Pink Work

Same-Sex Marriage, Employment and Discrimination [♠]

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JOB MARKET PAPER

The most recent version of the paper and the Online Appendix are available on my [website](#).

Abstract

This paper exploits variations among U.S. states to show that gay and lesbian couples increased their labor supply following the legalization of same-sex marriage. Both partners in these couples were more likely to be employed, to work full time, and to work longer hours. Marriage equality was also associated with a decrease in self-employment and within-household specialization among same-sex couples. Additional evidence is then provided in order to investigate whether these changes were driven by a reduction in discrimination, a marriage premium in wages, or changes in fertility, assortative matching and homeownership.

Keywords: same-sex marriage; discrimination; labor supply; marriage premium; gay; lesbian

JEL: D10; J12; J15; J22; J71

1. Introduction

In 1895, Oscar Wilde was incarcerated because of "the love that dare not speak its name". Alan Turing, the father of computer science and artificial intelligence, was prosecuted for homosexual acts and forced to undergo chemical castration in 1952. In 1996, the U.S. federal government approved a law defining marriage as the union of one man and one woman. And yet, the last twenty years have seen exceptional improvements in LGBT rights: homosexuality became legal in all U.S. states in 2003 (*Lawrence v. Texas*), the Netherland became the first country in the world to allow same-sex marriage (SSM) in 2001, followed by Massachusetts in 2004. Finally, in 2015 the U.S. Supreme Court legalized same-sex marriage in all U.S. states (*Obergefell v. Hodges*).

This paper analyzes how the legalization of SSM affected gay and lesbian couples in the labor market. The empirical analysis exploits variations across U.S. states in the different timing of SSM reforms to show that this policy was associated with higher employment among same-sex couples: following SSM legalization, individuals in gay and lesbian couples were more likely to be employed and to work full-time. They also increased the total number of hours worked per week, while there was a reduction in self-employment and in the difference in hours worked between the household head and the partner.

The second part of the paper investigates whether these changes were driven by a reduction in discrimination, a marriage premium in wages, or changes in fertility, assortative matching and homeownership. While there is no detectable impact of SSM legalization on fertility, matching and homeownership rates among same-sex couples, there is evidence that hourly earnings increased, especially among gays. Additional suggestive evidence is provided to support the hypothesis that SSM legalization reduced discrimination based on sexual orientation, thus increasing the labor supply and demand of gay and lesbian workers.

This paper contributes in several ways to the literature in household and labor economics. First and foremost, it exploits this unique opportunity provided by a large scale natural experiment in which the availability of marriage is arguably exogenous to investigate how access to this institution affected several economic outcomes of interest. Historically, the only other analogous legal case is the invalidation of law prohibiting interracial marriage after *Loving v. Virginia* in 1967 (Fryer 2007), which has been shown to have led to an increase in mixed-race births (Fryer et al. 2012).

This analysis is also linked to previous studies on the impact of unilateral divorce laws on women. In particular, (Stevenson and Wolfers 2006) argued that these reforms led to a reduction in female suicide and domestic violence, while (Stevenson 2007) found that couples in states that allowed unilateral divorce were more likely to have both spouses employed in the labor force. Increases in female labor supply following changes in divorce laws have been documented both in the United States (Stevenson 2007) and in Europe (Bargain et al. 2012). In contrast with these studies, this paper shows that SSM legalization did *not* lead to a symmetric negative reduction in employment among gays and lesbians.

Despite the scarcity of data, economic analysis of LGBT issues started thanks to the pioneering works by (Klawitter and Flatt 1998) and (Badgett 2001). Later on, using mainly data from the U.S. Census, (Black et al. 2007) provided a first glance at the economic lives of same-sex couples. Most of the research on this topic has so far focused on the effect of sexual orientation on earnings using observational data (such as in (Plug and Berkhout 2004); (Carpenter 2007); (Clarke and Sevak 2013)), or correspondence experiments (see for instance (Weichselbaumer 2003) and (Drydakis 2009)). As summarized by (Klawitter 2015), most of these studies found that gay men earn less and lesbian women earn more than their heterosexual counterparts.

Some researchers have also started to look at the effects of SSM legalization. (Aldén et al. 2015) found that entering into a registered partnership in Sweden was negatively associated with individual earnings for gay men, and positively related to fertility rates among lesbian women. Reductions in sexually-transmitted diseases (syphilis) after SSM legalization have been found by (Dee 2008) and (Francis et al. 2012). (Aksoy et al. 2018) argued that SSM legalization in Europe was followed by an improvement in attitudes towards sexual minorities. This paper extends this literature by analyzing the impact of SSM legalization on several additional economic outcomes such as employment, self-employment, earnings, fertility and homeownership.

Last but not least, the findings highlighted in the empirical analysis support the expansion of marriage equality. Homosexuality is illegal or barely tolerated in most countries outside Western Europe and North America. Previous research have pointed out that there is no effect of SSM legalization on heterosexual behavior (Badgett 2009), including non-marital sex (Francis et al. 2012), marriage, divorce and extramarital birth rates ((Dillender 2014); (Trandafir 2015)), thus dispelling any concerns about the potential destruction of traditional family values. This paper shows instead that a more tolerant environment can increase participation of gay and lesbian individuals in the labor market, thus offering an additional economic justification to the expansion of LGBT rights.

2. Institutional context

This Section provides a summary of the historical process that led to same-sex marriage legalization in the United States. A more detailed timeline and discussion of LGBT laws is available in Section A.1 in the Online Appendix.

The campaign for marriage equality in the United States started - with rather disappointing initial results - in the 1970s. In 1972, the U.S. Supreme Court denied appeal in *Baker v. Nelson*, a case in which the Minnesota Supreme Court ruled out that state's statute limiting marriage to opposite-sex couples does not violate the U.S. Constitution. In 1973, Maryland became the first state to introduce a ban on same-sex marriage in its statute.

In 1993, the Supreme Court of Hawaii ruled out that prohibition on same-sex marriage violates the state constitution (*Baehr v. Miike*). The response at the state and federal level was immediate. In 1996, President Bill Clinton signed the Defense of Marriage Act (DOMA): a law defining marriage

for federal purposes as the union of one man and one woman, and allowing states to refuse recognition of same-sex marriages granted in other states. Between 1994 and 1998, several states included a ban on same-sex marriage in their statute. In 1998, for the first time voters in Alaska and Hawaii approved constitutional bans to same-sex marriage.

Things started to look better after that. In 1999, California introduced domestic partnerships, while Vermont became the first state to introduce civil unions in 2000. Massachusetts was instead the first U.S. state to legalize same-sex marriage in 2004, followed by Connecticut in 2008, and Iowa in 2009. Vermont also became the first state in 2009 to legalize same-sex marriage by statute instead of following a court decision.

All these changes generated backlashes in other states, with 26 states introducing bans to same-sex marriage in their constitution between 2004 and 2008. California swung several time over the years between legalizing and banning domestic partnerships, civil unions and same-sex marriage. Despite these negative reactions, in 2013 the U.S. Supreme Court deemed Section 3 of DOMA unconstitutional (*United States v. Windsor*), thus forcing the U.S. government to recognize marriage unions performed in states that allowed such marriages, and to extend marriage-related federal benefits to same-sex married couples. Finally, same-sex marriage became legal in all the states after the U.S. Supreme Court decision in *Obergefell v. Hodges*.

According to (GAO 2004), there are 1,138 federal statutory provisions in which benefits, rights and privileges are contingent on marital status (or in which marital status is a factor). These include well-known tax benefits such as Social Security, estate and inheritance laws, but also laws protecting from stalkers, gift tax laws, numerous benefits for veterans and their families (DePaulo 2010). In addition to these, federal agencies, states and employers often link benefits to marital status in key areas such as health care, family-related and child care policies, retirement benefits, relocation allowances, credit union membership, company store discount, tuition remission, and hospital access when the partner is sick (Badgett 2001).

3. Data

3.1 The American Community Survey

The main dataset used in the empirical analysis is the version of the American Community Survey (ACS) publicly available through IPUMS-USA (Ruggles et al. 2017). As described in (Lofquist 2011), the ACS is a nationally representative survey containing demographic, economic, social, and housing data. It is conducted every year and it has an average annual sample size of around 3 million addresses in the United States and Puerto Rico. The sample size has increased over time: the ACS 2000 had about a 1-in-750 national random sample of the population, which increased to around 1-in-240 from 2001, while from 2005 the ACS has surveyed 1% of the US population (IPUMS 2017). The addresses include not only housing units, but also group quarters: e.g., nursing facilities and prisons.

