.184
	(0.922)	(1.264)	(1.202)
Some college	-0.320	-0.232	-0.446
	(1.023)	(1.407)	(1.331)
More college	-0.427	-0.523	-0.194
	(1.099)	(1.504)	(1.434)
Employment rate	0.001	0.003	0.002
	(0.005)	(0.006)	(0.006)
Year FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
State*time	Yes	Yes	Yes
State*time^2	Yes	Yes	Yes
Observations	765	760	763
R^2	0.782	0.781	0.553

Note: All columns include controls for the proportion of white and black individuals, the proportion of individuals who have completed high school, who have studied 1 to 3 years of college, who have studied 4 or more years of college, and the employment rate by state and year. Lesbian women have been excluded in column 5, and gay men have been excluded in column 6. Estimates are weighted. Standard errors are in parentheses. ***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

Table 4: More robustness checks

Dependent variable: Percentage of homosexual migrants	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Same-sex marriage 1–2	0.039***	0.040***	0.004	0.005	0.044***	0.044***	0.032**	0.029**
	(0.014)	(0.015)	(0.023)	(0.023)	(0.016)	(0.016)	(0.014)	(0.014)
Same-sex marriage 3-4	0.133***	0.136***	0.157***	0.159***	0.127***	0.131***	0.111***	0.106***
	(0.031)	(0.032)	(0.050)	(0.050)	(0.034)	(0.034)	(0.031)	(0.031)
Same-sex marriage 5-6	0.184***	0.188***	0.242***	0.242***	0.173***	0.182***	0.157***	0.149***
	(0.052)	(0.053)	(0.083)	(0.084)	(0.056)	(0.057)	(0.051)	(0.052)
Same-sex marriage >7	0.289***	0.296***	0.381***	0.394***	0.279***	0.292***	0.254***	0.240***
	(0.071)	(0.073)	(0.113)	(0.115)	(0.076)	(0.078)	(0.069)	(0.071)
White		0.207		-0.552		0.292		0.183
		(0.399)		(0.626)		(0.430)		(0.391)
Black		-0.636		-1.853		-0.978		-2.014
		(1.611)		(2.515)		(1.742)		(1.563)
High school graduate		0.724		1.573		0.290		1.372
		(0.921)		(1.451)		(0.993)		(0.888)
Some college		-0.515		-1.905		-0.757		-0.317
		(1.022)		(1.591)		(1.102)		(0.983)
More college		-0.545		-0.319		-1.609		-0.498
		(1.098)		(1.714)		(1.183)		(1.056)
Employment rate		0.002		0.015**		0.002		-0.005
		(0.005)		(0.007)		(0.005)		(0.004)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State*time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State*time^2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	765	765	764	764	765	765	765	765
R^2	0.781	0.782	0.720	0.725	0.811	0.813	0.767	0.770

Note: Columns 1 and 2 include married individuals. Columns 3 and 4 include those individuals who are between 25 and 45 years old. Those individuals who lived in other country the year before have been included in addition to those individuals who lived in a different state in the previous year, in columns 5 and 6. Columns 7 and 8 only include those individuals who are originating from the US. Estimates are weighted. Standard errors are in parentheses. ***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

Table 5: The effect of same-sex marriage on the percentage of homosexual migrants including other laws

Dependent variable: Percentage of homosexual moving people	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Same-sex marriage 1–2	0.038***	0.039***	0.038***	0.039***	0.039***	0.042***	0.040***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.015)
Same-sex marriage 3-4	0.131***	0.134***	0.137***	0.139***	0.135***	0.145***	0.144***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.032)	(0.032)
Same-sex marriage 5-6	0.183***	0.185***	0.194***	0.201***	0.187***	0.213***	0.221***
	(0.052)	(0.053)	(0.053)	(0.053)	(0.053)	(0.055)	(0.056)
Same-sex marriage >7	0.289***	0.293***	0.305***	0.309***	0.295***	0.337***	0.350***
	(0.071)	(0.071)	(0.071)	(0.071)	(0.071)	(0.075)	(0.076)
Prohibition of discrimination by adoption agencies	0.039						0.020
based on sexual orientation and gender identity	(0.033)						(0.038)
Prohibition of discrimination based on		0.006					0.066**
gender identity in employment		(0.017)					(0.032)
Prohibition of discrimination based on			-0.022				-0.054
gender identity in housing			(0.017)				(0.034)
Prohibition of discrimination based on				-0.028			-0.035
gender identity in public accommodations				(0.018)			(0.029)
Allowing a gender marker change					0.002		0.000
on birth certificates					(0.016)		(0.016)
The repeal of sodomy laws						0.151	0.167*
						(0.095)	(0.095)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*time	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country*time^2	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	765	765	765	765	765	765	765
R^2	0.782	0.781	0.782	0.782	0.781	0.782	0.786

Notes: Columns show results after prohibiting discrimination by adoption agencies and officials based on sexual orientation and gender identity, the prohibition of discrimination based on gen identity in employment, housing and public accommodation, the approval of gender marker change on birth certificates, and the introduction of the repeal of sodomy laws, respectively. Estima are weighted. Standard errors are in parentheses. ***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

Table 6: The effect of same-sex marriage on the percentage of homosexual migrants by physical distance