It is worth mentioning that the ACS is a mandatory survey. Although nobody has been prosecuted for not responding to the survey (Selby 2014), this approach significantly increases self-response rate and the quality of the data: around 95% of the US counties are deemed to have acceptable quality data (U.S. Census 2017).

The advantage of using this dataset is that, since the 1990, the U.S. Census Bureau has given respondents the option of classifying a member of the household as "unmarried partners" when asking about his or her relationship with the household head. In other words, roommates and unmarried partners have been treated as two separated categories starting from the 1990 Census. Therefore, it is possible to identify unmarried same-sex couples in the ACS. Furthermore, same-sex couples have been allowed to report their marital status since 2012.

There are other surveys with contains information on sexual orientation, e.g. the General Social Survey. However, these alternative data sources have limited sample sizes, thus the ACS is the only survey which allows to exploit the year-to-year changes in SSM laws between states. On the other hand, the main disadvantage is that it is possible to identify in the ACS only gay and lesbian individuals in same-sex couples, not singles. Furthermore, there is no information on sexual behavior, so it is not possible to detect members of opposite-sex couples who are bisexuals.

Most of the empirical analysis focuses on household heads aged between 18 and 65 with married or unmarried partners. The household head is defined as the person who owns or rent the house, apartment or mobile home. If there is no such person, the first person listed can be any adult living in the household.

One key issue when dealing with same-sex couples is measurement error: indeed, a low rate of random error in a large group (opposite-sex couples) may create issues in the estimates of a small group (same-sex couples). As a result, there is the risk that several same-sex couples may actually be misidentified opposite-sex couples. Section A.4 in the Online Appendix discuss at length the topic. To minimize such errors, observations with imputed sex and relation to the household head have been dropped (Black et al. 2007). Moreover, the US Census Bureau implemented several changes between 2007 and 2008 to address this issue. The drop in the reported number of same-sex couples between these two years reported in Section A.2 in the Online Appendix can be attributed to these changes, which have resulted in more reliable estimates of same-sex couple households (U.S. Census 2013). Therefore, only observations from 2008 have been considered in the main empirical analysis.

Even if the terminology is debatable, for simplicity the words "gay couple", "gays" and "male same-sex couple" are used are synonyms throughout the paper. The same logic applies to female same-sex couples and opposite-sex couples.

3.2 Descriptive statistics

Section A.2 in the Online Appendix reports sample sizes and summary statistics for same-sex and opposite sex couples. In 2016, the last year available, same-sex couples represented 1.5% of all

the unmarried and married couples in the sample. This is a substantial increase from 2008, the first year used in the empirical analysis, when same-sex couples represented only 0.9% of the sample. The percentage of female same-sex couples has always been slightly higher: in 2008, more than 51% of same-sex couples were composed by women, while such percentage in 2016 was around 50.5%. Among same-sex couples who decided to report their status in 2016, 52% of gays and 55% of lesbians were married (compared with 89% of opposite-sex couples).

When looking at employment outcomes, it is interesting to note that in 67% of male same-sex couples both partners were working in the week preceding the interview, a higher percentage than among female same-sex couples (66%), married opposite-sex couples (57%) and unmarried opposite-sex couples (60%). This is in line with the statistics reported in (Black et al. 2007). Even when focusing on young couples with children, same-sex couples were more likely to have both partners working (61% for gays, 64% for lesbians) than opposite-sex couples (60% for married, 53% for unmarried).

Similar differences are found among full-time workers: 49% of male same-sex couples had both partners usually working at least 40h/week in the 12 months preceding the interview, compared with 44% of female same-sex couples, 37% of married opposite-sex couples, and 40% of unmarried opposite-sex couples.

4. Econometric framework

The main econometric specification relies on the following difference-in-difference strategy:

$$y_{ist} = \beta SSM_{st} + \delta_s + \alpha_t + \tau_{ts} + \tau_{ts}^2 + x_{st}'\gamma_1 + x_{ist}'\gamma_2 + \varepsilon_{ist}$$

Where y_{ist} is the relevant labor market outcome for individual (or household) *i* living in state *s* at time *t*. The coefficient of interest is β. SSM_{st} is an indicator equal to one if the individual lived at time *t* in a state *s* where same-sex marriage had been legalized. The specification includes state fixed effects (δ_s), year fixed effects (α_t), as well as state-specific linear and quadratic trends ($\tau_{ts} + \tau_{ts}^2$). It is also possible to include time-varying state-level controls x_{st}', as well as individual-level controls x_{ist}'. State-level controls are important to take into account potential omitted-variable bias. While running a state-level regression with weights for population would give the same point estimates, the inclusion of individual-level controls is useful to increase precision (Angrist and Pischke 2009). Since gay and lesbian couples may differ in their behavior, this specification is estimated for male and female same-sex couples separately when suspecting heterogeneities. Given the relatively large number of states (51, including the District of Columbia), it is possible to consistently estimate an arbitrary variance-covariance matrix: standard errors have been clustered at the state level to allow any correlation pattern within states over time (Bertrand et al. 2004).

The state-level controls x_{st}' are similar to those included in (Stevenson and Wolfers 2006): unemployment rate, income per capita, racial and age composition, proportion of state population with positive welfare (public assistance) income. In addition to these, x_{st}' also includes the state

heterosexual cohabitation rates, i.e. the proportion of different-sex couples who classify themselves as "unmarried partners", since this variable may capture higher levels of openness to SSM legalization (Badgett 2009).

The individual and household controls x'_{ist} include demographic characteristics of the household head and partner: age, education, race and ethnicity. Given its return to the labor market, this set of controls also includes whether the household head and the partner spoke English. One more reason because it may be important to control for age and education of the respondents is to account for match quality. Indeed, marriage laws may affect the quality of couple matches (Stevenson 2007): being able to marry implies that it is more difficult to exit from a relationship, thus individuals may be reluctant to risk on a high-variance match. This would imply a higher match quality. On the other hand, marriage legalization would increase the benefits of entering into a relationship, which may lead individuals to become less selective. In other words, if there are advantages from getting married, individuals may lower their minimum threshold for match quality in order to start benefiting from marriage early on. In both cases, legalizing SSM may affect match quality, which may in turn affect labor market decisions.

Similarly, x'_{ist} also includes the interaction between education of the household head and partner, as well as the age interaction, since positive assortative matching may affect specialization and labor market decisions through bargaining power and comparative advantages. For instance, if both partners are highly educated and have similar age, they are more likely to have equal weights in intra-household decisions.

5. Effect of SSM on labor supply

The estimates from the difference-in-difference model described above are presented in Section 5.1, while the main issues which may prevent a causal interpretation of these findings are discussed in Section 5.2. It is worth stressing that the difference-in-difference model estimates the impact of SSM legalization, not the impact of getting married. In other words, it is possible to estimate an intention-to-treat (ITT) effect, not an average treatment effect of marriage.

5.1 Main results

Table 1 shows the estimated effect of SSM legalization on the probability that both partners were working in the week preceding the interview. Columns 1 and 2 include only male same-sex couples, while Columns 3 and 4 focuses on female same-sex couples, and all these couples are combined in Column 5. Even after including state controls to account for factors potentially related with the legalization of SSM (Columns 2 and 4), the estimated coefficients are statistically significant and very similar for both gays and lesbians at around 2.3 percentage points. A similar estimate (2.4 percentage points) is obtained when looking at the effect on all same-sex couples (Column 5).

It is important to emphasize that the magnitude associate with SSM legalization is similar to the impacts of other related policy reforms. In fact, (Stevenson 2007) found an increase of 2 percentage

points in the probability of both spouses being employed full time, and an increase of 2.4 percentage points in the probability that the wife was working following the introduction of unilateral divorce laws. Similarly, (Bailey 2006) found an increase of 2-4 percentage points in the labor force participation rates of women aged 26 to 35 following the introduction of the pill. In contrast, several studies found very limited impact of childcare policies on labor supply ((Fitzpatrick 2010); (Black et al. 2014)).

As evident from Table 2, the effect of SSM legalization on employment was substantial also when looking at other related outcomes. This policy reform was associated with an increase of around 1.3 hours in the amount of time spent working weakly by the household head and the partner (Column 1), as well as an increase in the probability of both the household head and the partner working at least 40 hours per week (Column 2), or at least 30 hours per week (Column 3). These findings are reassuring since these questions were asked considering the twelve months preceding the interview, while the employment status information examined in Table 1 was in regard to the week before the survey was conducted. In addition to this, also in these cases the magnitudes are similar to those of other policy reforms: for instance, (Bailey 2006) found an employment increase of 1.5-2.3 hour/week among women aged 26 to 35 after the introduction of the pill.

In addition to this, the difference in the number of hours worked weekly by both partners got smaller (Column 4). Finally, there was a reduction in self-employment among same-sex couples (Column 5).

The Online Appendix includes several extensions. Section A.4 shows that the conclusions from Table 1 and 2 are still valid after extending the time period considered. As discussed in Section A.5.1, qualitatively similar results are also obtained when examining the employment outcomes of individuals rather than couples. Additional heterogeneities are investigated in Section A.5.2: there is some evidence that the effect of SSM legalization on lesbian (but not gay) couples was lower among highly educated households. Results from Table 1 are instead robust to restricting the sample to prime age workers. Black gay couples seem to have particularly benefited from SSM legalization. The estimated impact of SSM legalization on employment is also qualitatively similar between couples in urban and rural areas, as well as between gay and lesbian couples. Finally, Section A.5.3 shows that SSM led not only to higher employment, but also to higher labor force participation.

5.2 Threats to the identification strategy

As usual with the difference-in-difference model, there are several potential issues which may undermine the identification strategy. This section aims at discussing and ruling out the main threats. All related tables are included in the Online Appendix.

It may be argued that same-sex couples living in Massachusetts are not comparable to those living in more conservative states such as Mississippi. First, it is important to remember that the difference-in-difference model requires only parallel trends, not similar baseline characteristics.

Moreover, the specifications presented in the previous section also include several state and individual controls. As an additional robustness check, it is possible to estimate a triple difference model, i.e. comparing same-sex and opposite-sex couples within the same state over time. The estimated impact of SSM legalization is still positive, statistically significant, and with magnitude close to the coefficients in Table 1.[2] Since this estimate is obtained by comparing same-sex and opposite-sex couples *within* the same state, it also suggests that the positive impact found in the difference-in-difference estimates when comparing same-sex couples *between* states was not due to backlashes and negative employment outcomes in states that had not legalize SSM, but rather to actual improvements in states that legalized SSM.

Between-state migration may have also changed the geographical composition and distribution of same-sex couples, thus leading the difference-in-difference model to compare different populations over time. Nevertheless, there is no evidence that same-sex couples massively moved to states that legalized SSM.[3] In addition to this, it is reassuring to note that the results in Table 1 are not driven by other contemporaneous reforms or by changes in only one state.[4]

The estimation and interpretation of the impact of SSM legalization may also depend on how same-sex couples have been identified: individuals may differ over time and between states in their propensity to be in a homosexual relationship and to be open about it. As shown in Section 7, the coefficient of SSM legalization remains positive, statistically significant and with a magnitude equal to the one estimated in Table 1 Column 5 even when including same-sex roommates (Table 9 Column 4). Therefore, the main results are not driven by SSM legalization affecting the composition of the sample, i.e. by changing how many same-sex couples decided to be open about their sexuality. In line with this result, there is no evidence that SSM legalization led to a substantial change in the demographic composition of same-sex couples within each state.[5]

Section A.5.8 in the Online Appendix also discusses why several past turnarounds and abrupt law repeals make it is unlikely that same-sex couples started changing their labor market decisions before the actual legalization of SSM. Moreover, the estimated coefficient of an additional lead indicator (SSM_{st+1}) is statistically insignificant and close to zero in magnitude. This result rules out both any anticipation effect and the hypothesis that improvements in the labor market were actually driven by changes in attitudes among the general population *before* SSM legalization. In

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[2] Section A.5.4 in the Online Appendix reports and further discusses the estimates from the triple difference model.

[3] Section A.5.5 in the Online Appendix reports the estimated coefficients and additional evidence on limited inter-state migration.

[4] As shown in Table 7, the estimate of SSM is robust to the inclusion of other policy indicators as controls, such as whether the state introduced anti-discrimination laws in the same period. Moreover, the contemporaneous introduction of other reforms would have been a major concern if the identification strategy had relied on only two states. For instance, just comparing Massachusetts to a similar state before and after 2004 would have been problematic since Massachusetts implemented a health reform around the same period. Nevertheless, this is less of an issue when using all U.S. states since each state has a lower weight than in a pair comparison. In addition to this, Section A.5.6 in the Online Appendix shows that the estimates in Table 1 remain positive and statistically significant even when excluding one state at a time.

[5] Section A.5.7 in the Online Appendix reports the estimates from the difference-in-difference specifications using household head's demographic characteristics as dependent variables. SSM legalization did not substantially affected the ethnic, age and language composition of same-sex couples. However, it seems that more individuals without tertiary education decided to be open about their sexuality. If anything, since education is positively related with employment, this change should lead to a downward bias in the estimates in Tables 1 and 2.

other words, the statistically insignificant coefficient of SSM_{st+1} does not support the idea that (after controlling for linear and quadratic trends) attitudes towards sexual minorities among heterosexuals improved before the legalization of SSM, and that they affected both the change in policy and the variation in employment.

More generally, adding up to three lead operators to the specifications in Tables 1 and 2 still results in statistically insignificant coefficients, while the contemporaneous effect of SSM legalization remains significant.[6] These findings not only confirm that no changes occurred before the policy reform, but also support the parallel trend assumption (conditional on observables) in the difference-in-difference model. Indeed, since all these additional lead variables are indistinguishable from zero, it is possible to assume that trends in employment among same-sex couples were similar among U.S. states before the legalization of SSM.

Another key concern is the validity of SSM legalization as a natural experiment: the timing of this policy reform should not reflect pre-existing difference in state-level characteristics. First and foremost, unlike other policy reforms such as unilateral divorce laws (Stevenson 2007), SSM legalization was primarily driven by state and federal courts' decisions. Therefore, the time of the legalization was less likely to depend on other time-varying state characteristics since judges were – arguably - less influenced by public opinion than policymakers. Indeed, state courts started to legalized SSM in Massachusetts, Iowa and Connecticut before 2010 even if pools did not show national popular support for SSM until 2011-2013 ((Justin McCarthy 2017); (Pew 2017)). For instance, when Massachusetts legalized SSM in 2004, only 36% of residents in New England did not oppose sexual relationships between two adults of the same sex.[7]

In addition to this, the main difference-in-difference specifications include several state-level variables which may have affected the legalization of SSM. In particular, following (Badgett 2009), this set of controls includes the share of opposite-sex unmarried couples in the state. According to the author, higher cohabitation rates may signal a higher level of openness towards sexual minorities and different family structures in the society, so taking this factor into account reduces concerns about the endogeneity of the policy reforms.

It is also worth pointing out that state fixed effects encompass all the time-invariant characteristics of the state, such as religion or political affiliation. This is the same argument used by (Bailey 2006) when analyzing the impact of the pill on female labor supply to control for the fact that a strong Catholic lobby may have delayed the diffusion of birth control methods. The time span considered in the empirical analysis is rather short (2008-2016, 9 years), so it is likely that these variables did not change in this time period. Last but not least, all specifications include linear and quadratic state-specific time trends.

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[6] Section A.5.9 in the Online Appendix reports the estimated coefficients and discusses the introduction of additional leads and lags in the model.
[7] Source: GSS data, author's own calculation.

As an additional robustness check, Column 6 of Table 1 shows that the effect of SSM legalization on the probability that both same-sex partners were working remains positive, statistically significant, and with an even larger magnitude when restricting the sample to the years between 2012 and 2016. In this time period, most of the legal changes were driven by decisions from the U.S. Supreme Court, thus they were not influenced by local factors. It is also possible to restrict the sample size even more and consider only the 2014-2016 time period. In this specification the coefficient of SSM legalization is identified only through the *Obergefell v. Hodges* decision by the federal Supreme Court, a sentence independent of state characteristics. Nevertheless, the estimate remains positive and statistically significant. Its magnitude also increases up to 6 percentage points (Column 7 Table 1).[8]

Finally, there estimated coefficients of SSM legalization are statistically insignificant and with tight confidence intervals around zero when examining opposite-sex couples in isolation.[9] Therefore, this null result from such a placebo test reinforces the validity of the primary analysis, and supports the hypothesis discussed in the introduction that SSM did not lead to a deterioration of the American family.