Dependent variable: Percentage of homosexual migrants	Contiguous states	Non-contiguous states	Distance at or less than 1000km	Distance at or less than 2000km	Distance at or less than 3000km
	(1)	(2)	(3)	(4)	(5)
Same-sex marriage 1–2	-0.010	0.048***	0.047***	0.029***	0.025***
	(0.006)	(0.013)	(0.011)	(0.009)	(0.007)
Same-sex marriage 3-4	-0.018	0.153***	0.145***	0.120***	0.072***
	(0.014)	(0.027)	(0.023)	(0.019)	(0.015)
Same-sex marriage 5-6	-0.038*	0.226***	0.210***	0.167***	0.101***
	(0.023)	(0.046)	(0.039)	(0.031)	(0.025)
Same-sex marriage >7	-0.044	0.339***	0.327***	0.292***	0.198***
	(0.031)	(0.063)	(0.053)	(0.043)	(0.034)
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
State*time	Yes	Yes	Yes	Yes	Yes
State*time^2	Yes	Yes	Yes	Yes	Yes
Observations	765	765	765	765	765
R^2	0.366	0.797	0.834	0.833	0.807

Note: The dependent variable has been defined as the percentage of homosexual migrants between contiguous states and non-contiguous states in columns 1 and 2, respectively. That variable has been defined as the percentage of homosexual migrants coming from a distance of 1000, 2000 and 3000 km or less in columns 3,4 and 5, respectively. Estimates are weighted. Standard errors are in parentheses. ***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

Table 7: The effect of same-sex marriage on the stock of homosexual migrants

Dependent variable: Percentage of homosexuals	(1)	(2)
Same-sex marriage 1–2	0.040***	0.041***
	(0.015)	(0.015)
Same-sex marriage 3-4	0.103***	0.107***
	(0.031)	(0.032)
Same-sex marriage 5-6	0.059	0.065
	(0.054)	(0.055)
Same-sex marriage >7	0.113	0.121
	(0.080)	(0.080)
White		-0.475
		(0.444)
Black		-0.450
		(1.324)
High school graduate		-0.411
		(0.711)
Some college		-0.309
		(0.766)
More college		-1.463*
		(0.845)
Employment rate		-0.001
		(0.004)
Year FE	Yes	Yes
Country FE	Yes	Yes
Country*time	Yes	Yes
Country*time^2	Yes	Yes
Observations	765	765
R^2	0.880	0.881

Note: Estimations show the effect of same-sex marriage on the stock of homosexual migrants. ***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

Table 8: The effect of same-sex marriage on the non-native individuals originating from non-tolerant countries

Dependent variable: Percentage of non-native individuals	(1)
Same-sex marriage 1–2	-0.095***
	(0.019)
Same-sex marriage 3-4	-0.132***
	(0.040)
Same-sex marriage 5-6	-0.157**
	(0.068)
Same-sex marriage >7	-0.195*
	(0.102)
Year FE	Yes
State FE	Yes
State*time	Yes
State*time^2	Yes
Observations	736
R^2	0.647

Note: ***Significant at the 1% level, ** Significant at the 5% level, *Significant at the 10% level.

Appendix

Table A1: Data on the year of the introduction of other laws

State	Year discrimination based on gender identify in adoption banned	Year discrimination based on gender identify in employment banned	Year discrimination based on gender identify in housing banned	Year discrimination based on gender identify in public accommodations	Year gender marker change on birth certificates allowed	Year the repeal of sodomy laws
Alabama					1992	
Alaska					2012	1978
Arizona					2006	2001
Arkansas					1995	2002
California	2003	2003	2004	2005	2014	1975
Colorado		2007	2008	2008	2019	1971
Connecticut		2011	2004	2011	2012	1969
Delaware		2013	2013	2013	2017	1972
District of Columbia	1977	2006	2006	2006	2013	1993
Florida					2018	
Georgia					2005	1998
Hawaii		2011	2005	2006	2015	1972
Idaho					2018	
Illinois		2005	2005	2005	2017	1961
Indiana					2006	1976
Iowa		2007	2007	2007	2004	1976
Kansas					2019	
Kentucky					2005	1992
Louisiana					2006	
Maine		2005	2005	2005	2005	1975
Maryland	2019	2014	2014	2014	2006	1999
Massachusetts		2011	2011	2016	2006	2002
Michigan					2006	
Minnesota		1993	1993	1993	2006	2001
Mississippi					2006	
Missouri					2006	
Montana					2017	1997
Nebraska					2005	1977
Nevada	2015	2011	2011	2011	2006	1993
New Hampshire		2018	2018	2018	2006	1973
New Jersey	2019	2007	2007	2007	2013	1978
New Mexico		2003	2003	2003	2019	1975
New York	2019	2015	2015	2015	2014	1980
North Carolina					2005	
North Dakota					2005	1973
Ohio						1972
Oklahoma						
Oregon	2007	2007	2007	2007	2017	1971
Pennsylvania					2016	1980
Rhode Island	2015	2001	2001	2001	2005	1998
South Carolina						
South Dakota						1976
Tennessee						1996
Texas						
Utah		2015	2015		2004	
Vermont		2007	2007	2007	2011	1977
Virginia					2006	
Washington		2006	2006	2006	2018	1975
West Virginia					2006	1976
Wisconsin					2006	1983
Wyoming					2005	1977

Notes: This table shows the year in which each law was introduced in each state. Column 2 presents the first year in which employment non-discrimination law covers sexual orientation and gender identity. Column 3 shows the timing of the law introducing housing non-discrimination law covers sexual orientation and gender identity. Column 4 shows the first year in which public accommodations non-discrimination law enumerates

sexual orientation and gender identity. Data for these fourth columns come to the Movement Advancement Project. Last column lists the year in which states have decriminalized sodomy. Data come from Kane (2003)