6. Possible explanations

There are different explanations for the positive relation between SSM legalization and the labor outcomes of gays and lesbians highlighted in the previous section.

There are actually two reasons which may have explained a *negative* impact on employment. First, marriage may have incentivized intra-household specialization (Becker 1991). Second, SSM may have led to an expansion of health insurance coverage among same-sex partners. Therefore, spouses who gained access to health insurance through their partners were no longer obliged to have a job in order to be covered by insurance.

There are instead five reasons which could be reasonably behind the estimated positive effect of SSM. First, married individuals may have decided to start working more to save money and build a family later on. For instance, same-sex couples may have decided to save more in order to buy a house and/or have children in the following years. Second, SSM legalization may have changed the composition and matching patterns among gays and lesbians, thus leading individuals with a higher propensity to work to match with similar partners.

Third, a more tolerant environment may have improved mental health among LGBT members, thus improving productivity and indirectly leading to higher employment and earning levels. Fourth, hourly earnings may have increased following the legalization of SSM. In other words, the emergence of a marriage premium - either because married individuals were considered more

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[8] In addition to this, Section A.5.10 in the Online Appendix also finds no evidence of a substantial omitted variable bias following (Oster 2017). It also rejects the hypothesis that the effect of SSM legalization was different in states that legalized SSM following a state or federal court decision than in states that directly introduced the law in the state statute.
[9] See also Section A.5.11 in the Online Appendix.

trustworthy, or because lower discrimination increased wages – may have incentivized higher employment among same-sex couples.

Fifth, lower perceived and actual discrimination following the legalization of SSM may have directly led more homosexual individuals to participate in the labor market and to find jobs more easily. Each of these hypotheses are discussed in the following paragraphs. In particular, Section 7 focuses on the leading explanation, i.e. lower discrimination. As discussed in Appendix A.8, several researchers have already documented the improvements in mental health following SSM legalization, but it is not possible to test with the available data whether this actually led to substantial higher productivity.

6.1 Fertility

(Becker 1973) identified the main advantages from marriage in the intra-household specialization: one person in the couple try to increase his or her productivity and earnings in the labor market while the partner specializes in the production of household commodities, that is, in goods that are non-marketable or transferable among different households, although they may be transferred among members of the same household, such as children. However, as stressed in (Stevenson and Wolfers 2007) and (Juhn and Mccue 2017), the production complementarities stressed by (Becker 1991) have lost their central role in modern families. New household technologies (washing machines, vacuum cleaners, etc.) have reduced time devoted to household tasks, while the development of service industries has allowed individuals to buy in the market most of the goods (such as processed food) which used to be produced within the household. The only area where specialization has remained intact is with respect to children. Indeed, when considering individuals without children, there is no evidence that married women earn less than single women, while women with children have substantially lower earnings (Juhn and Mccue 2017). SSM legalization may therefore increase specialization within households only under the condition that it had an impact on fertility.

Overall, same-sex couples are less likely to have children: only 13% of male same-sex couples in the sample had a child living with them, compared to 28% of female same-sex couples and 58% of opposite-sex couples. Even when looking only at married couples, couples with children represented 22% of male same-sex couple, 36% of female same-sex couples, and 59% of opposite-sex couples.[10]

At the same time, married couples have higher fertility than unmarried ones: 22% of married male same-sex couples have at least a child, compared to 6% among unmarried same-sex couples. The percentages are 36% and 23% among married and unmarried female same-sex couples respectively, and 59% and 41% among opposite-sex couples. [11] Moreover, there seems to be more specialization among married couples than unmarried ones: when examining unmarried male

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[10] See Section A.6.1 in the Online Appendix for additional descriptive statistics.
[11] See Section A.6.1 in the Online Appendix for additional descriptive statistics.

same-sex couples, almost 70% of them have both partners working, compared with 63% among married male same-sex couples. Similar gaps can be found among female same-sex couples (67% vs. 63%) and opposite-sex couples (62% vs. 57%).[12]

As shown in Table 3, the effect of SSM legalization on the number of children in the household is close to zero and statistically insignificant both for gays (Column 1) and lesbians (Column 5). There is also no detectable effect on the probability of having a child (Columns 2 and 6). These conclusions do not change if lagged indicators of SSM legalization are used to allow couples more time to adjust their behaviors and fertility decisions (Columns 3 and 4 for gays, Columns 7 and 8 for lesbians). Restricting the sample size to consider only households in usual childbearing years also results in statistically insignificant coefficients.[13]

To summarize, it is not surprising that SSM legalization did not lead to an increase in intra-household specialization since the main factor behind the advantages of home production – fertility – was not affected by this policy reform. It is true that married same-sex couples were more likely to have children and higher levels of intra-household specialization, but the policy reform itself does not seem to have trigger an increase in fertility among same-sex couples. Actually, the difference in fertility between married and unmarried same-sex couples predated the policy reform. The gap is mainly due to children older than five, thus implying than same-sex couple with a higher fertility rate were more likely to get married, not vice versa.

6.2 Homeownership

There is a strict link between marriage and homeownership (Lafortune and Low 2017). As argued by (Pollak 1985), marriage reduces transaction costs: it provides a general framework to contract over long-term investments. Even if two cohabitating individuals can get a mortgage together, transaction costs are lower for married couples (Badgett 2001). In addition to this, married individuals can pool resources more easily, thus allowing them to collect enough resources to buy a house.

At the same time, marriage also reduces uncertainty and increases risk-sharing, which may lead to a reduction in precautionary savings, including housing. Another channel is based on the interpretation of a house as a relationship-specific capital: as also stressed in (Stevenson 2007), couple may overinvest in relationship-specific assets in the present in order to constrain their future selves to remain married rather than to divorce, thus offsetting the incomplete enforcement of marriage contracts by the government. However, married couple may invest less than cohabitating ones in these assets exactly because cohabitating couples have less protection from the state, so they need to compensate more.

(Miller and Park 2016) found that SSM legalization increased home purchase mortgage applications among same-sex couples. In this context, it is also worth mentioning that (Ahmed and

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[12] See Section A.2.3 in the Online Appendix.
[13] Section A.6.2 in the Online Appendix.

Hammarstedt 2009) detected discrimination towards homosexual couples in the housing market. Furthermore, unlike race and ethnicity, sexual orientation is not a protected class under the Fair housing act.

Table 4 reports the difference-in-difference estimates of the impact of SSM legalization on the probability that same-sex couples owned the house in which they lived (with or without a mortgage) at the time the survey was conducted. The contemporaneous effects are close to zero and statistically insignificant for gays (Column 1), lesbians (Column 3), and when considering all same-sex couples jointly (Column 5). If anything, there is some evidence of a negative lagged impact (Column 6), especially when looking at male same-sex couples only (Column 2).

As for fertility in Table 3, this section does not support the hypothesis that SSM legalization increased employment among same-sex couples in the short-run because these individuals wanted to increase their savings and invest in long-term assets in the following years.

6.3 Positive assortative matching

As already discussed when examining the effect of SSM legalization on fertility, (Stevenson and Wolfers 2007) argued that nowadays the factors central to marriage are leisure and consumption complementarities, as well as insurance. Increasing leisure time and wealth enhance the gains from the joint consumption of public goods and shared leisure activities. Therefore, individuals may increasingly match on similarities (e.g. within educational groups) rather than on potential gains from within-household trade. Furthermore, as mentioned in the econometric framework, SSM legalization may affect match quality by influencing the propensity of individuals to enter into a high-variance relationship.

Table 5 reports the effect of SSM legalization on the probability that both the household head and the spouse (or unmarried partner) had a Bachelor's degree or a higher educational level (Master's degree, advanced professional degree, or Ph.D.). The estimated impact is not statistically significant when examining gay couples (Column 1), lesbian couples (Column 3), or all same-sex couples (Column 5). There is also no evidence of a lagged effect of SSM on gays (Column 2) or lesbians (Column 4). Only when considering all same-sex couples and including the lagged operators (Column 6), the contemporaneous effect of SSM legalization becomes significant at a 10-percent level: if anything, SSM led to a small decrease in positive assortative matching.

6.4 Health Insurance

Insurance companies that offer coverage to opposite-sex spouses are now obliged to do the same for same-sex spouses (HealthCare.gov 2017). However, before the U.S. Supreme Court decisions in 2013 (*United States v. Windsor*) and 2015 (*Obergefell v. Hodges*), employer-sponsored health insurance benefits were treated differently than benefits received by married opposite-sex couples. For instance, they were not considered tax exempt. As a result, (Badgett 2007) estimated that employees with partners paid $1,069 more taxes than similar married individuals. Given these

limitations, it is not surprising that only 31% provided access to same-sex partners among firms offering health benefits (Dawson et al. 2016).

Even after *Obergefell v. Hodges*, private employers were not required to offer same-sex spousal coverage if they already provided coverage for opposite-sex spouses (unless specified in the state anti-discrimination laws). In fact, (Dawson et al. 2016) found that in 2016 still only 43% of firms offering spousal benefits had extended such coverage to same-sex spouses.

There is some evidence that SSM legalization did increase access to employer-sponsored health insurance (Gonzales 2015). However, in many cases the beneficiaries were individuals previously covered by Medicaid, so for them the incentives to work did not change substantially. Furthermore, (Buchmueller and Carpenter 2012) and (Gonzales and Blewett 2014) found persistent gaps in employer-sponsored insurance coverage between individuals in same-sex and opposite-sex relationships.

In conclusion, access to health insurance depended not only on federal and state regulations, but also on case-by-case decisions by individual employers and insurance companies. Therefore, given the resulting uncertainty, it is understandable that homosexual individuals did not overwhelmingly stop working just because they could potentially access their partners' health insurance.

6.5 Marriage premium

Marriage is usually associated with an earning premium for heterosexual male workers. This may be due to increase productivity following intra-household specialization or behavioral changes (e.g., higher reliability and loyalty), employer discrimination in favor of married men, or positive selection into marriage. The magnitude and the mechanisms behind such marriage premium have been extensively debated in the literature (see for instance (Ginther and Zavodny 2001); (Antonovics and Town 2004); (Dougherty 2006)).

A similar increase in earnings for gays and lesbians may incentivize them to work more, thus supporting the results on employment in Tables 1 and 2. As already discussed, such marriage premium is unlikely to stem from intra-household specialization due to the absence of substantial increase in fertility reported in Table 3. There is also no evidence of an increase in positive assortative matching. Nevertheless, employers may still value the non-cognitive skills signaled by marriage or have a preference for married men. Alternatively, lower discrimination based on sexual orientation by employers, co-workers and customers may boost earnings.

On average, male employees in same-sex couples earned more than male workers in opposite-sex couples during the time period considered ($22 per hour vs $19.2). This is mainly due to the fact that those respondents were more educated: 57% of male respondents in same-sex couples had a Bachelor's degree or more, compared to 38.3% of men in opposite-sex couples. There was also a small gap between women in same-sex and opposite-sex couples ($18.5 vs. $17.9). In all types of couples, married employees earned more than unmarried individuals. The raw marriage premium was 15% for men in same-sex couples, 21% for women in same-sex couples, 40% for men in

opposite-sex couples, 42% for women in opposite-sex couples.[14]

Using the same identification strategy implemented in the previous sections, Table 5 reports the difference-in-difference estimates of the effect of SSM legalization on earnings among male same-sex couples (Column 1), female same-sex couples (Column 2), and all same-sex couples jointly (Column 3). The coefficients are positive in all specifications, but only significant when looking at gay men. The coefficient for women is close to zero, while the one for men implies an increase of 2.8% in the earnings of gay employees compared to gay workers living in states that had not legalized SSM yet. One possible explanation for this different effect among gay and lesbian couples might be that employers expect married individuals to be monogamous, thus reducing the risk of contracting HIV – more widespread among male homosexuals – and leading to better health, lower health insurance premiums, and higher wages.

Similar results are obtained once wages are adjusted for inflation (Section A.7.2 in the Online Appendix), if part-time workers are excluded from the sample (Section A.7.3), or using a triple difference model (Section A.7.4).

Therefore, a marriage premium may explain the reported increase in labor supply, especially for gay men. It is worth stressing that the interpretation of marriage premium used here is rather loose. The estimated coefficients measure the impact on earnings of SSM legalization, not of actually getting married. So they are intent-to-treat (ITT) estimates. It is not possible to obtain LATE estimates through IV since SSM legalization is not a valid instrument: it can affect earning also through different channels other than marriage.

7. Discrimination

Given the positive effect of SSM legalization on employment and earnings, it is worth investigating more in depth whether marriage equality actually led to a decrease in discrimination towards sexual minorities. Indeed, previous studies have emphasized the positive effect of lower discrimination on labor supply and employment among women and racial minorities (see for instance (Leonard 1990) and (Collins 2001)), so it is possible that SSM legalization triggered the same mechanism.

This section describes the conceptual framework linking SSM legalization with discrimination and employment. It then collects a set of supplementary analyses to support this theory. The Online Appendix provides additional evidence using data on hate crimes (Section A.11.1) and on attitudes towards homosexuals (Section A.11.2).

7.1 Conceptual framework

There are different reasons which may explain discrimination towards sexual minorities. The classical theory is the one of taste-based discrimination developed by (Becker 1957): some employers may dislike minority workers, thus making it more expensive to hire this kind of

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[14] See also Section A.7.1 in the Online Appendix for additional descriptive statistics on earnings.

workers compare to equally productive heterosexual individuals. Furthermore, even in absence of personal prejudices, a profit-maximizer employer would discriminate if she expected that consumers prefer to interact with heterosexual workers, or that other employees prefer to work with heterosexual co-workers, and thus hiring a minority worker may reduce overall firm productivity and increase staff turnover.

The second leading theory is the one of statistical discrimination described in (Arrow 1973): given the uncertainty about the actual productivity of a job candidate, employers may try to predict the quality of the worker from the (perceived) average productivity of minority workers. From this perspective, gay men may be discriminated because deemed less masculine as a group, a trait usually remunerated in several occupations. Moreover, employers could believe that gay men are more likely to have HIV, and that their health condition may affect their productivity (even if this is no longer true thanks to the new generation of anti-retroviral drugs) or that they might – though some mysterious ways – infect other workers. Lesbian women may be actually positively discriminated due to their perceived lower fertility, higher labor force attachment, and stronger personality (Patacchini et al. 2015), although the empirical evidence is far from clear-cut (Weichselbaumer 2003). Second-order statistical discrimination stems from the (perceived) higher variance in productivity among minority workers (Klumpp and Su 2013). Employers are less familiar with minority workers, so even if they perceived these workers as productive as heterosexual workers on average, they might be reluctant to hire them due to the higher uncertainty.

More recently, (Pęski and Szentes 2013) based their model of discrimination on social norms rather than preferences or productivity reasons: heterosexual employers may discriminate minority workers because such behavior is tolerated, expected and deviations are punished by other heterosexual individuals.

SSM legalization may affect all these kinds of discrimination. First, this policy may shape preferences and change attitudes among employers, workers and consumers towards sexual minorities (Aksoy et al. 2018). These individuals may also realize that most homosexuals do not follow their idea of "gay sinful lifestyle", but rather they have the same aspirations to get married and have a family. Second, higher visibility of LGBT individuals may dissipate old cliché about gay men as all feminine and thus reduce statistical discrimination. As more homosexual workers are hired or decide to come out, employer would adjust their expectations about average productivity and variance for this group of employees. Given the time required to update employers' expectations, short-term decreases in discrimination would be mainly due to a decline in taste-based discrimination, while lower statistical discrimination should drive long-term trends. Third, social norms might be affected and employers may realize that such a discriminatory behavior is no longer considered acceptable, and that having a diverse workforce is not punished, but actually valued.

Finally, the documented increase in employment among same-sex couples may be due not only to an increase in labor demand, but also to a higher labor supply. Indeed, through a feedback mechanism, more gay and lesbian individuals could decide to participate in the labor market since they expect lower discrimination and thus their expected wages exceed their reservation wages.

7.2 Additional policy reforms

The first suggestive evidence supporting the hypothesis of lower discrimination following SSM legalization is provided by Table 7. This table extends the difference-in-difference model with male and female same-sex couples estimated in Table 1 (Column 5) by including additional policy indicators, that is, whether states introduced other policies affecting homosexual individuals in the time period considered.

In particular, these policies indicate whether and in which year a state introduced a constitutional ban on same-sex marriage (Column 2), legalized domestic partnership and civil union (Column 3), introduced anti-discrimination laws (Column 4), and allowed or prohibited adoptions by same-sex couples (Column 5). It is worth emphasizing that these results are only presented as suggestive evidence to reinforce the findings on SSM legalization. Indeed, while 48 states legalized SSM between 2008 and 2016, only between 1 and 7 states implemented one or more of these additional reforms.[15]

First of all, it is reassuring that the coefficient of SSM legalization remains positive and statistically significant in all specifications, thus minimizing any concern about endogeneity. The impact of these other policy reforms is also consistent with the idea that employment increased because of higher tolerance signaled and caused by these laws. Couples living in states that introduced a constitutional ban on SSM or adoptions were less likely to be both working. On the other hand, there is a positive association between the legalization of domestic partnerships (or civil unions) and employment. Similarly, the coefficients of anti-discrimination laws and second-parent adoption are also positive.[16]

7.3 Heterogeneity by marital status.

If indeed SSM legalization led to lower discrimination based on sexual orientation, then all same-sex couples should have benefited, even those unmarried. This hypothesis is investigated in Table 8. Since the U.S. Census started allowing same-sex couples to classified themselves as married only from 2012, these specifications have been estimated using the ACS 2012-2016 waves. The usual caveat in this case is that marital status is endogenous, so results in this section are presented as suggested evidence, not causal inference.[17]

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[15] See also Section A.1 in the Online Appendix for the complete timeline of these reforms.

[16] As discussed in Section A.9 in the Online Appendix, there is no evidence of heterogeneity in the effect of SSM marriage between more or less tolerant states.

[17] It is worth emphasizing that the interaction term between marital status and SSM legalization would still be consistently estimated if certain higher-order conditions were met (Bun and Harrison 2018). (Nizalova and Murtazashvili 2016) argued that the

In line with the idea of a widespread impact among gays and lesbians, SSM legalization led to an increase in the probability that both partners were working also among unmarried same-sex couples. In fact, the coefficient associated with the policy indicator is positive in all specification, and statistically significant when focusing on lesbians (Column 2), or all same-sex couples jointly (Column 3). Consistently with the descriptive statistics presented in Section 6.1, the coefficient of marital status is negative and significant (probably due to different fertility rates between married and unmarried couples). However, married individuals benefited even more from the policy change: the interaction term between marital status and SSM legalization is positive and significant. Overall, the positive effect of SSM legalization compensate the negative effect of marital status. One possible explanation for these results is that employers discriminated less all homosexual employers, and that they had a preference for married individuals given a positive signal of reliability and "heteronormative" lifestyle.

7.4 Roommates

An alternative way to test the hypothesis that SSM legalization affected all same-sex couples, not only married ones, is to extend the sample to include also same-sex roommates. Indeed, despite the anonymity guaranteed by the U.S. Census, some individuals may have decided not to truthfully report their sexual orientation. In order to include also these "closeted" couples, Table 9 has a similar structure to Table 1, but estimates the impact of SSM legalization on the probability that both partners are working among same-sex married couples, unmarried couples, and households with two same-sex roommates.

Only couples in which one household member was listed as roommate and had the same sex of the household head have been included among same-sex roommates since in case of multiple roommates it was not possible to infer the identity of the household head's partner. Roommates were not considered when the household had also a spouse or unmarried partner. Moreover, only couples whose household head was aged between 30 and 60 have been considered to reduce the risk of including students cohabitating or old individuals living with non-relatives.

It is quite interesting to note that there are large differences between states when looking at the proportion of opposite-sex and same-sex couples (married, unmarried or roommates). For instance, 98.9% of these couples are opposite-sex in Mississippi. In contrast, male-female couples represent 89% of the couples in DC. Around 1.2% of the couples are female same-sex married or unmarried in Vermont and Massachusetts, and almost 1% are male same-sex married or unmarried in California. Only 0.3% of couples are gay in Alabama. The proportion of same-sex roommates is similar to that of same-sex married/unmarried couples in less tolerant states such as Alabama, Mississippi, Texas and Louisiana, while it is smaller in more LGBT-friendly states such as Massachusetts, Vermont, New York and DC. [18] This result provides evidence that individuals in

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interaction term is consistently estimated also when the endogenous regressor (marital status) and the unobservables are jointly independent from the treatment variable (SSM legalization), but this assumption seems less realistic in this context.

[18] See also Section A.9 in the Online Appendix

same-sex relationships are more likely to report being roommates when they prefer not to report their sexual orientation.

As in Table 8, the estimated coefficients support the hypothesis that the benefits stemming from SSM legalization were not concentrated only among gays and lesbians who decided to get married. The interaction term between the policy variable and the roommate indicator is statistically insignificant, thus suggesting that the impact of SSM legalization was similar among same-sex couples and (potentially closeted) same-sex roommates.

Moreover, the coefficient associated with SSM legalization is positive in all specifications, and statistically significant when looking at lesbian couples in isolation (Column 2), or all same-sex couples jointly (Column 3). The coefficient for gay couples is positive but statistically indistinguishable from zero (Column 1). This may reflect a downward bias due to a higher proportion of male same-sex roommates who are actually heterosexual men living together.

7.5 Evidence from Google Trends

Google searches provide an interesting alternative data source to investigate changes in animosity towards gays. Indeed, Google data are a good proxy for socially sensitive attitudes since searchers are online, alone, and have an incentive not to lie in order to obtain what they are looking for: all these factors make it easier to express opinions on sensible topics such as race, health, or sexual practices (Stephens-Davidowitz 2014). As discussed in (Choi and Varian 2012) and (Dergiades et al. 2015), it is possible to use Google Trends to compute a time series index of the volumes of queries entered by users into Google in each given U.S. state. This search intensity index is based on query shares normalized between from 0 to 100. A query share is the total query volume for a given search term(s) within a particular geographical region divided by the total number of queries in that region during the time period being considered. The maximum query share in the time period considered is set to 100.

It is therefore possible to estimate the following difference-in-difference model:

$$y_{st} = \beta SSM_{st} + \delta_s + \alpha_t + \tau_{ts} + \tau_{ts}^2 + x'_{st}\gamma + \varepsilon_{st}$$

Where y_{st} is the search intensity for a given word in state *s* at time *t*. All the other regressors are defined as in the main sections. However, in this case data are available only at the state level, not the individual level, so the number of observations is substantially reduced and it is not possible to include individual controls as in the previous sections.

The first word used to approximate attitudes towards homosexuals is *Leviticus*. This is a book of the Bible and contains the reference "You shall not lie with a man as with a woman, this is an abomination" which has been often used to justify homophobia among Christians and Jews. As reported in Table 10, SSM legalization led to a statistically significant reduction in search intensity for this term of 2.1 points out of 100 (Column 1). Despite the relatively small sample size, this coefficient remains large, negative and significant also when including the additional policy

indicators reported in Table 7 (Column 2). Since this decline may simply reflect lower media coverage and interest after the passage of the law, Column 3 includes two lagged operators: the decline in Google searches is negative and significant even two years after the legalization of SSM, thus reflecting a long-lasting decline in this kind of derogatory searches. Similar conclusions are obtained when controlling for the overall search intensity on LGBT topics (Column 5), as well as when including state-specific linear time trends (Column 6). The estimates remain negative but become too imprecise only when adding state-specific quadratic time trends (Column 7), arguably because the number of regressors (179) is too close to the number of observations (663).

Section A.10.1 in the Online Appendix emphasizes that searches for the word *Leviticus* did not start to decline before the legalization of SSM. This is consistent with the hypothesis discussed in Section 5.2 that changes in attitudes did not predate legal changes. Similar results are presented in the Online Appendix from the analysis of additional Google trends for both words with a negative connotation (*Sodomy* in Section A.10.2, *Faggot* in Section A.10.3) and a positive one (*Gay pride* in Section A.10.4).

8. Conclusions

This paper exploits variations across U.S. states in the different timing of same-sex marriage reforms to show that this policy was associated with higher employment among same-sex couples. There is no evidence that changes in fertility, intra-household specialization, matching, health insurance coverage and homeownership drove this result. On the other hand, higher productivity due to improved mental health and increases in earnings thanks to a marriage premium may have affected the labor supply of gay men and lesbian women. Most of all, the second part of the empirical analysis focuses on supporting the hypothesis that SSM legalization reduced discrimination towards sexual minorities, thus boosting health, earnings and employment. This result is in line with experimental and observational studies showing that prejudiced attitudes towards LGBT individuals can be effectively and durably reduced ((Broockman and Kalla 2016); (Aksoy et al. 2018)).

From a policy perspective, these results emphasize the overwhelming positive effects of extending civil and human rights to sexual minorities. This paper provides an economic rationale to marriage equality. Analogously to the increases in female labor force participation witnessed in the past decades, legalizing same-sex marriage led to higher integration of same-sex couples in the labor market, thus potentially stimulating economic growth and a more efficient allocation of human capital.

Even if accurate estimates of the LGBT population are difficult to obtain,[19] (Stephens-Davidowitz 2017) combined different online data to argue that 5% of men are gay in the U.S., and a substantial share of them has not come out yet (or it is even married to a female partner). Recent surveys found that 7.5% of Millennials identify themselves as non-heterosexual (Gates 2017). Therefore, LGBT

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[19] See Section A.2.2 in the Online Appendix for an overview of different estimates.

individuals represent a sizable portion of the U.S. population: lower discrimination based on sexual orientation and higher employment among gays and lesbians are likely to have positive macroeconomic effects (and improve matching based on sexual preferences in the marriage market).

Future research should extend this analysis by looking at additional economic outcomes and how these variables have been impacted by same-sex marriage legalization. For instance, due to lack of data and small sample sizes, there is not enough information on how time use differs between same-sex and opposite-sex couples, and whether such time allocation has changed once same-sex couples have been allowed to get married. Furthermore, it would be interesting to understand how same-sex couples specialize and, once they have children, which partner spends more time taking care of them.

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Tables

Table 1: Effect of SSM legalization on probability both partners working.

	Same-sex couples						
	2008-16					2012-16	2014-16
	Male		Female		Male and female		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SSM legal	0.020[*]	0.023[**]	0.018[*]	0.023[**]	0.024[***]	0.044[***]	0.060[***]
	(0.012)	(0.011)	(0.011)	(0.010)	(0.008)	(0.014)	(0.009)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear state trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quadratic state trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State controls	No	Yes	No	Yes	Yes	Yes	Yes
Observations	28,118	28,118	29,796	29,796	57,914	35,991	23,242
Number clusters	51	51	51	51	51	51	51
Average dep var	0.668	0.668	0.660	0.660	0.664	0.662	0.666
Adjusted R^2	0.107	0.108	0.098	0.098	0.102	0.105	0.110

This table analyzes whether same-sex couples were more likely to have both partners working after the legalization of same-sex marriage. Difference-in-difference (DiD) estimates. Standard errors in parenthesis clustered at the state level. Individual and household controls: age, education, ethnicity, race and language of household head and partner. Household controls also include interaction terms between household head's and partner's age, as well as education. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Source: ACS 2008-2016 for Columns 1-5, ACS 2012-2016 for Column 6, ACS 2014-2016 for Column 7.
[*] $p < 0.10$, [**] $p < 0.05$, [***] $p < 0.01$

Table 2: Effect of SSM legalization on employment.

	Male and female same-sex couples				
	(1)	(2)	(3)	(4)	(5)
	HH hours	Both 40h	Both 30h	HH gap	Self Empl
SSM legal	1.294***	0.030***	0.025***	-0.936***	-0.019***
	(0.483)	(0.008)	(0.009)	(0.340)	(0.006)
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Linear state trends	Yes	Yes	Yes	Yes	Yes
Quadratic state trends	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes
Observations	57,815	57,914	57,914	57,815	56,633
Number clusters	51	51	51	51	51
Average dep var	69.40	0.461	0.612	15.40	0.175
Adjusted R^2	0.151	0.078	0.097	0.020	0.035

This table analyzes the effect of legalizing same-sex marriage on the employment of same-sex couples. The dependent variables are: total number of hours worked weekly by the household head and the partner (Column 1), whether both the household head and the partner worked more than 40 hours per week (Column 2), whether both the household head and the partner worked more than 30 hours per week (Column 3), absolute value of the difference in hours worked weekly by the household head and the partner (Column 4), whether the household head and/or the partner were self-employed (Column 5). Male and female same-sex couples have been considered jointly. Difference-in-difference (DiD) estimates. Standard errors in parenthesis clustered at the state level. Individual and household controls: age, education, ethnicity, race and language of household head and partner. Household controls also include interaction terms between household head's and partner's age, as well as education. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Source: ACS 2008-2016.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Effect of SSM legalization on fertility.

	Male same-sex couples				Female same-sex couples			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NChild	Child	NChild	Child	NChild	Child	NChild	Child
SSM legal	0.002	0.002	-0.005	-0.002	-0.011	-0.000	-0.003	0.003
	(0.019)	(0.009)	(0.020)	(0.009)	(0.019)	(0.010)	(0.021)	(0.012)
SSM legal (Lag 1)			-0.021	-0.009			0.021	0.007
			(0.013)	(0.008)			(0.018)	(0.010)
SSM legal (Lag 2)			-0.012	-0.008			0.017	0.007
			(0.015)	(0.008)			(0.020)	(0.012)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear state trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quadratic state trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,047	28,118	28,047	28,118	29,701	29,796	29,701	29,796
Number of clusters	51	51	51	51	51	51	51	51
Average dep var	0.215	0.125	0.215	0.125	0.456	0.281	0.456	0.281
Adjusted R^2	0.053	0.055	0.053	0.055	0.080	0.087	0.080	0.087

This table analyzes the effect of legalizing same-sex marriage on the fertility of same-sex couples. The dependent variables are: number of children in the households (odd-numbered columns), and whether there is a child living in the household (even-numbered columns). Households with more than 4 children (top 1%) have not been considered in Columns 1 and 5. Male and female same-sex couples have been considered separately. Difference-in-difference (DiD estimates). Standard errors in parenthesis clustered at the state level. Individual and household controls: age, education, ethnicity, race and language of household head and partner. Household controls also include interaction terms between household head's and partner's age, as well as education. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Source: ACS 2008-2016.
$^* p < 0.10$, $^{**} p < 0.05$, $^{***} p < 0.01$

Table 4: Effect of SSM legalization on homeownership.

| | Same-sex couples | | | | | |
| | Male | | Female | | All | |
	(1)	(2)	(3)	(4)	(5)	(6)
SSM legal	-0.001	-0.012	0.006	0.003	0.003	-0.004
	(0.009)	(0.010)	(0.010)	(0.011)	(0.006)	(0.007)
SSM legal (Lag 1)		-0.016*		-0.008		-0.012**
		(0.008)		(0.007)		(0.005)
SSM legal (Lag 2)		-0.025***		-0.006		-0.014**
		(0.009)		(0.009)		(0.007)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Linear state trends	Yes	Yes	Yes	Yes	Yes	Yes
Quadratic state trends	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,118	28,118	29,796	29,796	57,914	57,914
Number of clusters	51	51	51	51	51	51
Average dep var	0.713	0.713	0.695	0.695	0.704	0.704
Adjusted R^2	0.222	0.222	0.294	0.294	0.260	0.260

This table analyzes the effect of legalizing same-sex marriage on the homeownership rate of same-sex couples. Difference-in-difference (DiD estimates). Standard errors in parenthesis clustered at the state level. Individual and household controls: age, education, ethnicity, race and language of household head and partner. Household controls also include interaction terms between household head's and partner's age, as well as education. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Source: ACS 2008-2016.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Effect of SSM legalization on matching.

| | Same-sex couples | | | | | |
| | Male | | Female | | All | |
	(1)	(2)	(3)	(4)	(5)	(6)
SSM legal	-0.014	-0.017	-0.007	-0.011	-0.009	-0.013[*]
	(0.010)	(0.011)	(0.010)	(0.014)	(0.006)	(0.007)
SSM legal (Lag 1)		0.008		0.005		0.007
		(0.009)		(0.011)		(0.006)
SSM legal (Lag 2)		-0.012		-0.015		-0.014
		(0.011)		(0.014)		(0.008)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Linear state trends	Yes	Yes	Yes	Yes	Yes	Yes
Quadratic state trends	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,118	28,118	29,796	29,796	57,914	57,914
Number of clusters	51	51	51	51	51	51
Average dep var	0.335	0.335	0.336	0.336	0.335	0.335
Adjusted R^2	0.073	0.073	0.075	0.075	0.072	0.072

This table analyzes the effect of legalizing same-sex marriage on the assortative matching among same-sex couples. Difference-in-difference (DiD estimates). Standard errors in parenthesis clustered at the state level. Individual and household controls: age, ethnicity, race and language of household head and partner. Household controls also include the interaction term between household head's and partner's age. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Source: ACS 2008-2016.
[*] $p < 0.10$, [**] $p < 0.05$, [***] $p < 0.01$

Table 6: Effect of SSM legalization on hourly earnings.

	Same-sex couples		
	(1)	(2)	(3)
	Male	Female	All
SSM legal	0.028**	0.006	0.014
	(0.014)	(0.010)	(0.010)
Year FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Linear state trends	Yes	Yes	Yes
Quadratic state trends	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes
State controls	Yes	Yes	Yes
Observations	40,757	44,983	85,740
Number of clusters	51	51	51
Average dep var	3.16	3.00	3.08
Adjusted R^2	0.267	0.302	0.286

This table analyzes the effect of legalizing same-sex marriage to the earnings (in logs) of same-sex couples. Self-employed individuals excluded when analyzing hourly earnings. Difference-in-difference (DiD estimates). Standard errors in parenthesis clustered at the state level. Individual and household controls: age, education, ethnicity, race and language of household head and partner. Individual controls also include whether the individual was identified as the household head or the partner. Household controls also include interaction terms between household head's and partner's age, as well as education. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Source: ACS 2008-2016.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Effect of same-sex laws on probability both partners working.

	Male and female same-sex couples				
	(1)	(2)	(3)	(4)	(5)
SSM legal	0.024***	0.024***	0.024***	0.025***	0.023***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
SSM ban		-0.068***	-0.071***	-0.064***	-0.087***
		(0.015)	(0.015)	(0.015)	(0.018)
Domestic partnership			0.069***	0.071***	0.073***
			(0.024)	(0.025)	(0.025)
Civil union			0.007	0.011	0.012
			(0.017)	(0.018)	(0.018)
No discrimination				0.186***	0.180***
				(0.057)	(0.059)
No discrimination public employees				0.026	0.035
				(0.022)	(0.022)
Second-parent adoption					0.270***
					(0.094)
No adoption by same-sex couples					-0.063
					(0.043)
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Linear state trends	Yes	Yes	Yes	Yes	Yes
Quadratic state trends	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes	Yes
Observations	57,914	57,914	57,914	57,914	57,914
Number of clusters	51	51	51	51	51
Average dep var	0.664	0.664	0.664	0.664	0.664
Adjusted R^2	0.102	0.102	0.102	0.102	0.102

This table analyzes whether same-sex couples were more likely to have both partners working after the introduction of laws concerning same-sex individuals. Difference-in-difference (DiD estimates). A second-parent adoption is a legal procedure that allows a same-sex parent to adopt his or her partner's biological or adoptive child without terminating the legal rights of the first parent. Standard errors in parenthesis clustered at the state level. Individual and household controls: age, education, ethnicity, race and language of household head and partner. Household controls also include interaction terms between household head's and partner's age, as well as education. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Source: ACS 2008-2016.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Effect of SSM legalization on probability both partners working. Marital status.

	Same-sex married and unmarried couples		
	Male	Female	All
	(1)	(2)	(3)
SSM legal	0.017	0.049**	0.035**
	(0.019)	(0.019)	(0.014)
Married	-0.054***	-0.055***	-0.054***
	(0.014)	(0.014)	(0.009)
SSM legal * Married	0.028*	0.024*	0.024**
	(0.016)	(0.014)	(0.009)
Year FE	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Linear state trends	Yes	Yes	Yes
Quadratic state trends	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes
State controls	Yes	Yes	Yes
Observations	17,558	18,433	35,991
Number of clusters	51	51	51
Average dep var	0.671	0.654	0.662
Adjusted R^2	0.114	0.100	0.107

This table analyzes whether same-sex couples were more likely to have both partners working after the legalization of same-sex marriage. Difference-in-difference (DiD estimates). Standard errors in parenthesis clustered at the state level. Individual and household controls: age, education, ethnicity, race and language of household head and partner. Household controls also include interaction terms between household head's and partner's age, as well as education. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Source: ACS 2012-2016.
$^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 9: Effect of SSM legalization on probability both partners working. Roommates.

	Same-sex couples and roommates			
	Male	Female	All	
	(1)	(2)	(3)	(4)
SSM legal	0.007	0.030***	0.018**	0.024***
	(0.012)	(0.010)	(0.007)	(0.008)
Roommate	-0.030***	-0.023**	-0.021***	
	(0.006)	(0.009)	(0.006)	
SSM legal * Roommate	0.017	0.006	0.013	
	(0.011)	(0.014)	(0.009)	
Year FE	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Linear state trends	Yes	Yes	Yes	Yes
Quadratic state trends	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes
State controls	Yes	Yes	Yes	Yes
Observations	41,389	38,135	79,524	79,524
Number of clusters	51	51	51	51
Average dep var	0.692	0.671	0.682	0.682
Adjusted R^2	0.085	0.087	0.083	0.083

This table analyzes whether same-sex couples were more likely to have both partners working after the legalization of same-sex marriage. The sample includes same-sex married couples, unmarried couples, and roommates aged 30-60. Difference-in-difference (DiD estimates). Standard errors in parenthesis clustered at the state level. Individual and household controls: age, education, ethnicity, race and language of household head and partner/roommate. Household controls also include interaction terms between household head's and partner's (roommate's) age, as well as education. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Source: ACS 2008-2016.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: Effect of SSM legalization on Google searches for *Leviticus*.

	Web search intensity					
	(1)	(2)	(3)	(4)	(5)	(6)
SSM legal	-2.094***	-1.974**	-1.373*	-1.365*	-1.323*	-1.150
	(0.736)	(0.809)	(0.764)	(0.761)	(0.769)	(1.130)
SSM legal (Lag 1)			-1.130	-1.143	-0.636	-0.438
			(0.822)	(0.834)	(0.809)	(0.967)
SSM legal (Lag 2)			-4.010***	-3.974***	-2.483**	-1.827
			(0.898)	(0.907)	(1.074)	(1.199)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Linear state trends	No	No	No	No	Yes	Yes
Quadratic state trends	No	No	No	No	No	Yes
State controls	Yes	Yes	Yes	Yes	Yes	Yes
Policy controls	No	Yes	Yes	Yes	Yes	Yes
LGBT searches	No	No	No	Yes	Yes	Yes
Observations	663	663	663	663	663	663
Number of clusters	51	51	51	51	51	51
Average dep var	20.87	20.87	20.87	20.87	20.87	20.87
Within R^2	0.597	0.606	0.620	0.620	0.729	0.761
Overall R^2	0.081	0.069	0.065	0.060	0.129	0.138

This table analyzes whether search intensities on Google for the word *Leviticus* changed after the legalization of same-sex marriage. Difference-in-difference (DiD estimates). State-level analysis with state fixed effects. Robust standard errors in parenthesis. State controls: unemployment rate, income per capita, racial and age composition, percentage of state population with positive welfare (public assistance) income, and cohabitation rate among opposite-sex couples. Policy controls: constitutional ban on same-sex marriage, legalization domestic partnership and civil union, anti-discrimination laws, legalization or prohibited adoptions by same-sex couples. LGBT searches measures the intensity of Google searches on LGBT topics. Source: ACS and Google Trends 2004-2016.
$^*\ p < 0.10, ^{**}\ p < 0.05, ^{***}\ p < 0.01$